CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

Schedule I
Existing Terminal Holdroom Renovation

Schedule II
Terminal Holdroom Addition

VOLUME 1: Contract Documents and Specification Divisions 00-12

Local Project No. PFC/LOC 19-01

Casper, Wyoming

Sponsored By:
Casper/Natrona County International Airport Board of Trustees

Casper/Natrona County International Airport

JVIATION
900 S. Broadway, Suite 350
Denver, CO 80209

MOA ARCHITECTURE
Main 303.524.3030
Fax 303.524.3031

Issued For Bid
April 9, 2020
SECTION 00 0107
DESIGN PROFESSIONAL SEALS

A. As a matter of consistency, completeness, and convenience, this bound set of Project documents includes designs prepared by Architect in addition to designs prepared by other consultants who have provided services as independent design professionals.

B. For purposes of graphic consistency, uniformity, and ease of reference, Project documents may be presented on plan sheets or in the Project Manual containing Architect's title blocks or page formats. The works of each design discipline are separately identifiable, and each design professional exclusively retains professional responsibility for the designs prepared by that design professional.

1.02 CERTIFICATIONS

A. Each of the design firms listed below certify that they have prepared or directly supervised the preparation of their respective Drawings and Specifications, and that each is currently and legally licensed as an Architect or Engineer in Wyoming.

B. Each of the design firms below is responsible only for the content of the Drawings and Specifications which were prepared by each design firm, as briefly described below each seal, and does not accept responsibility for the content of any Drawings or Specifications which were not prepared by each design firm.

Name: Andrew J. Remsmai
Firm: Aviation, Inc.
Design Responsibility: Site Layout

Name: Chad Lockard Jr.
Firm: MOA ARCHITECTURE
Design Responsibility: Architecture

Name: Robert Bennett
Firm: CEPI
Design Responsibility: Civil Engineering

Name: David Lockard
Firm: KL&A
Design Responsibility: Structural Engineering
Name: 
Firm: Engineering Design Associates
Design Responsibility: Mechanical Engineering

Name: 
Firm: Engineering Design Associates
Design Responsibility: Electrical Engineering
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INVITATION FOR BIDS

Casper/Natrona County International Airport
Casper, Wyoming
Project No. PFC/LOC 19-01

Sealed bids, subject to the conditions contained herein, for improvements to the Casper/Natrona County International Airport, Casper, Wyoming, Project No. PFC/LOC 19-01 will be received by the Casper/Natrona County International Airport, Airport Director's Office Suite 208, Casper, Wyoming, 82604, until Wednesday, 6/24/2020, at 10:00 A.M., and then publicly opened and read aloud.

The work involved will include the following:

Base Bid:
Schedule I: Existing Terminal Building Holdroom Renovation
Schedule II: New Terminal Holdroom Addition

Bid Alternates:
Bid Alt 1: Exterior Egress Stairs
Bid Alt 2: 2nd Floor Fire Sprinklers
Bid Alt 3: Bar Equipment
Bid Alt 4: Courtyard Improvements
Bid Alternate 5: Add Fire Suppression System to Remaining Area of Terminal
Bid Alternate 6: Sliding Doors

Construction for this project is expected to take 360 calendar day(s).

Contract Documents. The complete set of Specifications and Contract Documents can be downloaded from Jviation, Inc.'s bid site (http://bid.jviation.com), beginning on 4/9/2020. In order to submit a responsive bid as a Prime Contractor and to receive all necessary addendum(s) for this project, you must be on the Planholder's List. To view all planholder documents (contract documents, plans and addendums) you must fill out the online form located at (http://www.jviation.com/bidrequest). By filling out and submitting this form, you agree to be publicly listed on the bid site with your contact information as a planholder for all projects requested. It is the planholder's responsibility to review the site for addendums and changes before submitting their proposal. For additional information, please contact us via email at bidinfo@jviation.com.

*Note that contractors will NOT be automatically added to new projects. You will need to re-submit the online form for access to new projects. Once granted access, additional projects will use your same login credentials. Note: Plan ahead when submitting the online request form and allow up to 2 business days for approval and access to projects.

Pre-Bid Conference. Due to COVID-19 the pre-bid conference for this project will be held on 4/23/2020 at 10:00 A.M., via Conference Call (Specific Call In information to be sent to the Plan Holders). All bidders are required to examine the site to become familiar with all site conditions. Site visits may to be coordinated with the Airport staff by calling Aaron Buck at (307) 472-6688 ext. 82.

Bid Conditions. The bidder is required to provide all information as required within the Contract Documents. The bidder is required to bid on all items of every schedule or as otherwise detailed in the Instructions to Bidders.
Bids may be held by Casper/Natrona County International Airport Board of Trustees for a period not to exceed 45 calendar days from the date of the bid opening for the purpose of evaluating bids prior to award of contract.

The right is reserved, as Casper/Natrona County International Airport Board of Trustees may require, to reject any and all bids and to waive any informality in the bids received.

All questions regarding the bid are to be directed to Andy Remstad, AIA with Jviation, Inc., 900 South Broadway, Suite 350, Denver, Colorado 80209, (303) 524-3030, Fax: (303) 524-3031, or email andy.remstad@jviation.com.

**Bid Bond.** Guarantee will be required with each bid as a certified check on a solvent bank or a Bid Bond in the amount of five (5) % of the total amount of the bid, made payable to the Casper/Natrona County International Airport Board of Trustees.

**Performance & Payment Bond.** The successful bidder will be required to furnish separate performance and payment bonds each in an amount equal to 100% of the contract price.


**Title VI Solicitation Notice:** The Casper/Natrona County International Airport Board of Trustees, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

**Wyoming Preference:** Preference will be given to materials, supplies, equipment, machinery and provisions produced, manufactured, supplied or grown in Wyoming, quality being equal to articles offered by the competitors outside of the state. When applicable, a percentile preferential will be accomplished or allowed in the following manner. Preference will be given to Wyoming bidders. The contract shall be let to the responsible resident making the lowest proposal, if such resident’s proposal is not more than 5% higher than that of the lowest responsible non-resident bidder.

A successful resident bidder (resident as defined by Wyoming Statute) shall not subcontract more than thirty percent (30%) of the work covered by his contract to nonresident contractors.

Casper/Natrona County International Airport Board of Trustees
Casper, Wyoming
INSTRUCTIONS TO BIDDERS

Hereinafter in these Contract Documents including these Instructions to Bidders, Sponsor/Owner refers to Casper/Natrona County International Airport Board of Trustees and Engineer refers to Jviation, Inc., 900 S. Broadway, Suite 350, Denver, Colorado, 80209.

1. Submission of Bids

   a. Division 2 of the Contract Documents shall be completed and submitted in its entirety, in order for the bid to be considered responsive.

   b. Qualifications shall be furnished as described in Division 4, Section 20, with the bid proposal.

   c. Bids are to be submitted in a sealed envelope to Casper/Natrona County International Airport, Suite 208, 8500 Airport Parkway, Casper, WY 82604, Casper, Wyoming, 82604.

   d. Date/Time: Bids shall be received on or before: Wednesday, 6/24/2020, at 10:00 A.M., Airport Board Room.

   e. Bidding Documents: Bidding documents must be downloaded from Jviation, Inc.’s bid site (http://bid.jviation.com). Note: Plan ahead when submitting the online request form and allow up to 2 business days for approval and access to projects.

   f. Bid Bond is required if total bid exceeds $20,000.00.

2. Pre-Bid Conference

   A Conference Call pre-bid is scheduled for Thursday, 4/23/2020, at 10:00 A.M.. Call In information will be set to the plan holders prior to the meeting.

3. Late Bids/Late Modifications of Bids

   a. Bids received in the office designated under Item 1 above, after the exact time set for opening are considered "late bids", and may not be accepted by the Bid Opening Official. Bidders are solely responsible for insuring their bids arrive on time and to the place of bids specified in the Invitation For Bid.

   b. The Owner will not consider a late bid or late modification of bid unless received prior to contract award and -

      (1) There is conclusive evidence that the bid was submitted to the office designated in Item 1 above, on time and was mishandled by the Casper/Natrona County International Airport (i.e., lost or misplaced) staff responsible for handling/receiving bids. Mishandling by other units or offices at the Casper/Natrona County International Airport does not constitute airport staff.

      (2) Or - it was the only bid received.
4. Mistakes in Bids - Confirmation of Bid

When it appears from a review of the bid that a mistake has been made, the bidder may be requested to confirm their bid. Situations in which the confirmation may be requested include obvious, apparent errors on the face of the bid or a bid unreasonably lower than the other bids submitted. All mistakes in bids will be handled in accordance with the Casper/Natrona County International Airport Board of Trustees/Casper/Natrona County International Airport policy.

5. Minor Informalities/Irregularities in Bids

a. A minor informality or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is considered immaterial when the effect on price, quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the services being acquired.

b. If the Owner determines that the bid submitted contains a minor informality or irregularity, then the Director shall give the bidder an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid, or waive the deficiency, whichever is to the advantage of the Owner. In no event will the bidder be allowed to change the bid amount. Examples of minor informalities or irregularities include but are not limited to the following:

(1) Bidder fails to sign the Bid, but only if the unsigned bid is accompanied by other material evidence, which indicates the bidder's intention to be bound by the unsigned bid. (Such as Bid Bond, or signed cover letter which references the bid and amount of bid).

(2) Bidder fails to acknowledge an Addendum - this may be considered a minor informality only if the Addendum, which was not acknowledged, involves only a matter of form or has either no effect or merely a negligible effect on price, quantity, quality, or delivery of the item or services bid upon.

6. Rejection of Bids

Any bid that fails to conform to the essential requirements of the invitation for bids will be rejected.

a. Any bid that does not conform to the applicable specifications shall be rejected unless the invitation authorizes the submission of alternate bids and the items or services offered as alternates meet the requirements specified in the invitation for bids.

b. A bid shall be rejected when the bidder imposes conditions that would modify requirements of the invitation or limit the bidder's liability to the Owner, since to allow the bidder to impose such conditions would be prejudicial to other bidders. For example, bids shall be rejected in which the bidder:

(1) Protects against future changes in conditions, such as increased costs, if total possible costs to the Owner cannot be determined.
(2) Fails to state a price and indicates that price shall be "price in effect at time of delivery".
(3) States a price but qualifies it as being subject to "price in effect at time of delivery".
(4) Takes exceptions to the invitation for bids terms and conditions.
(5) Inserts the bidder's terms and conditions.
(6) Limits the rights of the Owner under any contract/invitation for bid clause.

7. Estimated Quantities

The quantities listed for each of the items in the bid schedule are only estimated quantities. Contractors are required to bid a firm unit cost for each item specified. The actual quantities ordered may fluctuate up or down. The unit prices proposed by each bidder will remain firm and will not be re-negotiated if the estimated quantities are not met or are exceeded. For bidding purposes, if there is a conflict between the extended total of an item and the Unit Price, the Unit Price shall prevail and be considered as the amount of the bid.

8. Number of Copies

Bidder shall submit in its sealed and marked envelope, one (1) copy of its bid, signed in ink, and, if applicable, one (1) original copy of the Bid Bond as defined under Items 1.f. and 10.

9. Identification of Bid

Bids must be returned in a sealed envelope and addressed to the Casper/Natrona County International Airport, Suite 208, 8500 Airport Parkway, Casper, WY 82604, Casper, Wyoming, 82604 and marked as follows:

Bid of _________________________________________

(Name of Contractor)

for improvements to the Casper/Natrona County International Airport, Casper, Wyoming, Project No. PFC/LOC 19-01. To be opened Wednesday, 6/24/2020, at 10:00 A.M., local time in the Airport Board Room.

Any offer that is submitted without being properly marked may be opened for identification prior to the deadline for receipt of offers and then ressealed.

10. Bid Bond Requirements

A Bid Bond is required in the amount of five (5) % of the amount bid when (1) the total amount of your accumulative bid is more than $20,000 or (2) is required elsewhere in this solicitation. This Bid Bond must meet the conditions specified under Item 19 Bond Requirements and shall be submitted using the form in Division 2 of this solicitation.
11. Preparation of Bid Offer

a. Bidders are expected to examine the drawings, specifications, bid documents, proposed contract forms, terms and conditions, and all other instructions and solicitation documents. Bidders are expected to visit the job-site to determine all requirements and conditions that will affect the work. Failure to do so will not relieve a bidder from responsibility to know what is contained in this invitation for bid, or site conditions affecting the work.

b. The bidder certifies that it has checked all of its figures, and understands that the Owner will not be responsible for any errors or omissions on the part of the bidders in preparing its bid.

c. All items, (unless the invitation specifically states otherwise) including any additive or deductive alternates on the bid schedule, must be completely filled out or the bid will be determined non-responsive and ineligible for consideration for award.

d. The bidder declares that the person or persons signing this bid is/are authorized to sign on behalf of the firm listed and to fully bind the bidder to all the requirements of the solicitation.

e. The bidder certifies that no person or firm other than the bidder or as otherwise indicated has any interest whatsoever in this bid/offer or the contract that may be entered into as a result of this bid/offer and that in all respects the offer is legal and firm, submitted in good faith without collusion or fraud.

f. By submitting a bid, the bidder certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this bid.

g. If there is a discrepancy between the unit price and the total price, the unit price shall be used to determine the applicable total.

12. Basis of Award

The Owner intends to award a contract resulting from this solicitation to the lowest, responsive, responsible bidder, whose offer, conforming to the solicitation, will be most advantageous to, and in the best interest of, the Owner, cost or price and other factors considered.

a. In addition to other factors, bid offers will be evaluated on the basis of advantages and disadvantages to the Owner that might result from offers received.

b. The Owner reserves the right to reject any or all proposals and to waive informalities and/or irregularities in the bid offer.

c. Total bid will be evaluated and awarded as follows: It is the Owner’s intent to award this bid based on the TOTAL BASE BID FOR ALL AWARDED SCHEDULES, split awards will not be made.

d. The Owner will determine which Schedules and/or Bid Alternates will be awarded based on the received total bid amount for the schedules and/or Bid Alternates (based on unit
prices and estimated quantities) and available funding. The project award will be based on the low bid sum of the Schedules and Bid Alternates awarded by the Owner. Not all Schedules and/or Bid Alternates may be awarded. A combination of Schedules and Bid Alternates may be awarded, including only a single Schedule. The numbering of the Schedules or Bid Alternates does not necessarily indicate the order of award. The project award is contingent on the availability of funding.

13. Period of Acceptance

The bidder agrees that its bid offer shall remain open for acceptance by the Owner for a period of 45 calendar days from and including the date specified in the solicitation for receipt of bids.

14. Contract Award

The signature of the bidder indicates that within thirty (30) calendar days from acceptance of its bid offer it will execute a contract with the Owner and furnish a project specific Certificate of Insurance, furnish Performance and Payment Bonds and any other documents required by the Contract Documents.

15. Notice to Proceed

Work may not start under any awarded contract until a written Notice to Proceed is issued by the Owner. The Owner may issue the Notice to Proceed any time after the contract is signed and, if required, insurance and bonds have been provided in accordance with Item 19 below.

Although the acceptance period allows for the project to be awarded within 45 calendar days from the date specified in the solicitation for receipt of bids, construction for this project is expected to take place during the Summer / Fall 2020.

16. Amendments to the Solicitation

a. If this solicitation is amended, then all specifications, terms and conditions, which are not amended, remain unchanged.

b. Bidders shall acknowledge receipt of any addendum to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid offer, or (3) by letter or facsimile.

c. Acknowledged addendums must be received prior to bid opening. Bidders are encouraged to include signed addenda or initialed acknowledgement with returned bids.

17. Explanations to Prospective Bidders

Any prospective bidder desiring an explanation or interpretation of the solicitation documents, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the time for submission of bids. Oral explanations or instructions given before the opening of bids will not be binding. Any information provided to a prospective bidder during the bid preparation stage will be promptly furnished to all other prospective bidders as an addendum to the solicitation if that information is necessary in submitting bid offers or if the lack of it would be prejudicial to other prospective bidders.
18. Questions and Other Requests for Information

For all questions or requests, please direct to:

Jviation, Inc.
900 S. Broadway, Suite 350
Denver, Colorado 80209
Phone: 303-524-3030
Fax: 303-524-3031

Attention: Andy Remstad, AIA (andy.remstad@jviation.com)

19. Bond Requirements

a. Bid (offer) Bond

(1) The bidder is required to furnish a Bid Bond in the form of certified check, cashier's check, irrevocable letter of credit, or surety Bid Bond acceptable to the Contracting Officer in the sum equal to at least 5% of the total amount of the Proposal payable without condition to Casper/Natrona County International Airport Board of Trustees, if: (1) the total amount of your accumulative bid is more than $20,000 or (2) is required elsewhere in this solicitation.

(2) The Bid Bond shall guarantee that the bid will not be withdrawn or modified after the time set for the receipt of bid offers, and if accepted, that the person, firm or corporation submitting same shall within thirty (30) calendar days after being notified of the acceptance of its bid offer, enter into a contract and shall, within said time, furnish the required bonds and all insurance certificates called for under this invitation for bid.

(3) The Bid Bonds of all bidders, except for the two lowest bidders, will be returned to the respective bidders only in the event a self-addressed, stamped envelope is provided along with a written request from the contractor that their Bid Bond be return. However, if a certified check or a cashier's check is submitted in lieu of the Bid Bond, it will be returned as soon as possible after the lowest responsive and responsible bidder is determined and a contract is executed.

(4) In the event the bidder whose bid offer is accepted fails to enter into the contract and/or furnish the proper bonds, its certified check, cashier's check, irrevocable letter of credit, or surety Bid Bond will be forfeited in full to the Owner.

b. Performance, Labor and Materials Payment, and Maintenance Bonds

Bonds shall:

(1) Be for the full amount of the contract price;

(2) Guarantee the Contractor's faithful performance of the work under this contract, and the prompt and full payment for all labor and materials involved therein;
(3) Guarantee protection to the Owner against liens of any kind;

(4) Be, when a surety bond is furnished, from a surety company operating lawfully in the State of Wyoming and shall be accompanied with an acceptable "Power-of-Attorney" form attached to each bond copy.

(5) Be issued from a surety company that is acceptable to the Owner; and

(6) Be submitted using the forms in Division 3 of this solicitation.

20. Specifications and Drawings

Upon award of the contract, the Owner will be responsible for furnishing the selected contractor a minimum of five (5) sets of both the specifications and drawings. The Contractor will be required to purchase additional half size sets for $50.00 as desired.

21. Type of Contract

It is the intent of this Invitation for Bids to award a firm fixed unit price contract based on the unit prices and estimated quantities offered by the lowest responsive and responsible bidder. Contract unit prices shall remain firm and fixed throughout the contract performance period. Actual quantities used in the work will be used to determine contractor payments and final project cost.

22. Bid Results

Once the Sponsor has had the opportunity to thoroughly evaluate the bids, the Bid Tabulation Summary will be posted on our website: bid.jviation.com.

Bid result tabulations will also be emailed upon request. To request a fax or email of the bid tabulation, call (303) 524-3030.

23. Terms, Conditions and Special Provisions

Bidders are advised to pay special attention to the General and Special Provisions of the Contract Documents. These sections may contain requirements that will have an impact on all potential bidders, such as Federal Provisions, Liquidated Damages, Indemnification, type of contract, and delivery schedule.

The Contractor shall submit a Phasing and Work Plan identifying their proposed approach to perform this work in an operational airport terminal building.
TO: Casper/Natrona County International Airport
Casper, Wyoming

1. The undersigned hereby certifies that they have examined the form of contract, plans and specifications and other associated Contract Documents for the improvement of Casper/Natrona County International Airport, Project No. PFC/LOC 19-01. The undersigned further certifies that he/she has examined the site of the work, has determined for himself/herself the conditions affecting the work and subject to acceptance of the proposal, agrees to provide at his or her expense, all labor, insurance, superintendence, machinery, plant, equipment, tools, apparatus, appliances, and means of construction, and all materials and supplies complete the entire work, including work incidental thereto, in conformance with the plans, specifications, and associated Contract Documents.


3. The undersigned, in compliance with your Invitation for Bids dated 6/24/2020, hereby proposes to do the work called for in said contract and specifications and shown on said plans and to furnish all materials, tools, labor, and all appliances and appurtenances necessary for the said work at the following unit rates and prices:

TOTAL BID (Base Bid based on unit prices and estimated quantities) __________________

TOTAL BID IN WORDS _____________________________________________________________

4. The undersigned understands that the above quantities of work to be done are approximate only and are intended principally to serve as a guide in evaluating the bids. Final project payments will be made on actual quantities and unit prices.

5. It is understood that the schedule of minimum wage rates, as established by the Secretary of Labor and included in the Specifications, are to govern on this project, and the undersigned certifies that he/she has examined this schedule of wage rates and that the prices bid are based on such established wage rates.

6. The undersigned agree upon written notice of the acceptance of this bid, that within thirty (30) days after the award, that he/she will execute the contract in accordance with the bid as accepted and give contract (Performance and Payment) bonds on attached forms.

7. The undersigned further agrees that if awarded the contract, he/she will commence the work within ten (10) calendar days after the receipt of a Notice to Proceed and that he/she will complete the work within 360 calendar day(s). An extension of time may be allowed when extra or additional work is ordered by the engineer. Liquidated damages in the amount of
$1,500.00/calendar day(s) shall be paid to the Airport for that time which exceeds the number of calendar day(s) allowed in this paragraph. In addition, up to $2,340.00/calendar day(s) for the construction manager plus up to $1,680.00/calendar day(s) for each additional engineer plus any incurred expenses (per diem, lodging, etc.) will be charged to the Contractor for that time which exceeds the number of calendar day(s) allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08.

FAILURE TO COMPLETE ON TIME.

8. As an evidence of good faith in submitting this proposal, the undersigned encloses a certified check or Bid Bond in the amount of ______________________dollars ($______________) which, in case the undersigned refuses or fails to accept an award and to enter into a contract and file the required bonds within the prescribed time, shall be forfeited to the Casper/Natrona County International Airport, Casper, Wyoming, as liquidated damages.

9. By entering into this contract, the Contractor certifies that neither it (nor he/she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

10. The undersigned hereby declares that the only parties interested in this proposal are named herein, that this proposal is made without collusion with any other person, or corporation. That no member of the council, officer or agent of Casper/Natrona County International Airport Board of Trustees, is directly or indirectly financially interested in this bid.

11. The undersigned acknowledges receipt of the following Addendums:

Addendum No. _____________ Date Received ____________
Addendum No. _____________ Date Received ____________
Addendum No. _____________ Date Received ____________
Addendum No. _____________ Date Received ____________
Addendum No. _____________ Date Received ____________

SIGNATURE OF BIDDER:

By _________________________________________
Name and Title of Authorized Agent

_________________________________________
Name of Company

_________________________________________
Address of Company
BID BOND

KNOW ALL MEN BY THESE PRESENTS, that ______________ _______________________
_________________________________________ as Principal, hereinafter called Contractor, and
___________________________________, licensed to do business as such in the State of
Wyoming, as Surety, hereby bind themselves and their respective heirs, executors, administrators,
successors, and assigns, unto Casper/Natrona County International Airport Board of Trustees,
Wyoming, as Obligee, in the penal sum of __________ ___________________ Dollars
($____________________) for the payment whereof Contractor and Surety bind themselves, their
heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS,

The Contractor has submitted to the Obligee, a contract bid dated the ______________ day of
_________________________ for the following contract:

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor
bid is accepted by the Obligee and the Contractor is awarded the contract in whole or in part, the
Contractor shall enter into the Contract with the Obligee in accordance with the terms of such bid,
give such Payment and Performance Bonds as may be specified in the Contract Documents with good
and sufficient surety for the faithful performance of such Contract and for the prompt payment of
labor and materials furnished in the prosecution thereof, or in the event of failure of the Contractor
to enter such Contract and give such bond or bonds, if the Contractor shall promptly pay the Obligee
the amount of this bond as set forth herein above, then the obligation shall be null and void, otherwise
this obligation will remain in full force and effect.

IN WITNESS WHEREOF, the above parties have executed this instrument, the ___________ day
of ___________________, 20__.

SIGNATURE OF PRINCIPAL (as applicable)

A. Individual, partnership or joint venture

(Signature of sole proprietor or general partner)

B. Corporation

Name of Corporate Principal

Attest: ____________________________ By  __________ __________________________

Secretary (affix seal)
SIGNATURE OF SURETY

Name and address of Corporate Surety

_______________________________________

_______________________________________

By _______________________________ (seal)

Attorney in Fact (attach power of attorney)

ACCEPTANCE BY

The foregoing bond is approved.

Date ______________________ By _______________________________

The foregoing bond is in due form according to law and is approved.

Date ______________________ By _______________________________
CONTRACTOR INFORMATION

1. Name of Bidder/Contractor: __________________________________________________

2. Type of Business Entity: _________________________ ____________________________
   NOTE: If bidder is **partnership** or **joint venture**, give full names of all partners or joint
   ventures. Bid must be signed by all Joint Ventures. If bidder is a **limited liability company**, bid
   must be signed by an authorized manager (may be signed by member-manager if LLC is
   organized to allow management by members).

3. Address of Contractor: ________________________________________________________

4. Telephone: _____________________ Fax: ____________________________
   E-mail: ___________________________________________________________________

5. Established where and when: _________________________________________________

6. Contractor’s Banking Information: _____________________________________________

7. Principal Officers of Contractor (managers and members if LLC):
   Name: ___________________________ Name: ___________________________
   Title: ___________________________ Title: ___________________________

   Name: ___________________________ Name: ___________________________
   Title: ___________________________ Title: ___________________________

   Name: ___________________________ Name: ___________________________
   Title: ___________________________ Title: ___________________________
8. Bidder’s/Contractor’s state of incorporation (state of organization if an LLC or Partnership):

________________________________________________________________________

9. Bidder’s Surety:  

________________________________________________________________________

10. Surety’s State of Incorporation:  

________________________________________________________________________

11. Name and Address of person to receive payment  

________________________________________________________________________

12. If the Bidder/Contractor is a Joint Venture, it shall attach a certified copy of the Joint Venture Agreement. The Joint Venture Agreement will not be included as part of the Contract Documents.

13. The Bidder/Contractor shall identify all applicable labor agreements (if any) to be used in the performance of the work:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The bidder shall provide information on all subcontractors/material suppliers bidding or quoting on subcontracts for this project.

<table>
<thead>
<tr>
<th>Name of Firm</th>
<th>Address</th>
<th>Type of Work to be Performed on Contract</th>
<th>Licensed in Yes</th>
<th>No</th>
<th>State</th>
<th>Contractors License # Class</th>
<th>Certified DBE Yes</th>
<th>No</th>
<th>Certification Number</th>
<th>Bid Amount</th>
<th>Date Firm Established</th>
<th>*GRS</th>
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<tbody>
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*GRS - Annual Gross Receipts

Enter 1 for less than $1 million
Enter 2 for more than $1 million but less than $5 million
Enter 3 for more than $5 million but less than $10 million
Enter 4 for more than $10 million but less than $15 million
Enter 5 for more than $15 million
CONTRACTOR'S STATEMENT OF QUALIFICATIONS

Qualifications shall be furnished as described in Division 4, Section 20, with the bid proposal.
## BID PROPOSAL SUMMARY

<table>
<thead>
<tr>
<th>Bidder Name:</th>
<th></th>
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<tbody>
<tr>
<td>SCHEDULE I - Existing Terminal Holdroom Renovation</td>
<td></td>
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<tr>
<td>SCHEDULE II - Terminal Holdroom Addition</td>
<td></td>
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<tr>
<td>BID ALTERNATE 1 - Exterior Egress Stairs</td>
<td></td>
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<tr>
<td>BID ALTERNATE 2 - 2nd Floor Fire Sprinklers</td>
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<td>BID ALTERNATE 3 - Bar Equipment</td>
<td></td>
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<tr>
<td>BID ALTERNATE 4 - Courtyard Improvements</td>
<td></td>
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<tr>
<td>BID ALTERNATE 5 - Add Fire Suppression System to Remaining Area of Terminal</td>
<td></td>
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<tr>
<td>BID ALTERNATE 6 - Sliding Doors</td>
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<tr>
<td><strong>TOTAL ALL SCHEDULES</strong></td>
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</tbody>
</table>

Issued for Bid
April 9, 2020
Jviation, Inc.
CPR-Holdroom
CONTRACT AGREEMENT

Casper/Natrona County International Airport
Casper, Wyoming
PROJECT NO. PFC/LOC 19-01

THIS AGREEMENT, made and entered into this ________ day of _______________________,
20_____, by and between Casper/Natrona County International Airport Board of Trustees, Party of the
First Part, hereinafter referred to as the “Owner”, and _______________________________________, Party of the Second Part, hereinafter referred to as the “Contractor,” for the construction of airport improvement including _______________________
________________________________________________________ and other incidental work at the Casper/Natrona County International Airport.

WITNESSETH:

ARTICLE 1. It is hereby mutually agreed that for and in consideration of the payments as provided for herein to the Contractor by the Owner, the said Contractor shall furnish all labor, equipment, and material and shall perform all work necessary to complete the improvements in a good and substantial manner, ready for use, and in strict accordance with this Contract, a copy of which is filed pursuant to law in the office of the legal representative of the Owner.

ARTICLE 2. It is hereby further agreed that in consideration of the faithful performance of the work by the Contractor, the Owner shall pay the Contractor the compensation due him/her by reason of said faithful performance of the work, at stated intervals and in the amount certified by the Engineer, in accordance with the provisions of this Contract.

ARTICLE 3. It is hereby further agreed that, at the completion of the work and its acceptance by the Owner, all sums due the Contractor by reason of his faithful performance of the work, taking into consideration additions to or deductions from the Contract price by reason of alterations or modifications of the original Contract or by reason of “Extra Work” authorized under this Contract, will be paid the Contractor by the Owner after said completion and acceptance.

ARTICLE 4. It is hereby further agreed that any references herein to the “Contract” shall include “Contract Documents” as the same as defined in Paragraph 10-16, Section 10 of the General Provisions and consisting of the Invitation for Bid, Instruction to Bidders, all issued Addenda, Proposal, Statement of Qualifications, Anticipated Sub-Contracts, Form of Proposal Guaranty, Notice of Award, Contract Agreement, Performance & Payment Bonds, Notice to Proceed, Notice of Contractor’s Settlement, Wage Rates, General Provisions, Special Provisions, Plans, Technical Specifications, attached appendices and all documents incorporated by reference. Said “Contract Documents” are made a part of the Contract as if set out at length herein. Said Contract Agreement is limited to the items in the proposal as signed by the “Contractor” and included in the “Contract Documents.”

ARTICLE 5. The Contractor agrees to perform all the work described in the Contract Documents for the unit prices and lump sums as submitted in the Bid, taking into consideration additions to or deductions from the Total Bid by reason of actual quantities measured, alterations or modifications of
the original estimated quantities or by reason of “Extra Work” authorized under this Agreement in accordance with the provisions of the Contract Documents.

**ARTICLE 6.** The Contractor agrees to commence work within ten (10) calendar days after the receipt of a Notice to Proceed and the Contractor further agrees to complete said work within 360 calendar day(s). Extensions of the Contract time may only be permitted execution of a formal modification to Contract Agreement as approved by the Owner. Liquidated damages in the amount of $1,500.00/calendar day(s) shall be paid to the Airport for that time which exceeds the number of Calendar days allowed in this paragraph. In addition, up to $2,340.00/calendar day(s) for the construction manager plus up to $1,680.00/calendar day(s) for each additional resident engineer plus any incurred expenses (per diem, lodging, etc.) will be charged to the Contractor for that time which exceeds the number of Calendar days allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08 FAILURE TO COMPLETE ON TIME.

**ARTICLE 7.** The amount of money appropriated will be equal to or in excess of the contract amount as forth in the notice(s) to proceed. Change orders requiring additional compensable work to be performed, which cause the aggregate amount payable under the contract to exceed the amount appropriated for the original contract, are prohibited unless the contractor is given written assurance by owner that lawful appropriations to cover costs of the additional work have been made or unless such work is covered under a remedy granting provision of the contract. Notwithstanding anything to the contrary in the Contract Documents the Contractor hereby acknowledges and agrees that Owner’s performance under the contract is subject to availability of funds.

### The total estimated cost for project #PFC/LOC 19-01 thereof to be $(__________).

IN WITNESS WHEREOF, the Party of the First Part and the Party of the Second Part, respectively, have caused this Agreement to be duly executed in day and year first herein written in five (5) copies, all of which to all intents and purposed shall be considered as the original.

CONTRACTOR, Party of the Second Part

______________________________

By: __________________________

(Office or Position of Signer)

(SEAL)

ATTEST: _______________________

______________________________

(Office or Position of Signer)

OWNER, Party of the First Part

______________________________

By: __________________________

(Office or Position of Signer)

(SEAL)

ATTEST: _______________________

______________________________

(Office or Position of Signer)
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That ________________________________, as Principal, hereinafter called Contractor, and ________________________________, as Surety, licensed to do business as such in the State of Wyoming, hereby bind themselves and their respective heirs, executors, administrators, successors, and assigns, unto Casper/Natrona County International Airport Board of Trustees, Casper, Wyoming, as Obligee, and hereinafter called Owner, in the penal sum of ________________________________ Dollars ($______________________) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement, entered into a contract with Casper/Natrona County International Airport Board of Trustees for Terminal Building - Holdroom Addition / Renovation, which contract, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if in connection with the Contract including all duly authorized modifications thereto, prompt payment shall be made to all laborers, subcontractors, teamsters, truck drivers, owners or other suppliers of equipment employed on the job, and other claimants, for all labor performed in such work whether done for the prime contractor, a subcontractor, the Surety, a completion contractor or otherwise (at the full wage rates required by any law of the United States or of the State of Wyoming, where applicable), for services furnished and consumed, for repairs on machinery, for equipment, tools, lubricants, oil, gasoline, water, gas, power, light, heat, oil, telephone service, grain, hay, feed, coal, coke, groceries and foodstuffs, either consumed, rented, used or reasonably required for use in connection with the construction of the work or in the performance of the Contract and all insurance premiums, both for compensation and for all other kinds of insurance on the work, for sales taxes and for royalties in connection with, or incidental to, the completion of the Contract, in all instances whether the claim be directly against the Contractor, against the Surety or its completion contractor, through a subcontractor or otherwise, and, further, if the Contractor shall defend, indemnify and hold Casper/Natrona County International Airport Board of Trustees harmless from all such claims, demands or suits by any such person or entity, then this obligation shall be void; otherwise it shall remain in full force and effect.

Any conditions legally required to be included in a payment bond on this contract, including but not limited to those set out in the applicable Wyoming state section of the Owner Charter, are included herein by reference.

The Surety agrees that, in the event that the Contractor fails to make payment of the obligations covered by this bond, it will do so and, further, that within forty-five (45) days of receiving, at the address given below, a claim here under stating the amount claimed and the basis for the claim in reasonable detail, it (a) will send an answer to the claimant, with a copy to the Owner, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed and (b) will pay any amounts that are undisputed. The amount of this bond shall be reduced by and to the extent of any payment of payments made in good faith here under.
While this bond is in force, it may be sued on at the instance of any party to whom any such payment is due, in the name of the Owner, to the use of such party. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

WAIVER. The said Surety, for value received, hereby expressly agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, shall in any wise affect the obligations of this bond, and it does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the contract or the work to be performed thereunder.

No suit shall be commenced or pursued hereunder other than in a state court of competent jurisdiction in Natrona, Wyoming, or in the United States District Court for the District of Wyoming.

IN WITNESS WHEREOF, the above parties have executed this instrument the __________ day of ________________________, 20__. 

SIGNATURE OF PRINCIPAL (as applicable)

A. Individual, partnership or joint venture

______________________________
(Signature of sole proprietor or general partner)

B. Corporation

______________________________
Name of Corporate Principal

Attest: __________________________
Secretary (affix seal)

By ____________________________

SIGNATURE OF SURETY

Name and address of Corporate Surety

______________________________

By ____________________________ (seal)

Attorney in Fact (attach power of attorney)

ACCEPTANCE BY

The foregoing bond is approved.

Date __________________________

By ____________________________

The foregoing bond is in due form according to law and is approved.

Date __________________________

By ____________________________
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That _________________________ as Principal, hereinafter called Contractor, and _________________________ as Surety, licensed to do business as such in the State of Wyoming, hereby bind themselves and their respective heirs, executors, administrators, successors, and assigns, unto Casper/Natrona County International Airport Board of Trustees, Casper, Wyoming, as Obligee, hereinafter called Owner, in the penal sum of _________________________ Dollars ($____________________) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS,

Contractor has by written agreement, entered into a contract with Casper/Natrona County International Airport Board of Trustees for Terminal Building - Holdroom Addition / Renovation, which contract, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform said Contract including all duly authorized changes thereto, according to all the terms thereof, including those under which Contractor agrees to pay legally required wage rates including the prevailing hourly rate of wages in the locality, as determined by the Department of Labor and Industrial Relations or by final judicial determination, for each craft or type of workman required to execute the contract, and, further, shall defend, indemnify and hold the Owner harmless from all damages, loss and expense occasioned by any failure whatsoever of said Contractor and Surety to fully comply with and carry out each and every requirement of the contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

In the event that Contractor shall be and is declared by the Owner to be in default under the Contract, the Owner having performed its obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and the Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable here under, the penal sum of the bond. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by the Owner to Contractor under the Contract and any amendments thereto, disbursed at the rate provided in the original contract, less the amount properly paid by the Owner to the Contractor. If the completion contract provides for more rapid payment than the Contract, then Surety shall advance such sums as are needed to make payment as provided in the completion contract and shall recover it from the Owner when payment from the Owner is due.
No suit shall be commenced or pursued hereunder other than in a state court of competent jurisdiction in Natrona, Wyoming, or in the United States District Court for the District of Wyoming.

WAIVER. The said surety, for value received, hereby expressly agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, shall in any wise affect the obligations of this bond; and it does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the contract or the work to be performed thereunder.

IN WITNESS WHEREOF, the above parties have executed this instrument the ________ day of ______________________, 20__.

SIGNATURE OF PRINCIPAL (as applicable)

A. Individual, partnership or joint venture

________________________________________
(Signature of sole proprietor or general partner)

B. Corporation

________________________________________
Name of Corporate Principal

Attest: ____________________________
Secretary (affix seal)

By ________________________________

SIGNATURE OF SURETY

Name and address of Corporate Surety

________________________________________

By ________________________________ (seal)
Attorney in Fact (attach power of attorney)

ACCEPTANCE BY

The foregoing bond is approved.

Date _____________________

By ________________________________

The foregoing bond is in due form according to law and is approved.

Date _____________________

By ________________________________
NOTICE OF AWARD

DATE: ____________________________________

TO: ____________________________________

_____________________________________

Casper/Natrona County International Airport Board of Trustees, having considered the Contract Proposals submitted for improvements to the Casper/Natrona County International Airport, Project No. PFC/LOC 19-01, and it appearing that your Contract Proposal of ______________ _______________ Dollars ($________________________) for Terminal Building - Holdroom Addition / Renovation is fair, equitable and in the best interest of the Casper/Natrona County International Airport Board of Trustees and having authorized the work to be performed, the said Contract Proposal is hereby accepted at the bid prices (based on unit prices and estimated quantities) contained therein.

In accordance with the terms of the Contract Documents, you are required to execute the formal Contract Agreement and furnish the required Performance Bond and Payment Bond within 30 consecutive calendar days from and including the date of this notice.

The Bid Bond submitted with your Contract Proposal will be returned upon execution of the Contract Agreement and the furnishing of the Performance Bond and Payment Bond. In the event that you should fail to execute the Contract Agreement and furnish the Performance Bond and Payment Bond, within the time specified, the Bid Bond will be forfeited to the Owner Airport Board.

This Award is subject to the concurrence of the Federal Aviation Administration.

Casper/Natrona County International Airport
Board of Trustees
Casper, Wyoming

By: _________________________________

Contract Authorized Representative

___________________________________

Name and Title

___________________________________

Date
NOTICE TO PROCEED

TO: ___________________________________ DATE: __________________

___________________________________

___________________________________

You are hereby authorized to proceed on this date, ____________________________ with the improvements to the Casper/Natrona County International Airport, Project No. PFC/LOC 19-01, for Terminal Building - Holdroom Addition / Renovation, in accordance with the terms of the Contract Documents and your Contract Proposal. The work shall begin no later than ten calendar days after the date of this notice.

Casper/Natrona County International Airport
Board of Trustees
Casper, Wyoming

By: ___________________________________  
   Contract Authorized Representative

___________________________________  
   Name and Title

___________________________________  
   Date
NOTICE OF CONTRACTOR’S SETTLEMENT

County of Natrona
State of Wyoming

Notice is hereby given that on or after the ______ day of ____________________, 20_____, final settlement will be made by Casper/Natrona County International Airport Board of Trustees, for and on account of the contract of said:

_______________________________________________________________________________

for the furnishing and installation of Improvements to the Casper/Natrona County International Airport, Schedule(s)______, Project No. PFC/LOC 19-01 and any person, co-partnership, association or corporation who has an unpaid lien against said __________________________ for or on account of the furnishing of labor, materials, team hire, sustenance, provision, provender or other supplies used or consumed by such Contractor or any of the subcontractors in or about the performance of said work, may at any time up to and including said time of final settlement on said ____________day of ____________________, 20_____, file a verified statement in the amount due and unpaid on account of such claim with Casper/Natrona County International Airport Board of Trustees.

Failure on the part of the claimant to file such final statement will relieve said Owner from all and any liability for such claim.

Casper/Natrona County International Airport
Board of Trustees
State of Wyoming

First Publication:  _________________

Second Publication:  _________________
## PART 1 - GENERAL CONTRACT PROVISIONS

### SECTION 10
#### DEFINITION OF TERMS

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

<table>
<thead>
<tr>
<th>Paragraph Number</th>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-01</td>
<td>AASHTO</td>
<td>The American Association of State Highway and Transportation Officials.</td>
</tr>
<tr>
<td>10-02</td>
<td>Access Road</td>
<td>The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.</td>
</tr>
<tr>
<td>10-03</td>
<td>Advertisement</td>
<td>A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.</td>
</tr>
<tr>
<td>10-04</td>
<td>Airport</td>
<td>Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.</td>
</tr>
<tr>
<td>10-05</td>
<td>Airport Improvement Program (AIP)</td>
<td>A grant-in-aid program, administered by the Federal Aviation Administration (FAA).</td>
</tr>
<tr>
<td>10-06</td>
<td>Air Operations Area (AOA)</td>
<td>The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.</td>
</tr>
<tr>
<td>10-07</td>
<td>Apron</td>
<td>Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.</td>
</tr>
<tr>
<td>10-09</td>
<td>Award</td>
<td>The Owner’s notice to the successful bidder of the acceptance of the submitted bid.</td>
</tr>
<tr>
<td>10-10</td>
<td>Bidder</td>
<td>Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.</td>
</tr>
<tr>
<td>10-11</td>
<td>Building Area</td>
<td>An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.</td>
</tr>
<tr>
<td>10-12</td>
<td>Calendar Day</td>
<td>Every day shown on the calendar.</td>
</tr>
<tr>
<td>Paragraph Number</td>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>10-13</td>
<td>Certificate of Analysis (COA)</td>
<td>The COA is the manufacturer’s Certificate of Compliance (COC) including all applicable test results required by the specifications.</td>
</tr>
<tr>
<td>10-14</td>
<td>Certificate of Compliance (COC)</td>
<td>The manufacturer’s certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.</td>
</tr>
<tr>
<td>10-15</td>
<td>Change Order</td>
<td>A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.</td>
</tr>
<tr>
<td>10-16</td>
<td>Contract</td>
<td>A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.</td>
</tr>
<tr>
<td>10-17</td>
<td>Contract Item (Pay Item)</td>
<td>A specific unit of work for which a price is provided in the contract.</td>
</tr>
<tr>
<td>10-18</td>
<td>Contract Time</td>
<td>The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.</td>
</tr>
<tr>
<td>10-19</td>
<td>Contractor</td>
<td>The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.</td>
</tr>
<tr>
<td>10-20</td>
<td>Contractors Quality Control (QC) Facilities</td>
<td>The Contractor’s QC facilities in accordance with the Contractor Quality Control Program (CQCP).</td>
</tr>
<tr>
<td>10-21</td>
<td>Contractor Quality Control Program (CQCP)</td>
<td>Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.</td>
</tr>
<tr>
<td>Paragraph Number</td>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>10-22</td>
<td>Control Strip</td>
<td>A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.</td>
</tr>
<tr>
<td>10-23</td>
<td>Construction Safety and Phasing Plan (CSPP)</td>
<td>The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.</td>
</tr>
<tr>
<td>10-24</td>
<td>Drainage System</td>
<td>The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.</td>
</tr>
<tr>
<td>10-25</td>
<td>Engineer</td>
<td>The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.</td>
</tr>
<tr>
<td>10-26</td>
<td>Equipment</td>
<td>All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.</td>
</tr>
<tr>
<td>10-27</td>
<td>Extra Work</td>
<td>An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.</td>
</tr>
<tr>
<td>10-28</td>
<td>FAA</td>
<td>The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.</td>
</tr>
<tr>
<td>10-29</td>
<td>Federal Specifications</td>
<td>The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.</td>
</tr>
<tr>
<td>10-30</td>
<td>Force Account</td>
<td>a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Owner Force Account - Work performed for the project by the Owner's employees.</td>
</tr>
</tbody>
</table>
| 10-31            | Intention of Terms                        | Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the
<table>
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</thead>
<tbody>
<tr>
<td></td>
<td>words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</td>
<td></td>
</tr>
<tr>
<td>10-32</td>
<td>Lighting</td>
<td>A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.</td>
</tr>
<tr>
<td>10-33</td>
<td>Major and Minor Contract Items</td>
<td>A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.</td>
</tr>
<tr>
<td>10-34</td>
<td>Materials</td>
<td>Any substance specified for use in the construction of the contract work.</td>
</tr>
<tr>
<td>10-35</td>
<td>Modification of Standards (MOS)</td>
<td>Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.</td>
</tr>
<tr>
<td>10-36</td>
<td>Notice to Proceed (NTP)</td>
<td>A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.</td>
</tr>
<tr>
<td>10-37</td>
<td>Owner</td>
<td>The term “Owner” shall mean the party of the first part or the contracting agency signatory to the contract. Where the term “Owner” is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is Casper/Natrona County International Airport Board of Trustees.</td>
</tr>
<tr>
<td>10-38</td>
<td>Passenger Facility Charge (PFC)</td>
<td>Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.</td>
</tr>
<tr>
<td>10-39</td>
<td>Pavement Structure</td>
<td>The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.</td>
</tr>
<tr>
<td>10-40</td>
<td>Payment bond</td>
<td>The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.</td>
</tr>
<tr>
<td>Paragraph Number</td>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>10-41</td>
<td>Performance bond</td>
<td>The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.</td>
</tr>
<tr>
<td>10-42</td>
<td>Plans</td>
<td>The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'</td>
</tr>
<tr>
<td>10-43</td>
<td>Project</td>
<td>The agreed scope of work for accomplishing specific airport development with respect to a particular airport.</td>
</tr>
<tr>
<td>10-44</td>
<td>Proposal</td>
<td>The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.</td>
</tr>
<tr>
<td>10-45</td>
<td>Proposal guaranty</td>
<td>The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.</td>
</tr>
<tr>
<td>10-46</td>
<td>Quality Assurance (QA)</td>
<td>Owner’s responsibility to assure that construction work completed complies with specifications for payment.</td>
</tr>
<tr>
<td>10-47</td>
<td>Quality Control (QC)</td>
<td>Contractor’s responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.</td>
</tr>
<tr>
<td>10-48</td>
<td>Quality Assurance (QA) Inspector</td>
<td>An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.</td>
</tr>
<tr>
<td>10-49</td>
<td>Quality Assurance (QA) Laboratory</td>
<td>The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer’s, Owner’s, or QA Laboratory.</td>
</tr>
<tr>
<td>10-50</td>
<td>Resident Project Representative (RPR)</td>
<td>The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.</td>
</tr>
<tr>
<td>10-51</td>
<td>Runway</td>
<td>The area on the airport prepared for the landing and takeoff of aircraft.</td>
</tr>
<tr>
<td>10-52</td>
<td>Runway Safety Area (RSA)</td>
<td>A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.</td>
</tr>
<tr>
<td>Paragraph Number</td>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>10-53</td>
<td>Safety Plan Compliance Document (SPCD)</td>
<td>Details how the Contractor will comply with the CSPP.</td>
</tr>
<tr>
<td>10-54</td>
<td>Specifications</td>
<td>A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.</td>
</tr>
<tr>
<td>10-55</td>
<td>Sponsor</td>
<td>A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.</td>
</tr>
<tr>
<td>10-56</td>
<td>Structures</td>
<td>Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.</td>
</tr>
<tr>
<td>10-57</td>
<td>Subgrade</td>
<td>The soil that forms the pavement foundation.</td>
</tr>
<tr>
<td>10-58</td>
<td>Superintendent</td>
<td>The Contractor’s executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.</td>
</tr>
<tr>
<td>10-59</td>
<td>Supplemental Agreement</td>
<td>A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.</td>
</tr>
<tr>
<td>10-60</td>
<td>Surety</td>
<td>The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.</td>
</tr>
<tr>
<td>10-61</td>
<td>Taxilane</td>
<td>A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.</td>
</tr>
<tr>
<td>10-62</td>
<td>Taxiway</td>
<td>The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport’s runways, aircraft parking areas, and terminal areas.</td>
</tr>
<tr>
<td>10-63</td>
<td>Taxiway/Taxilane Safety Area (TSA)</td>
<td>A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See...</td>
</tr>
<tr>
<td>Paragraph Number</td>
<td>Term</td>
<td>Definition</td>
</tr>
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</tr>
<tr>
<td></td>
<td>the construction safety and phasing plan (CSPP) for limits of the TSA.</td>
<td></td>
</tr>
<tr>
<td>10-64</td>
<td>Work</td>
<td>The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.</td>
</tr>
<tr>
<td>10-65</td>
<td>Working day</td>
<td>A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.</td>
</tr>
<tr>
<td>10-66</td>
<td>Owner Defined terms</td>
<td>None</td>
</tr>
</tbody>
</table>

END OF SECTION 10
SECTION 20
PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 ADVERTISEMENT (Notice to Bidders). The advertisement can be found on Division 1-1. This project has been advertised on the following dates:

WYDOT Website:  4/13/2020, 4/15/2020, 4/20/2020

20-02 QUALIFICATION OF BIDDERS. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder’s past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder’s financial resources and liabilities as of the last calendar year or the bidder’s last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder’s financial responsibility has changed, the bidder shall qualify the public accountant’s statement or report to reflect the bidder’s true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current “bidder’s list” of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-03 CONTENTS OF PROPOSAL FORMS. The Owner’s proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09, IRREGULAR PROPOSALS.

20-04 ISSUANCE OF PROPOSAL FORMS. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, ALTERATION OF WORK AND QUANTITIES, without in any way invalidating the unit bid prices.

20-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

20-07 PREPARATION OF PROPOSAL. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 RESPONSIVE AND RESPONSIBLE BIDDER. A responsive bid conforms to all significant terms and conditions contained in the Owner’s invitation for bid. It is the Owner’s responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor...
integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-09 IRREGULAR PROPOSALS. Proposals shall be considered irregular for the following reasons:

a. If the proposal is on a form other than that furnished by the Owner, or if the Owner’s form is altered, or if any part of the proposal form is detached.

b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 BID GUARANTEE. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

20-11 DELIVERY OF PROPOSAL. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-12 WITHDRAWAL OR REVISION OF PROPOSALS. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder’s request for withdrawal is received by the Owner in writing before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 PUBLIC OPENING OF PROPOSALS. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following reasons:
a. Submitting more than one proposal from the same partnership, firm, or corporation under
the same or different name.

b. Evidence of collusion among bidders. Bidders participating in such collusion shall be
disqualified as bidders for any future work of the Owner until any such participating bidder
has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in “default” for any reason specified in paragraph 20-04, Issuance
of Proposal Forms, of this section.

20-15 DISCREPANCIES AND OMISSIONS. A Bidder who discovers discrepancies or omissions
with the project bid documents shall immediately notify the Owner’s Engineer of the matter. A bidder
that has doubt as to the true meaning of a project requirement may submit to the Owner’s Engineer
a written request for interpretation no later than 5 days prior to bid opening.

Any interpretation of the project bid documents by the Owner’s Engineer will be by written addendum
issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations
of the bidding documents in any manner other than written addendum.

END OF SECTION 20
SECTION 30
AWARD AND EXECUTION OF CONTRACT

30-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder’s proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder’s proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, IRREGULAR PROPOSALS.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, DISQUALIFICATION OF BIDDERS.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner’s best interests.

30-02 AWARD OF CONTRACT. The award of a contract, if it is to be awarded, shall be made within 45 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

30-03 CANCELLATION OF AWARD. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07, APPROVAL OF CONTRACT.

30-04 RETURN OF PROPOSAL GUARANTY. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, CONSIDERATION OF PROPOSALS. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder’s proposal guaranty will be returned. The successful bidder’s proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, REQUIREMENTS OF CONTRACT BONDS.

30-05 REQUIREMENTS OF CONTRACT BONDS. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor’s performance of the work. The surety
and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in
this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the necessary
agreements for entering into the contract and return the signed contract to the Owner, along with the
fully executed surety bond or bonds specified in paragraph 30-05, REQUIREMENTS OF
CONTRACT BONDS, of this section, within 30 calendar days from the date mailed or otherwise
delivered to the successful bidder.

30-07 APPROVAL OF CONTRACT. Upon receipt of the contract and contract bond or bonds
that have been executed by the successful bidder, the Owner shall complete the execution of the
contract in accordance with local laws or ordinances, and return the fully executed contract to the
Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's
approval to be bound by the successful bidder’s proposal and the terms of the contract.

30-08 FAILURE TO EXECUTE CONTRACT. Failure of the successful bidder to execute the
contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-
06, EXECUTION OF CONTRACT, of this section shall be just cause for cancellation of the award
and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

END OF SECTION 30
SECTION 40
SCOPE OF WORK

40-01 INTENT OF CONTRACT. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 ALTERATION OF WORK AND QUANTITIES. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner’s Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, COMPENSATION FOR ALTERED QUANTITIES.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor’s surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

40-03 OMITTED ITEMS. The Owner, the Owner’s Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, PAYMENT FOR OMITTED ITEMS.

40-04 EXTRA WORK. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR’s opinion, is necessary for completion of the extra work.
When determined by the RPR to be in the Owner’s best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, **PAYMENT FOR EXTRA WORK.** Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, **SUPPLEMENTAL AGREEMENT.**

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

**40-05 MAINTENANCE OF TRAFFIC.** It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor’s equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

**a.** It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, **LIMITATION OF OPERATIONS.** It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, **CONTRACTOR’S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS.**

**b.** With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

**c.** The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

**40-06 REMOVAL OF EXISTING STRUCTURES.** All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.
Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

b. Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor’s own temporary construction on site; or,

d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR’s approval in advance of such use.

Should the RPR approve the Contractor’s request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor’s exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 FINAL CLEANUP. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and
presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40
SECTION 50
CONTROL OF WORK

50-01 AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 CONFORMITY WITH PLANS AND SPECIFICATIONS. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR’s written orders.

The term “reasonably close conformity” shall not be construed as waiving the Contractor’s responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR’s responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor’s execution of the work, when, in the RPR’s opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term “reasonably close conformity” is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor’s means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited
standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall
govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited
standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions
conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change,
edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy
within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and
decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or
specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor
shall immediately notify the Owner or the designated representative in writing requesting their written
interpretation and decision.

50-04 LIST OF SPECIAL PROVISIONS. See Division 5 for the Project Special Provisions.

50-05 COOPERATION OF CONTRACTOR. The Contractor shall be supplied with five hard
copies or an electronic PDF of the plans and specifications. The Contractor shall have available on
the construction site at all times one hardcopy each of the plans and specifications. Additional hard
copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall
cooperate with the RPR and their inspectors and with other Contractors in every way possible. The
Contractor shall have a competent superintendent on the work at all times who is fully authorized as
their agent on the work. The superintendent shall be capable of reading and thoroughly understanding
the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized
representative.

50-06 COOPERATION BETWEEN CONTRACTORS. The Owner reserves the right to
contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the
work not to interfere with or hinder the progress of completion of the work being performed by other
Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their
own contract and shall protect and hold harmless the Owner from any and all damages or claims that
may arise because of inconvenience, delays, or loss experienced because of the presence and
operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not
interfere with the operations of the other Contractors within the limits of the same project. The
Contractor shall join their work with that of the others in an acceptable manner and shall perform it
in proper sequence to that of the others.

50-07 CONSTRUCTION LAYOUT AND STAKES. Not Applicable

50-08 AUTHORITY AND DUTIES OF QUALITY ASSURANCE (QA) INSPECTORS. Not
Applicable.
50-09 INSPECTION OF THE WORK. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor’s expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor’s expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, CONFORMITY WITH PLANS AND SPECIFICATIONS.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, CONTRACTOR’S RESPONSIBILITY FOR WORK.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor’s expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 LOAD RESTRICTIONS. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.
The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor’s equipment and personnel.

50-12 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 FAILURE TO MAINTAIN THE WORK. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, MAINTENANCE DURING CONSTRUCTION, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR’s notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 PARTIAL ACCEPTANCE. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 FINAL ACCEPTANCE. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.
50-16 CLAIMS FOR ADJUSTMENT AND DISPUTES. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor’s right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50
SECTION 60
CONTROL OF MATERIALS

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR’s option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program and Addendum*, that is in effect on the date of advertisement.

60-02 SAMPLES, TESTS, AND CITED SPECIFICATIONS. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor’s expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor’s representative at their request after review and approval of the RPR.

A legible, hand written copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an electronic spreadsheet file, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

60-03 CERTIFICATION OF COMPLIANCE/ANALYSIS (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer’s COC stating that such materials or assemblies fully comply with the requirements of
the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer’s COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by “brand name or equal” and the Contractor elects to furnish the specified “or equal,” the Contractor shall be required to furnish the manufacturer’s certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and,

b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed “or equal” is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 PLANT INSPECTION. Not Applicable.

60-05 ENGINEER/RESIDENT PROJECT REPRESENTATIVE (RPR) FIELD OFFICE. Not Applicable.

60-06 STORAGE OF MATERIALS. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor’s plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner’s permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 UNACCEPTABLE MATERIALS. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.
Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

**60-08 OWNER FURNISHED MATERIALS.** The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor’s handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor’s handling, storage, or use of Owner-furnished materials.

**END OF SECTION 60**
SECTION 70
LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor’s employees.

70-02 PERMITS, LICENSES, AND TAXES. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 PATENTED DEVICES, MATERIALS, AND PROCESSES. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 RESTORATION OF SURFACES DISTURBED BY OTHERS. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 FEDERAL PARTICIPATION. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.
70-06 SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor’s worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, MAINTENANCE OF TRAFFIC, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, LIMITATION OF OPERATIONS.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 CONSTRUCTION SAFETY AND PHASING PLAN (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is in the project plans.

70-09 USE OF EXPLOSIVES. Not Allowed.

70-10 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of
or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials
in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor;
or because of any claims or amounts recovered from any infringements of patent, trademark, or
copyright; or from any claims or amounts arising or recovered under the “Workmen’s Compensation
Act,” or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of
their own contract considered necessary by the Owner for such purpose may be retained for the use
of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or
claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to
the Owner, except that money due the Contractor will not be withheld when the Contractor produces
satisfactory evidence that he or she is adequately protected by public liability and property damage
insurance.

70-12 THIRD PARTY BENEFICIARY CLAUSE. It is specifically agreed between the parties
executing the contract that it is not intended by any of the provisions of any part of the contract to
create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a
party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms
or provisions of the contract.

70-13 OPENING SECTIONS OF THE WORK TO TRAFFIC. If it is necessary for the
Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior
to completion of the entire contract, such “phasing” of the work must be specified below and
indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When
so specified, the Contractor shall complete such portions of the work on or before the date specified
or as otherwise specified.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner
in accordance with Section 50, paragraph 50-14, PARTIAL ACCEPTANCE.

No portion of the work may be opened by the Contractor until directed by the Owner in writing.
Should it become necessary to open a portion of the work to traffic on a temporary or intermittent
basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in
an acceptable condition to support the intended traffic. Temporary or intermittent openings are
considered to be inherent in the work and shall not constitute either acceptance of the portion of the
work so opened or a waiver of any provision of the contract. Any damage to the portion of the work
so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the
Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the
work under the conditions herein described and shall not claim any added compensation by reason of
delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.
Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade
requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety
requirements prior to opening up sections of work to traffic.

70-14 CONTRACTOR’S RESPONSIBILITY FOR WORK. Until the RPR’s final written
acceptance of the entire completed work, excepting only those portions of the work accepted in
accordance with Section 50, paragraph 50-14, PARTIAL ACCEPTANCE, the Contractor shall have
the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 CONTRACTOR’S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS. As provided in paragraph 70-04, RESTORATION OF SURFACES DISTURBED BY OTHERS, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to “The Person to Contact” as provided in this paragraph and paragraph 70-04, RESTORATION OF SURFACES DISTURBED BY OTHERS. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor’s opinion, the Owner’s assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner’s
“Person to Contact” no later than two normal business days prior to the Contractor’s commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor’s failure to give the two days’ notice shall be cause for the Owner to suspend the Contractor’s operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor’s operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA FACILITIES AND CABLE RUNS. The Contractor is hereby advised that the construction limits of the project may include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor’s equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

70-16 FURNISHING RIGHTS-OF-WAY. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor’s operations.

70-17 PERSONAL LIABILITY OF PUBLIC OFFICIALS. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 NO WAIVER OF LEGAL RIGHTS. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may
be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner’s rights under any warranty or guaranty.

70-19 ENVIRONMENTAL PROTECTION. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 ARCHAEOLOGICAL AND HISTORICAL FINDINGS. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor’s finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor’s operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, EXTRA WORK, and Section 90, paragraph 90-05, PAYMENT FOR EXTRA WORK. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, DETERMINATION AND EXTENSION OF CONTRACT TIME.

70-21 INSURANCE REQUIREMENTS. The Contractor shall pay for and maintain during the life of this contract adequate Workmen's Compensation, Public Liability and Property Damage Insurance. The Contractor is charged with the responsibility for adequate and proper coverage for all his subcontract operations. Contractor shall furnish to the Sponsor satisfactory proof of carriage of the insurance required. Public Liability Insurance shall be in the amount of not less than $1,000,000.00 for injuries, including accidental death, to any one person, nor less than $1,000,000.00 on account of any one accident. Property Damage Insurance shall be carried in an amount not less than $1,000,000.00. Such Liability Insurance shall include completed operation coverage.

END OF SECTION 70
SECTION 80
EXECUTION AND PROGRESS

80-01 SUBLETTING OF CONTRACT. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 25 percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 NOTICE TO PROCEED (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within 15 days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 EXECUTION AND PROGRESS. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR’s review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR’s request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet
the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 LIMITATION OF OPERATIONS. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, CONSTRUCTION SAFETY AND PHASING PLAN (CSPP).

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor’s operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION. All Contractors’ operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.
The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

**80-05 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT.** The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct.
No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 TEMPORARY SUSPENSION OF THE WORK. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR’s order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor’s claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME. The number of working days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor’s control, it shall be adjusted as follows:

80-07.1 CONTRACT TIME BASED ON WORKING DAYS. Contract time based on working days shall be calculated weekly by the Resident Project Representative (RPR). The RPR will furnish the Contractor a copy of their weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved Change Orders or Supplemental Agreements covering Extra Work).

The weekly statement of contract time charged is based on the following considerations:

(1) Time will be charged for days on which the Contractor could proceed with scheduled work under construction at the time for at least six (6) hours with the normal work force employed on such items. When normal work force is a double-shift, use 12 hours; and when the normal work force is on a triple-shift, use 18 hours. Conditions beyond the Contractor’s control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the scheduled work items under construction or temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.
(2) The RPR will not make charges against the contract time prior to the effective date of the notice to proceed.

(3) The RPR will begin charges against the contract time on the first working day after the effective date of the notice to proceed.

(4) The RPR will not make charges against the contract time after the date of final acceptance as defined in Section 50, paragraph 50-14, *FINAL ACCEPTANCE*.

(5) The Contractor will be allowed one (1) week in which to file a written protest setting forth their own objections to the RPR’s weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

The contract time (stated in the proposal) is based on the originally estimated quantities as described in the Section 20, paragraph 20-05, *INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES*. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.

### 80-08 FAILURE TO COMPLETE ON TIME

For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *DETERMINATION AND EXTENSION OF CONTRACT TIME*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

<table>
<thead>
<tr>
<th>SCHEDULE</th>
<th>LIQUIDATED DAMAGES COST</th>
<th>ALLOWED CONSTRUCTION TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedules I and II</td>
<td>$1,500.00/ Working Days</td>
<td>360 Working Days</td>
</tr>
</tbody>
</table>

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

### 80-09 DEFAULT AND TERMINATION OF CONTRACT

The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor’s surety as to the reasons for considering the Contractor in default and the Owner’s intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor’s failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

**80-10 TERMINATION FOR NATIONAL EMERGENCIES.** The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.
Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

**80-11 WORK AREA, STORAGE AREA AND SEQUENCE OF OPERATIONS.** The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80
SECTION 90
MEASUREMENT AND PAYMENT

90-01 MEASUREMENT OF QUANTITIES. All work completed under the contract will be
measured by the RPR, or their authorized representatives, using United States Customary Units of
Measurement.

The method of measurement and computations to be used in determination of quantities of material
furnished and of work performed under the contract will be those methods generally recognized as
conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made
horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of
9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area
computations will be the net dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical
ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or
foundation upon which such items are placed.

The term “lump sum” when used as an item of payment will mean complete payment for the work
described in the contract. When a complete structure or structural unit (in effect, “lump sum” work)
is specified as the unit of measurement, the unit will be construed to include all necessary fittings and
accessories.

90-02 SCOPE OF PAYMENT. The Contractor shall receive and accept compensation provided
for in the contract as full payment for furnishing all materials, for performing all work under the
contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever
character arising out of the nature of the work or the execution thereof, subject to the provisions of
Section 70, paragraph 70-18, NO WAIVER OF LEGAL RIGHTS.

When the “basis of payment” subsection of a technical specification requires that the contract price
(price bid) include compensation for certain work or material essential to the item, this same work or
material will not also be measured for payment under any other contract item which may appear
elsewhere in the contract, plans, or specifications.

90-03 COMPENSATION FOR ALTERED QUANTITIES. When the accepted quantities of
work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as
contract items are concerned, payment at the original contract price for the accepted quantities of
work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph
40-02, ALTERATION OF WORK AND QUANTITIES, will be made for any increased expense,
loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor
which results directly from such alterations or indirectly from their own unbalanced allocation of
overhead and profit among the contract items, or from any other cause.

90-04 PAYMENT FOR OMITTED ITEMS. As specified in Section 40, paragraph 40-03,
OMITTED ITEMS, the RPR shall have the right to omit from the work (order nonperformance) any
contract item, except major contract items, in the best interest of the Owner.
Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR’s order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR’s order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR’s order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 PAYMENT FOR EXTRA WORK. Extra work, performed in accordance with Section 40, paragraph 40-04, EXTRA WORK, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 PARTIAL PAYMENTS Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, PAYMENT FOR MATERIALS ON HAND. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 10 percent of such total amount will be deducted and retained by the Owner for protection of the Owner’s interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-14. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor’s work is satisfactorily completed. A subcontractor’s work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.
When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, ACCEPTANCE AND FINAL PAYMENT.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 PAYMENT FOR MATERIALS ON HAND. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner’s payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.
In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 PAYMENT OF WITHHELD FUNDS. At the Contractor’s option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 PARTIAL PAYMENTS, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner’s deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 ACCEPTANCE AND FINAL PAYMENT. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, FINAL ACCEPTANCE, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR’s final estimate or advise the RPR of the Contractor’s objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor’s receipt of the RPR’s final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR’s estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, CLAIMS FOR ADJUSTMENTS AND DISPUTES.

After the Contractor has approved, or approved under protest, the RPR’s final estimate, and after the RPR’s receipt of the project closeout documentation required in paragraph 90-11, CONTRACTOR FINAL PROJECT DOCUMENTATION, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, CLAIMS FOR ADJUSTMENTS AND DISPUTES, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 CONSTRUCTION WARRANTY.
a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession.

c. The Contractor shall remedy at the Contractor’s expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor’s expense any damage to Owner real or personal property, when that damage is the result of the Contractor’s failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor’s warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor’s expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and

(3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner’s rights with respect to latent defects, gross mistakes, or fraud.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor’s final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.
c. Complete final cleanup in accordance with Section 40, paragraph 40-08, Final Cleanup.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. When applicable per state requirements, return copies of sales tax completion forms.

g. Manufacturer's certifications for all items incorporated in the work.

h. All required record drawings, as-built drawings or as-constructed drawings.

i. Project Operation and Maintenance (O&M) Manual(s).


k. Equipment commissioning documentation submitted, if required.

END OF SECTION 90
PART 2 - GENERAL CONSTRUCTION ITEMS
ITEM C-105
MOBILIZATION

105-1 DESCRIPTION. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, facilities, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

Equipment shall consist of machinery needed to accomplish the activities required to construct items described under the various bid items. Facilities shall consist of mobile shelters used to perform administrative functions, and trailers used to perform equipment maintenance functions, and fuel storage tanks. Expenditures required to connect facilities to various public utility services can be included. Not included are expendable supplies such as fuel, lubricants, and spare parts. Also not included are the materials which become a part of permanent physical features constructed under the contract.

105-2 MOBILIZATION LIMIT. Mobilization shall be limited to 10 percent of the total project cost.

105-3 POSTED NOTICES. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 BASIS OF MEASUREMENT AND PAYMENT. Partial payments for mobilization will be made once each month as the work progresses. Provided all requirements of applicable General and Special Provisions have been accomplished to the satisfaction of the Engineer, partial payments will be made as follows:

a. When 5% of the original contract amount is earned, 20% of the amount bid for this item will be paid, not to exceed 2% of the original contract amount.

b. When 20% of the original contract amount is earned, 50% of the amount bid for this item, less all-previous payments, will be paid, not to exceed 5% of the original contract amount.

c. When 35% of the original contract amount is earned, 60% of the amount bid for this item, less all-previous payments, will be paid, not to exceed 6% of the original contract amount.

d. When 75% of the original contract amount is earned, the amount bid for this item, less all-previous payments, will be paid, not to exceed 10% of the original contract amount.

e. When 90% of the original contract amount is earned, the amount in excess of 10% of the original contract amount, less all previous payments, will be paid.
For the purpose of the Specification that term "original contract amount" as used above shall mean the amount of the award for the construction items on this contract not including the amount bid for mobilization. Payments for materials on hand will not be included as a percent of original contract amount earned until said materials on hand have been incorporated into the work and accepted and paid for as contract items. For multiple schedule projects, the above “original contract amount” shall be interpreted by schedule.

This price shall extend to the general contractor and to any and all subcontractors. No additional payment will be made to any bid item to compensate the Contractor or subcontractor for loss of profits attributed to mobilization costs.

**BASIS OF PAYMENT: REFER TO SCHEDULE OF VALUES PROVIDE BY CONTRACTOR.**

**END OF ITEM C-105**
SPECIAL PROVISIONS

Part A – Federal Requirements

1. CIVIL RIGHTS ACT OF 1964, TITLE VI ASSURANCES

During the performance of this contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1.1(a) Compliance with Regulations. The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

1.1(b) Nondiscrimination. The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

1.1(c) Solicitations for Subcontracts, including Procurements of Materials and Equipment. In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

1.1(d) Information and Reports. The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

1.1(e) Sanctions for Noncompliance. In the event of a Contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited:

a. Withholding of payments to the Contractor under the contract until the Contractor complies, and/or
b. Cancellation, termination, or suspension of the contract, in whole or in part.

1.1(f) Incorporation of Provisions. The Contractor will include the provisions of paragraphs 1.1(a) through 1.1(f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

1.2 Title VI List of Pertinent Nondiscrimination Acts and Authorities. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

- 49 CFR part 21 (Non-discrimination in Federally assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

- Section 504 of the Rehabilitation Act of 1973, (29 USC § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;

- The Age Discrimination Act of 1975, as amended, (42 USC § 6101 et seq.), (prohibits discrimination on the basis of age);

- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

- The Civil Rights Restoration Act of 1987, (PL 100-209), (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all
of the programs or activities of the Federal-aid recipients, sub-recipients and Contractors, whether such programs or activities are Federally funded or not;  

- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 USC §§ 12131 – 12189) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;  

- The Federal Aviation Administration’s Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);  

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;  

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);  

- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC 1681 et seq).  

References: 49 CFR § 47123; FAA Order 1400.11

2. GENERAL CIVIL RIGHTS PROVISIONS

Sponsor Contracts

GENERAL CIVIL RIGHTS PROVISIONS

The Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.  

References: 49 USC § 47123
3. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

3.1 No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

1.2 If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

1.3 The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.


4. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner’s notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed...
with termination of the contract if the Contractor fails to correct the breach by deadline indicated in the Owner’s notice.

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

Reference: 2 CFR § 200 Appendix II(A)

5. TERMINATION OF CONTRACT

5.1 TERMINATION FOR CONVENIENCE (CONSTRUCTION & EQUIPMENT CONTRACTS)

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.

2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.

3. Discontinue orders for materials and services except as directed by the written notice.

4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.

5. Complete performance of the work not terminated by the notice.

6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;

2) documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
3) reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and

4) reasonable and substantiated expenses to the Contractor directly attributable to Owner’s termination action.

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

5.2 TERMINATION FOR DEFAULT (CONSTRUCTION)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes conditions, rights and remedies associated with Owner termination of this contract due to default of the Contractor.

References: 2 CFR § 200 Appendix II(B); FAA Advisory Circular 150/5370-10, Section 80-09

6. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division

Reference: 29 USC § 201, et seq.

7. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor’s compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

Reference 20 CFR part 1910
SPECIAL PROVISIONS

PART B - FAA REQUIREMENTS

1. OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

All work within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5370-2H and the Construction Safety and Phasing Plan (CSPP) contained in Division 6 of this document. The CSPP conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit for approval, a Safety Plan Compliance Document (SPCD), prior to Notice to Proceed, that details how it proposes to comply with the requirements presented within the CSPP.
SPECIAL PROVISIONS

PART C – AIRPORT REQUIREMENTS

1. HAUL & ACCESS ROADS:

The Contractor shall obtain approval from the Airport prior to establishing haul and access routes within the airport property. Haul roads across any active runway or taxiway shall be kept clean and in good order at all times. The Contractor shall repair any damage caused by the movement of equipment on any of the haul roads, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to re-grade any unpaved portions of the haul road and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, and repair of the haul roads, shall not be measured and paid for directly, but shall be considered as necessary and incidental to the work.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

2. AIRPORT SECURITY:

The Contractor will be required to submit to the airport prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the AOA have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor’s security program.

During the course of the construction operations, the Contractor will be allowed to utilize a maximum of two (2) airport access "Security Gates" as entrance to the construction site. This gate and the associated haul roads shall be designated by the Engineer. The Contractor shall be required to keep this gate guarded and closed during construction hours. The gate may be opened only for authorized vehicle traffic flow. At such times as this gate is not guarded, it shall be closed and securely locked. The Contractor will be required to obtain an "airport security" permit from the Office of the Airport Manager for all vehicles and personnel used on the construction project. Said permit shall hold the Contractor responsible for all vehicles and personnel on the airport property other than those that have individual authorization. All authorized vehicles and construction equipment must display a three foot by three foot flag with international orange and white 12 inch squares displayed in full view above the vehicles. Passengers in any authorized vehicles shall be the responsibility of the Contractor. The "gate guard" shall allow no unauthorized vehicle or person to enter the "air operations" side of the airport without the above stipulated "security clearance." The Contractor and the Contractor's "security gate guard" shall be held duly responsible to uphold the above security stipulations at all times during the progress of the construction project. No deviations from these security measures shall be allowed at any time. There shall be a penalty up to $11,000.00 for each deviation from these security provisions.
3. **RADIO COMMUNICATIONS:**

   The Contractor's superintendent and flagman shall be required to monitor transceiver radios tuned to the 121.9 MH frequency at all times. Radios shall be supplied by the Contractor. Such radios shall be used to obtain proper clearance in regard to the movement of equipment, trucks, etc., on the airport. Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

4. **WORK SCHEDULE:**

   Immediately after the award of contract, the Contractor shall file with the Engineer a time chart or schedule of proposed progress, a plan of construction and proposed detailed methods of carrying out the work, including a full statement of equipment and equipment layout for the job.

   The Sponsor reserves the right to request changes in the sequence of project schedules if such change is required in the interest of safety or airport operation.

5. **CONTRACTOR'S QUALITY CONTROL PROGRAM:**

   Refer to project specifications for quality assurance and quality control requirements.

6. **SEQUENCE OF WORK:**

   The Contractor will be required to accomplish the work items according to the schedule of construction as submitted to the Engineer following the award of the contract. Prior to closing any taxiways or apron area, they shall be marked in conformance with the FAA Advisory Circular 150/5340-1 latest edition. This shall consist of placing barricades and flashers on each taxiway and closed runway crosses on the effected runways. Flashers must be well anchored so they do not blow over from jet blasts or strong winds. Closed taxiway, apron area, and other airfield markings and maintenance of these items are considered a necessity and an incidental part of the work, and no separate measurement or payment will be made. The Contractor shall consider the costs and distribute them to the various bid items.

   The Contractor shall not allow men or equipment within 250 feet of any runway centerline or within 59 feet of the centerline of any taxiway, nor shall he permit materials to be stored or stocked within 400 feet of any runway centerline or within 93 feet of the centerline of any taxiway during the entire period of this project without first obtaining approval of the Engineer. When the Contractor's operations require the closing of any runway or taxiway, the Contractor shall mark said runway or taxiway in accordance with the plans and specifications at no additional cost to the Sponsor.

   Prior to construction on any taxiway or runway, the Contractor shall, upon approval by the Engineer, close the taxiway or runway and begin work. The Contractor shall be responsible for clearly marking and defining the closed taxiways or runways by use of warning lights, barricades, flags and closed taxiway or runway markings in conformance with FAA Advisory Circular 150/5370-2 latest edition. The Contractor shall be responsible for maintaining these barricades and keeping them clearly visible at all times.
The Sponsor shall meet with the Contractor immediately after the award of the contract to work up the sequence of work for the project.

7. CLOSURE OF AIR OPERATIONS AREAS:

Barricades are considered a necessary and incidental part of the work and no separate measurement or payment will be made therefore. The Contractor shall consider the costs and distribute them to the various bid items.

8. ACCIDENT PREVENTION:

Precautions shall be exercised at all times for the protection of persons (including employees) and property, and that the safety provisions of applicable laws and of applicable building construction codes shall be observed, and that machinery, equipment, and explosives shall be guarded and all hazards shall be eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law.

9. EXISTING UNDERGROUND CABLES:

The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's and all other public underground cables prior to construction. Damage to the underground cables through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications.

10. UTILITIES:

Any utilities required by the Contractor for the prosecution of the work shall be paid for by said Contractor.

11. INDEMNIFICATION:

The Contractor agrees to indemnify and save harmless Natrona County Board of Commissioners/Casper/Natrona County International Airport Board of Trustees, its officers, agents, and employees, against any and all damages to property or injuries to or death of any person or persons, including property and employees or agents of Natrona County Board of Commissioners/ Casper/Natrona County International Airport Board of Trustees, and further agrees to defend, indemnify and save harmless, Natrona County Board of Commissioners/ Casper/Natrona County International Airport Board of Trustees, its officers, agents, and employees from any claims, demands, suits, actions, proceedings of any kind or nature resulting from or arising out of operations in connection herewith, including operations of subcontractors and acts of omissions of employees or agents of the Contractor or his subcontractors.
12. SALES AND USE TAXES:

Construction and building materials sold to the contractors and subcontractors for use on public works owned by cities, towns, counties or their legal entities in the State of Wyoming, are not exempt from State Sales and Use Taxes. Wyoming statute 39-06-602 defines the meaning of the sales and use tax laws of Wyoming. Each contractor shall be solely responsible and liable for the sales/use tax on his cost of materials, supplies and other taxable services or transactions incidental to completing his or her contract for the repair, alteration, improvement or construction of real property.

13. PERMITS AND COMPLIANCE WITH LAWS:

The Contractor shall procure and pay for all permits, licenses, and bonds necessary for the prosecution of his work, and/or required by Local, State, and Federal regulations and laws, as pertains particularly to permits and transportation of materials and equipment, or other operations which are not a specific requirement of these specifications. The Contractor shall give all notices, pay all fees and taxes, and comply with all Federal, State, and Local laws, ordinances, rules, and regulations, and building and construction codes bearing on the conduct of the work.

14. EXECUTED CONTRACTS:

Each contract shall be executed in five original copies and there shall be executed originals of the Contractor's Performance Bond and Payment Bond in equal number to the executed originals of the contract. Two copies of such executed documents will be retained by Casper/Natrona County International Airport Board of Trustees, one copy shall be delivered to the FAA, and two copies will be delivered to the Contractor. The cost of executing the Contract, bonds and insurance, including all notary fees and incidental expenses are to be paid by the Contractor to whom the contract is awarded.

15. SUBLETTING OR ASSIGNING OF CONTRACTS:

The Contractor shall perform, with his organization, an amount of work equal to at least 50% of the total contract cost. No assignment by the Contractor of any principal construction contract or any part thereof or of the funds to be received thereunder by the Contractor will be recognized unless such assignment has received the prior written approval of the Sponsor, which shall be at Sponsor's sole discretion, and the Surety has been given due notice of such assignment and has also consented in writing thereto.

Such written approval of the Sponsor shall not relieve the Contractor of any obligation incurred by him, under the contract, unless otherwise expressly stated in the approval.

The following language must appear in any assignment:

"It is agreed that the funds to be paid to the assignee under this assignment are subject to a prior lien for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms, or corporations rendering such services or supplying such materials."
16. QUALIFICATION OF DISADVANTAGED BUSINESS ENTERPRISES:

Not Applicable.

17. LIQUIDATED DAMAGES:

Subject to the provisions of the Contract Documents, the Sponsor shall be entitled to liquidated damages for failure of the Contractor to complete the work within the specified contract time.

The Contractor further agrees to pay liquidated damages for failure to complete the work within the specified contract time and for expenses incurred by the Sponsor for unscheduled employment of the Engineer during the contract time overrun.

As compensation for non-use, the Contractor shall be assessed a liquidated damage of $1,500.00/calendar day(s) for each day that the work remains uncompleted beyond the contract period. As compensation for expenses incurred for unscheduled employment of the Engineer, up to $2,340.00/Calendar day for the construction manager plus up to $1,680.00/Calendar day for each additional resident engineer plus any incurred expenses (per diem, lodging, etc.) will be charged to the Contractor for that time which exceeds the number of calendar day(s) allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08 FAILURE TO COMPLETE ON TIME.

The Contractor further agrees to pay compensation for the unscheduled employment of the Engineer (and their Sub-Contractors) necessitated by the Contractor for any of the following: 1) working more than ten (10) hours per day, 2) furnishing materials or equipment not in conformance with the Contract Documents necessitating redesign, retesting, or additional review time by the Engineer and their Sub-Contractors, and 3) working beyond the time of completion established in the Notice to Proceed with Construction according to the following hourly rates:

<table>
<thead>
<tr>
<th>Description</th>
<th>Straight Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Engineer</td>
<td>$195.00/hr</td>
</tr>
<tr>
<td>Engineer</td>
<td>$155/hr</td>
</tr>
<tr>
<td>Associate Engineer</td>
<td>$140/hr</td>
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<td>Out of Pocket Cost, material, equipment, supplies, transportation, subsistence</td>
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Compensation shall be paid by deduction from the final payment.

The engineering budget will be analyzed at the end of the project to determine whether any unscheduled employment of the Engineer, during the scheduled contract time, resulted in a cost savings to the Sponsor. If, as a result of working more than (10) ten hours per day, the Contractor completes the project within the scheduled contract time, and if the overtime results in a reduced contract time and cost savings to the Sponsor, no liquidated damages will be assessed for the unscheduled employment of the Engineer during the scheduled contract time. Liquidated damages will be assessed as stipulated for each day the work remains uncompleted beyond the scheduled contract time.
18. **ACCEPTANCE TESTING:**

Acceptance testing shall be the responsibility of the Contractor.

19. **GRADE CONTROL AND SURFACE TOLERANCE:**

Not Applicable.

20. **CONSTRUCTION MANAGEMENT PLAN:**

Not Applicable.

21. **INSTRUCTION MANUALS:**

At the end of project construction, the Contractor shall provide to the airport three instruction manuals. The manuals shall include as a minimum the following:

1. Names, addresses, and phone numbers of electrical equipment suppliers/manufacturers.
2. Component parts list with manufacturer and part number.
3. Final wiring diagrams of lighting control system (where a new control panel and/or control system is installed).
4. Equipment schematic and wiring diagrams showing all components cross referenced to the parts list.
5. Installation manuals.
7. Operating instructions.
8. Equipment Warranties.

Manuals for each piece of equipment provided shall be separated by dividers. The dividers shall be labeled accordingly. Three ring binders marked with the project schedule(s), date of final inspection, as well as Contractor's electrical subcontractors names, addresses, and phone numbers.

22. **CONSTRUCTION CLOSEOUT**

In addition to the items discussed in section 90-11 of the General Provisions, after the final inspection has been completed, a Notice of Contractor's Final Settlement will be issued for publication in accordance with applicable state, local, and federal requirements. Contractor is required to submit on company letterhead and signed by supervisor or company officer the following:

   a) Affidavit that all wages, material purchases, and subcontractors have been paid in full.
   b) List of all subcontractors used on the project with final dollar value of subcontracts and DBE subcontractors identified.
   c) All test results in format required by the FAA. All tests results must be approved and accepted before the Engineer will release any final retainage amounts.
Final payment will not be authorized until these items have been completed.
DIVISION 6

FAA Advisory Circular 150/5370-2 Operational Safety on Airports During Construction
**Advisory Circular**

Subject: Operational Safety on Airports During Construction  
Date: 12/13/2017  
Initiated By: AAS-100  
AC No: 150/5370-2G  
Change:

1. **Purpose.**  
This AC sets forth guidelines for operational safety on airports during construction.

2. **Cancellation.**  

3. **Application.**  
This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4. **Related Documents.**  
ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5. **Principal Changes.**  
The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.
2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.

3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.

4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.

5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “←” keys simultaneously. Figures in this document are schematic representations and are not to scale.

6. **Use of Metrics.**
Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

7. **Where to Find this AC.**
You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8. **Feedback on this AC.**
If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards
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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.
Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport’s operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.
Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.
The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.
Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)\(^1\) for each affected taxiway; designated approach visibility minimums;

\(^1\) Find Taxiway Design Group information in AC 150/5300-13, Airport Design.
available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.
To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport’s most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.
Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.
The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, FAA Airports (ARP) Safety Management System (SMS), requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project “scope development” phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.
5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 **List Requirements.**

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA’s Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 **Prepare a Safety Plan Compliance Document (SPCD).**

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor’s points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 **Assume Responsibility for the CSPP.**

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.
1.4 Who Is Responsible for Safety During Construction?

1.4.1 Establish a Safety Culture.
Everyone has a role in operational safety on airports during construction: the airport operator, the airport’s consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator’s Responsibilities.
An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:
1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects. (Note “FAA” refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.

1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.

1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.

1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.

1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.

1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.
1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.2.13 Take immediate action to resolve safety deficiencies.

1.4.2.14 At airports subject to 49 CFR Part 1542, Airport Security, ensure construction access complies with the security requirements of that regulation.

1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.

1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.

1.4.3 Define Construction Contractor’s Responsibilities.

The contractor is responsible for complying with the CSPP and SPCD. The contractor must:
1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport’s operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

1.4.3.4 Identify in the SPCD the contractor’s on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.
1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.

1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant’s Responsibilities.
If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.

2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.

3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.

4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

5. Identify in the SPCD the contractor’s on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.

8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.
CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.
Aviation safety is the primary consideration at airports, especially during construction. The airport operator’s CSPP and the contractor’s Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.
Operational safety on the airport remains the airport operator’s responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator’s responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.
Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA’s Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.
By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.
The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.
2.3.3 **Submit an SPCD.**  
The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 **Submit CSPP Revisions.**  
All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 **Meet CSPP Requirements.**

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
   a. Contractor progress meetings.
   b. Scope or schedule changes.
   c. FAA ATO coordination.

2. Phasing.
   a. Phase elements.
   b. Construction safety drawings.

3. Areas and operations affected by the construction activity.
   a. Identification of affected areas.
   b. Mitigation of effects.

4. Protection of navigation aids (NAVAIDs).

5. Contractor access.
   a. Location of stockpiled construction materials.
   b. Vehicle and pedestrian operations.

6. Wildlife management.
   a. Trash.
   b. Standing water.
   c. Tall grass and seeds.
   d. Poorly maintained fencing and gates.
   e. Disruption of existing wildlife habitat.

7. Foreign Object Debris (FOD) management.

8. Hazardous materials (HAZMAT) management.

a. Maintenance of a list of responsible representatives/ points of contact.
b. NOTAM.
c. Emergency notification procedures.
d. Coordination with ARFF Personnel.
e. Notification to the FAA.

10. Inspection requirements.
   a. Daily (or more frequent) inspections.
   b. Final inspections.


12. Penalties.

13. Special conditions.

14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.
   a. General.
   b. Markings.
   c. Lighting and visual NAVAIDs.
   d. Signs, temporary, including orange construction signs, and permanent signs.

15. Marking and signs for access routes.

   a. Purpose.
   b. Equipment.

17. Work zone lighting for nighttime construction (if applicable).

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.
   a. Runway Safety Area (RSA).
   b. Runway Object Free Area (ROFA).
   c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.
   d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.
   e. Obstacle Free Zone (OFZ).
   f. Runway approach/departure surfaces.

19. Other limitations on construction.
   a. Prohibitions.
b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and any reference to any supplemental information (that is, “I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.

2. Phasing. Discuss proposed construction schedule elements, including:
   a. Duration of each phase.
   b. Daily start and finish of construction, including “night only” construction.
   c. Duration of construction activities during:
      i. Normal runway operations.
      ii. Closed runway operations.

3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.

4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.

5. Contractor access. Provide the following:
   a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
   b. Listing of individuals requiring driver training (for certificated airports and as requested).
   c. Radio communications.
      i. Types of radios and backup capabilities.
      ii. Who will be monitoring radios.
      iii. Who to contact if the ATCT cannot reach the contractor’s designated person by radio.
d. Details on how the contractor will escort material delivery vehicles.

6. Wildlife management. Discuss the following:
   a. Methods and procedures to prevent wildlife attraction.
   b. Wildlife reporting procedures.

7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.


9. Notification of construction activities. Provide the following:
   a. Contractor points of contact.
   b. Contractor emergency contact.
   c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
   d. Batch plant details, including 7460-1 submittal.

10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.

11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.

12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.

13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.

14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
   a. Equipment and methods for covering signage and airfield lights.
   c. Temporary orange construction signs.
   d. Types of temporary Visual Guidance Slope Indicators (VGSI).

15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.

16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.

17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.
18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:

a. Equipment and methods for maintaining Taxiway Safety Area standards.

b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.

c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.

19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 Coordination.

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.
Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.
Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.
Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)
2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 **Phase Elements.**

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 **Construction Safety Drawings.**

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.
2.7.1 **Identification of Affected Areas.**

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 **Partially Closed Runways.**

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 **Displaced Thresholds.**

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 **Closing of aircraft rescue and fire fighting access routes.**

2.7.1.3 **Closing of access routes used by airport and airline support vehicles.**

2.7.1.4 **Interruption of utilities, including water supplies for fire fighting.**

2.7.1.5 **Approach/departure surfaces affected by heights of objects.**

2.7.1.6 **Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.**
Figure 2-1. Temporary Partially Closed Runway

NOT TO SCALE
2.18.2.5

**Figure 2-2. Temporary Displaced Threshold**

**NOTES:**

1. This figure is a schematic representation and not intended for inspection purposes. Refer to the applicable ACs for guidance.
2. This figure depicts a typical temporary displaced threshold, the actual temporary measures will vary per each specific situation.
3. During construction VASI and PAPI systems should be taken out of service.

**Note:** See paragraph 2.18.2.5.
2.7.2 **Mitigation of Effects.**

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

2.7.2.1 Temporary changes to runway and/or taxi operations.

2.7.2.2 Detours for ARFF and other airport vehicles.

2.7.2.3 Maintenance of essential utilities.

2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 **Navigation Aid (NAVAID) Protection.**

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.)

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings.

Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 **Contractor Access.**

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 **Location of Stockpiled Construction Materials.**

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and
verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 **Vehicle and Pedestrian Operations.**
The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**
Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**
Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**
Determine the construction contractor’s access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul
roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.

2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

2.9.2.6 Required escorts.

2.9.2.7 Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator’s Vehicle Rules and Regulations.
Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, Ground Vehicle Operations on Airports, for information on training and records maintenance requirements.

2.9.2.8 Situational Awareness.
Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.

2.9.2.9 Two-Way Radio Communication Procedures.

2.9.2.9.1 General.
The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

1. Airport operations
2. ATCT
3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.

4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and “shortened” runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.
Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.
The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.
Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings.” This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see “Signs & Markings Vehicle Dashboard Sticker”) or obtained from the FAA Airports Regional Office.

2.9.2.10 Maintenance of the secured area of the airport, including:

2.9.2.10.1 Fencing and Gates.
Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-
00/52, Recommended Security Guidelines for Airport Planning and Construction, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

2.10 Wildlife Management.
The CSPP and SPCD must be in accordance with the airport operator’s wildlife hazard management plan, if applicable. See AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports, and CertAlert 98-05, Grasses Attractive to Hazardous Wildlife.
Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.
Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.
Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, Standards for Specifying Construction of Airports, Item T-901, Seeding. Contact the local office of the United States Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.
See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.
While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.
2.11 **Foreign Object Debris (FOD) Management.**
Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management.*

2.12 **Hazardous Materials (HAZMAT) Management.**
Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste.*

2.13 **Notification of Construction Activities.**
The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 **NOTAMs.**
Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.
2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.
The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 Part 77.
Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 Part 157.
With some exceptions, Title 14 CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 NAVAIDs.
For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.
If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, General Maintenance Handbook for National Airspace System (NAS) Facilities.
2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.

2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 Inspection Requirements.

2.14.1 Daily Inspections.
Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, Airport Safety Self-Inspection. Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.
Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator’s approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.
New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.
2.15 **Underground Utilities.**
The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “One Call” or “Miss Utility” services do not include FAA ATO/Technical Operations.

2.16 **Penalties.**
The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 **Special Conditions.**
The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 **Runway and Taxiway Visual Aids.**
This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 **General.**
Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 **Markings.**
During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,
airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, Standards for Airport Markings, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 Closed Runways and Taxiways.

2.18.2.1.1 Permanently Closed Runways.
For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.
For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.
When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic
control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

**Figure 2-3. Markings for a Temporarily Closed Runway**

1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-4.

2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1. Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-2.
2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** *AC 150/5300-13 Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an $X$ at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

**Figure 2-4. Temporary Taxiway Closure**

![Diagram of Permanently Closed Taxiways](image-url)
2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 **Temporarily Closed Airport.**
When the airport is closed temporarily, mark all the runways as closed.

2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, “temporary outboard white threshold bars and yellow arrowheads”, see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC
150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

**Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads**

INSTALL TEMPORARY WHITE THRESHOLD BARS AND YELLOW ARROWHEADS ON BOTH SIDES
SEE DETAIL BELOW

CLOSED PORTION OF RUNWAY

YELLOW ARROWHEAD DETAIL

SHOULDER EDGE
2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, Design and Installation Details for Airport Visual Aids, and fixture design in conformance with AC 150/5345-50, Specification for Portable Runway and Taxiway Lights. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, Maintenance of Airport Visual Aid Facilities, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 Permanently Closed Runways and Taxiways.

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure. For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.
2.18.3.3 Partially Closed Runways and Displaced Thresholds.
When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially
closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.
Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.
Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, Specification for L-853, Runway and Taxiway Retroreflective Markers.

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may
be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.

2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, Visual Guidance Lighting Systems, for installation criteria for FAA owned and operated NAVAIDs.

2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 Temporarily Closed Taxiways.

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, Specification for Runway and Taxiway Signs, and AC 150/5340-18, Standard for Airport Sign Systems.

2.18.4.1 Existing Signs.

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.
2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot “information overload,” the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs.* Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs,* are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 **Takeoff Run Available (TORA) signs.**

**Recommended:** Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

**Note:** See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections,* which may require modification to size and height guidance in the MUTCD.
2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 **Equipment.**

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.
2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

**Figure 2-8. Interlocking Barricades**
2.20.2.5 **Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 **Air Operations Area – Other.**

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 **Maintenance.**

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person’s information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 **Work Zone Lighting for Nighttime Construction.**

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to AC 150/5370-10 for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely
illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 Protection of Runway and Taxiway Safety Areas.

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.

2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.
2.22.1.4 Excavations.

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 Erosion Control.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.
2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. **Curves.** Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.

2. **Straight Sections.** Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
   a. Taxiing speed is limited to 10 mph.
   b. Appropriate NOTAMs are issued.
   c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
   d. Low mass, low-profile lighted barricades are installed.
   e. Appropriate temporary orange construction signs are installed.

3. **Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.**

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.
2.22.4 **Taxiway Object Free Area (TOFA).**

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.

2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.

2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

2.22.4.3.1 Taxiing speed is limited to 10 mph.

2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.

2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.

2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.

2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.
2.22.5 **Obstacle Free Zone (OFZ).**
In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 **Runway Approach/Departure Areas and Clearways.**
All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**
When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

2.22.6.3 **Caution About Displaced Thresholds.**
Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**
The CSPP must specify any other limitations on construction, including but not limited to:
2.23.1 **Prohibitions.**

2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.

2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.

2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See **AC 150/5370-10**.

2.23.2 **Restrictions.**

2.23.2.1 Construction suspension required during specific airport operations.

2.23.2.2 Areas that cannot be worked on simultaneously.

2.23.2.3 Day or night construction restrictions.

2.23.2.4 Seasonal construction restrictions.

2.23.2.5 Temporary signs not approved by the airport operator.

2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.
CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.
The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.
Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: “The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.” All other applicable sections should include a reference to 2.4.2.11: “ILS cables shall be identified and protected as described in 2.4.2.11” or “See 2.4.2.11 for ILS cable identification and protection requirements.” Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.
Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.
3.4 **Reference Documents.**
The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**
The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent (“as-built”) features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**
Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**
Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**
Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**
List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the
issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**
This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 **Location of Stockpiled Construction Materials.**
Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 **Vehicle and Pedestrian Operations.**
While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don’t belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport’s rules for ground vehicle operations, including its training program. Discuss the airport’s recordkeeping system listing authorized vehicle operators.

3.10.3 **Two-Way Radio Communications.**
Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light
3.10.4 **Airport Security.**
Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 **Wildlife Management.**
Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 **FOD Management.**
In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 **HAZMAT Management.**
Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 **Notification of Construction Activities.**
List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to
Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 Inspection Requirements.
Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator’s representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 Underground Utilities.
Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 Penalties.
Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 Special Conditions.
Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include
a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 **Runway and Taxiway Visual Aids.**
Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings;* AC 150/5340-18, *Standards for Airport Sign Systems;* and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

3.20 **Marking and Signs for Access Routes.**
Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 **Hazard Marking and Lighting.**
Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 **Work Zone Lighting for Nighttime Construction.**
If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator’s representative each time lights are relocated or repositioned.
3.23 Protection of Runway and Taxiway Safety Areas.
This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 Other Limitations on Construction.
This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.
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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at http://www.faa.gov/airports/.

Table A-1. FAA Publications

<table>
<thead>
<tr>
<th>Number</th>
<th>Title and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 150/5200-28</td>
<td>Notices to Airmen (NOTAMs) for Airport Operators</td>
</tr>
<tr>
<td></td>
<td>Guidance for using the NOTAM System in airport reporting.</td>
</tr>
<tr>
<td>AC 150/5200-30</td>
<td>Airport Field Condition Assessments and Winter Operations Safety</td>
</tr>
<tr>
<td></td>
<td>Guidance for airport owners/operators on the development of an acceptable airport</td>
</tr>
<tr>
<td></td>
<td>snow and ice control program and on appropriate field condition reporting procedures.</td>
</tr>
<tr>
<td>AC 150/5200-33</td>
<td>Hazardous Wildlife Attractants On or Near Airports</td>
</tr>
<tr>
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<td>Guidance on locating certain land uses that might attract hazardous wildlife to</td>
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<td>public-use airports.</td>
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<tr>
<td>AC 150/5210-5</td>
<td>Painting, Marking, and Lighting of Vehicles Used on an Airport</td>
</tr>
<tr>
<td></td>
<td>Guidance, specifications, and standards for painting, marking, and lighting vehicles</td>
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<td></td>
<td>operating in the airport air operations areas.</td>
</tr>
<tr>
<td>AC 150/5210-20</td>
<td>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</td>
</tr>
<tr>
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<td>Guidance to airport operators on developing ground vehicle operation training programs.</td>
</tr>
<tr>
<td>AC 150/5300-13</td>
<td>Airport Design</td>
</tr>
<tr>
<td></td>
<td>FAA standards and recommendations for airport design. Establishes approach visibility</td>
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<tr>
<td></td>
<td>minimums as an airport design parameter, and contains the Object Free area and the</td>
</tr>
<tr>
<td></td>
<td>obstacle free-zone criteria.</td>
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<tr>
<td>AC 150/5210-24</td>
<td>Airport Foreign Object Debris (FOD) Management</td>
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<tr>
<td></td>
<td>Guidance for developing and managing an airport foreign object debris (FOD) program</td>
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<tr>
<td>Number</td>
<td>Title and Description</td>
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</tr>
<tr>
<td>AC 150/5320-15</td>
<td>Management of Airport Industrial Waste</td>
</tr>
<tr>
<td></td>
<td>Basic information on the characteristics, management, and regulations of industrial</td>
</tr>
<tr>
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<td>wastes generated at airports. Guidance for developing a Storm Water Pollution</td>
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<tr>
<td></td>
<td>Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent,</td>
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<td></td>
<td>or reduce pollutants in storm water runoff with particular airport industrial</td>
</tr>
<tr>
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<td>activities.</td>
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<tr>
<td>AC 150/5340-1</td>
<td>Standards for Airport Markings</td>
</tr>
<tr>
<td></td>
<td>FAA standards for the siting and installation of signs on airport runways and</td>
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<tr>
<td></td>
<td>taxiways.</td>
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<tr>
<td>AC 150/5340-18</td>
<td>Standards for Airport Sign Systems</td>
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<tr>
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<td>FAA standards for the siting and installation of signs on airport runways and</td>
</tr>
<tr>
<td></td>
<td>taxiways.</td>
</tr>
<tr>
<td>AC 150/5345-28</td>
<td>Precision Approach Path Indicator (PAPI) Systems</td>
</tr>
<tr>
<td></td>
<td>FAA standards for PAPI systems, which provide pilots with visual glide slope guidance</td>
</tr>
<tr>
<td></td>
<td>during approach for landing.</td>
</tr>
<tr>
<td>AC 150/5340-30</td>
<td>Design and Installation Details for Airport Visual Aids</td>
</tr>
<tr>
<td></td>
<td>Guidance and recommendations on the installation of airport visual aids.</td>
</tr>
<tr>
<td>AC 150/5345-39</td>
<td>Specification for L-853, Runway and Taxiway Retroreflective Markers</td>
</tr>
<tr>
<td>AC 150/5345-44</td>
<td>Specification for Runway and Taxiway Signs</td>
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<td>FAA specifications for unlighted and lighted signs for taxiways and runways.</td>
</tr>
<tr>
<td>AC 150/5345-53</td>
<td>Airport Lighting Equipment Certification Program</td>
</tr>
<tr>
<td></td>
<td>Details on the Airport Lighting Equipment Certification Program (ALECP).</td>
</tr>
<tr>
<td>AC 150/5345-50</td>
<td>Specification for Portable Runway and Taxiway Lights</td>
</tr>
<tr>
<td></td>
<td>FAA standards for portable runway and taxiway lights and runway end identifier lights</td>
</tr>
<tr>
<td></td>
<td>for temporary use to permit continued aircraft operations while all or part of a</td>
</tr>
<tr>
<td></td>
<td>runway lighting system is inoperative.</td>
</tr>
<tr>
<td>AC 150/5345-55</td>
<td>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</td>
</tr>
<tr>
<td>Number</td>
<td>Title and Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AC 150/5370-10</td>
<td>Standards for Specifying Construction of Airports</td>
</tr>
<tr>
<td></td>
<td>Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.</td>
</tr>
<tr>
<td>AC 150/5370-12</td>
<td>Quality Management for Federally Funded Airport Construction Projects</td>
</tr>
<tr>
<td>EB 93</td>
<td>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</td>
</tr>
<tr>
<td>FAA Order 5200.11</td>
<td>FAA Airports (ARP) Safety Management System (SMS)</td>
</tr>
<tr>
<td></td>
<td>Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.</td>
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<tr>
<td>FAA Certalert 98-05</td>
<td>Grasses Attractive to Hazardous Wildlife</td>
</tr>
<tr>
<td></td>
<td>Guidance on grass management and seed selection.</td>
</tr>
<tr>
<td>FAA Form 7460-1</td>
<td>Notice of Proposed Construction or Alteration</td>
</tr>
<tr>
<td>FAA Form 7480-1</td>
<td>Notice of Landing Area Proposal</td>
</tr>
<tr>
<td>FAA Form 6000.26</td>
<td>National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form</td>
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</table>


### Table A-2. Code of Federal Regulation

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>Title 14 CFR Part 77</td>
<td>Safe, Efficient Use and Preservation of the Navigable Airspace</td>
</tr>
<tr>
<td>Title 14 CFR Part 139</td>
<td>Certification of Airports</td>
</tr>
<tr>
<td>Title 49 CFR Part 1542</td>
<td>Airport Security</td>
</tr>
</tbody>
</table>

# APPENDIX B. TERMS AND ACRONYMS

## Table B-1. Terms and Acronyms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Form 7460-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 7460-1</td>
<td>Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. (See guidance available on the FAA web site at <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a>.) The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a>, or filed electronically at: <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a>.</td>
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</tr>
<tr>
<td>Form 7480-1</td>
<td>Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a>.</td>
<td></td>
</tr>
<tr>
<td>Form 6000-26</td>
<td>Airport Sponsor Strategic Event Submission Form</td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td>Advisory Circular</td>
<td></td>
</tr>
<tr>
<td>ACSI</td>
<td>Airport Certification Safety Inspector</td>
<td></td>
</tr>
<tr>
<td>ADG</td>
<td>Airplane Design Group</td>
<td></td>
</tr>
<tr>
<td>AIP</td>
<td>Airport Improvement Program</td>
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<tr>
<td>ALECP</td>
<td>Airport Lighting Equipment Certification Program</td>
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</tr>
<tr>
<td>ANG</td>
<td>Air National Guard</td>
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</tr>
<tr>
<td>AOA</td>
<td>Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.</td>
<td></td>
</tr>
<tr>
<td>ARFF</td>
<td>Aircraft Rescue and Fire Fighting</td>
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</tr>
<tr>
<td>ARP</td>
<td>FAA Office of Airports</td>
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</tr>
<tr>
<td>ASDA</td>
<td>Accelerate-Stop Distance Available</td>
<td></td>
</tr>
<tr>
<td>AT</td>
<td>Air Traffic</td>
<td></td>
</tr>
<tr>
<td>ATCT</td>
<td>Airport Traffic Control Tower</td>
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</tr>
<tr>
<td>ATIS</td>
<td>Automatic Terminal Information Service</td>
<td></td>
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<tr>
<td>ATO</td>
<td>Air Traffic Organization</td>
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</tr>
<tr>
<td>Certificated Airport</td>
<td>An airport that has been issued an Airport Operating Certificate by the FAA under</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Term</td>
<td>Definition</td>
<td></td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.</td>
<td></td>
</tr>
<tr>
<td>CSPP</td>
<td>Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator’s consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.</td>
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</tr>
<tr>
<td>CTAFF</td>
<td>Common Traffic Advisory Frequency</td>
<td></td>
</tr>
<tr>
<td>Displaced Threshold</td>
<td>A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.</td>
<td></td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transportation</td>
<td></td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
<td></td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
<td></td>
</tr>
<tr>
<td>FOD</td>
<td>Foreign Object Debris/Damage</td>
<td></td>
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<tr>
<td>FSS</td>
<td>Flight Service Station</td>
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</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
<td></td>
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<tr>
<td>HAZMAT</td>
<td>Hazardous Materials</td>
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</tr>
<tr>
<td>HMA</td>
<td>Hot Mix Asphalt</td>
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<tr>
<td>IAP</td>
<td>Instrument Approach Procedures</td>
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<tr>
<td>IFR</td>
<td>Instrument Flight Rules</td>
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</tr>
<tr>
<td>ILS</td>
<td>Instrument Landing System</td>
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<tr>
<td>LDA</td>
<td>Landing Distance Available</td>
<td></td>
</tr>
<tr>
<td>LOC</td>
<td>Localizer antenna array</td>
<td></td>
</tr>
<tr>
<td>Movement Area</td>
<td>The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).</td>
<td></td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
<td></td>
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<tr>
<td>MUTCD</td>
<td>Manual on Uniform Traffic Control Devices</td>
<td></td>
</tr>
<tr>
<td>NAVAID</td>
<td>Navigation Aid</td>
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<tr>
<td>NAVAID Critical Area</td>
<td>An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.</td>
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<tr>
<td>Non-Movement Area</td>
<td>The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.</td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>NOTAM</td>
<td>Notices to Airmen</td>
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<tr>
<td>Obstruction</td>
<td>Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.</td>
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<tr>
<td>OCC</td>
<td>Operations Control Center</td>
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</tr>
<tr>
<td>OE / AAA</td>
<td>Obstruction Evaluation / Airport Airspace Analysis</td>
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<tr>
<td>OFA</td>
<td>Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13 for additional guidance on OFA standards and wingtip clearance criteria.)</td>
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<tr>
<td>OFZ</td>
<td>Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>OTS</td>
<td>Out of Service</td>
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<tr>
<td>P&amp;R</td>
<td>Planning and Requirements Group</td>
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</tr>
<tr>
<td>NPI</td>
<td>NAS Planning &amp; Integration</td>
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</tr>
<tr>
<td>PAPI</td>
<td>Precision Approach Path Indicator</td>
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</tr>
<tr>
<td>PFC</td>
<td>Passenger Facility Charge</td>
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</tr>
<tr>
<td>PLASI</td>
<td>Pulse Light Approach Slope Indicator</td>
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<tr>
<td>Project Proposal Summary</td>
<td>A clear and concise description of the proposed project or change that is the object of Safety Risk Management.</td>
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<tr>
<td>RA</td>
<td>Reimbursable Agreement</td>
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</tr>
<tr>
<td>RE</td>
<td>Resident Engineer</td>
<td></td>
</tr>
<tr>
<td>REIL</td>
<td>Runway End Identifier Lights</td>
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</tr>
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<td>RNAV</td>
<td>Area Navigation</td>
<td></td>
</tr>
<tr>
<td>ROFA</td>
<td>Runway Object Free Area</td>
<td></td>
</tr>
<tr>
<td>RSA</td>
<td>Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.</td>
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</tr>
<tr>
<td>SDS</td>
<td>Safety Data Sheet</td>
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<tr>
<td>SIDA</td>
<td>Security Identification Display Area</td>
<td></td>
</tr>
<tr>
<td>SMS</td>
<td>Safety Management System</td>
<td></td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>SPCD</td>
<td>Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.</td>
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<tr>
<td>SRM</td>
<td>Safety Risk Management</td>
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<tr>
<td>SSC</td>
<td>System Support Center</td>
<td></td>
</tr>
<tr>
<td>Taxiway Safety Area</td>
<td>A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.</td>
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<tr>
<td>TDG</td>
<td>Taxiway Design Group</td>
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<tr>
<td>Temporary</td>
<td>Any condition that is not intended to be permanent.</td>
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<tr>
<td>Temporary Runway End</td>
<td>The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.</td>
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<tr>
<td>Threshold</td>
<td>The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.</td>
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</tr>
<tr>
<td>TODA</td>
<td>Takeoff Distance Available</td>
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</tr>
<tr>
<td>TOFA</td>
<td>Taxiway Object Free Area</td>
<td></td>
</tr>
<tr>
<td>TORA</td>
<td>Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.</td>
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<tr>
<td>TSA</td>
<td>Taxiway Safety Area, or Transportation Security Administration</td>
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<tr>
<td>UNICOM</td>
<td>A radio communications system of a type used at small airports.</td>
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</tr>
<tr>
<td>VASI</td>
<td>Visual Approach Slope Indicator</td>
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</tr>
<tr>
<td>VGSI</td>
<td>Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).</td>
<td></td>
</tr>
<tr>
<td>VFR</td>
<td>Visual Flight Rules</td>
<td></td>
</tr>
<tr>
<td>VOR</td>
<td>Very High Frequency Omnidirectional Radio Range</td>
<td></td>
</tr>
<tr>
<td>VPD</td>
<td>Vehicle / Pedestrian Deviation</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix. This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Considerations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational safety is a standing agenda item for construction progress meetings.</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduling of the construction phases is properly addressed.</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any formal agreements are established.</td>
<td>2.5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Areas and Operations Affected by Construction Activity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawings showing affected areas are included.</td>
<td>2.7.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed or partially closed runways, taxiways, and aprons are depicted on drawings.</td>
<td>2.7.1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access routes used by ARFF vehicles affected by the project are addressed.</td>
<td>2.7.1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access routes used by airport and airline support vehicles affected by the project are addressed.</td>
<td>2.7.1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground utilities, including water supplies for firefighting and drainage.</td>
<td>2.7.1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination</td>
<td>Reference</td>
<td>Addressed?</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Approach/Departure surfaces affected by heights of temporary objects are addressed.</td>
<td>2.7.1.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.</td>
<td>2.7.1</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Temporary changes to taxi operations are addressed.</td>
<td>2.7.2.1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Detours for ARFF and other airport vehicles are identified.</td>
<td>2.7.2.2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Maintenance of essential utilities and underground infrastructure is addressed.</td>
<td>2.7.2.3</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Temporary changes to air traffic control procedures are addressed.</td>
<td>2.7.2.4</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**NAVAIDs**

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical areas for NAVAIDs are depicted on drawings.</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.</td>
<td>2.8</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Protection of NAVAID facilities is addressed.</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The required distance and direction from each NAVAID to any construction activity is depicted on drawings.</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.</td>
<td>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contractor Access**

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>The CSPP addresses areas to which contractor will have access and how</td>
<td>2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination</td>
<td>Reference</td>
<td>Addressed?</td>
<td>Remarks</td>
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<tr>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>the areas will be accessed.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.</td>
<td>2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The location of stockpiled construction materials is depicted on drawings.</td>
<td>2.9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The requirement for stockpiles in the ROFA to be approved by FAA is included.</td>
<td>2.9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements for proper stockpiling of materials are included.</td>
<td>2.9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction site parking is addressed.</td>
<td>2.9.2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction equipment parking is addressed.</td>
<td>2.9.2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access and haul roads are addressed.</td>
<td>2.9.2.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport, is included.</td>
<td>2.9.2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proper vehicle operations, including requirements for escorts, are described.</td>
<td>2.9.2.5, 2.9.2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training requirements for vehicle drivers are addressed.</td>
<td>2.9.2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-way radio communications procedures are described.</td>
<td>2.9.2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of the secured area of the airport is addressed.</td>
<td>2.9.2.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wildlife Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The airport operator’s wildlife management procedures are addressed.</td>
<td>2.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C-3
# Coordination Reference Addressed? Remarks

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foreign Object Debris Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The airport operator’s FOD management procedures are addressed.</td>
<td>2.11</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Hazardous Materials Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The airport operator’s hazardous materials management procedures are addressed.</td>
<td>2.12</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Notification of Construction Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.</td>
<td>2.13</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.</td>
<td>2.13.1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>A list of local ATO/Technical Operations personnel is included.</td>
<td>2.13.1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>A list of ATCT managers on duty is included.</td>
<td>2.13.1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>A list of authorized representatives to the OCC is included.</td>
<td>2.13.2</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.</td>
<td>2.8, 2.13.2, 2.18.3.3.9</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.</td>
<td>2.13.2</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Emergency notification procedures for medical, fire fighting, and police</td>
<td>2.13.3</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Coordination</td>
<td>Reference</td>
<td>Addressed?</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>response are addressed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination with ARFF personnel for non-emergency issues is addressed.</td>
<td>2.13.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notification to the FAA under 14 CFR parts 77 and 157 is addressed.</td>
<td>2.13.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.</td>
<td>2.13.5.3.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inspection Requirements**

- Daily and interim inspections by both the airport operator and contractor are specified. 2.14.1, 2.14.2
- Final inspections at certificated airports are specified when required. 2.14.3

**Underground Utilities**

- Procedures for protecting existing underground facilities in excavation areas are described. 2.15

**Penalties**

- Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed. 2.16

**Special Conditions**

- Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed. 2.17

**Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs**

- The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed. 2.18.1
- Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified. 2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4

C-5
<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>The requirement for markings to be in compliance with AC 150/5340-1, Standards for Airport Markings, is specified.</td>
<td>2.18.2</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Detailed specifications for materials and methods for temporary markings are provided.</td>
<td>2.18.2</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>The requirement for lighting to conform to AC 150/5340-30, Design and Installation Details for Airport Visual Aids; AC 150/5345-50, Specification for Portable Runway and Taxiway Lights; and AC 150/5345-53, Airport Lighting Certification Program, is specified.</td>
<td>2.18.3</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>The use of a lighted X is specified where appropriate.</td>
<td>2.18.2.1.2, 2.18.3.2</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>The requirement for signs to conform to AC 150/5345-44, Specification for Runway and Taxiway Signs; AC 50/5340-18, Standards for Airport Sign Systems; and AC 150/5345-53, Airport Lighting Certification Program, is specified.</td>
<td>2.18.4</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**Marking and Signs For Access Routes**

The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.

<table>
<thead>
<tr>
<th>Hazard Marking and Lighting</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.</td>
<td>2.20.1</td>
</tr>
<tr>
<td>Coordination</td>
<td>Reference</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.</td>
<td>2.20.1</td>
</tr>
<tr>
<td>The CSPP considers less obvious construction-related hazards.</td>
<td>2.20.1</td>
</tr>
<tr>
<td>Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.</td>
<td>2.20.2.1</td>
</tr>
<tr>
<td>The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.</td>
<td>2.20.2.1</td>
</tr>
<tr>
<td>Red lights meeting the luminance requirements of the State Highway Department are specified.</td>
<td>2.20.2.2</td>
</tr>
<tr>
<td>Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.</td>
<td>2.20.2.3</td>
</tr>
<tr>
<td>Barricades are specified to indicate construction locations in which no part of an aircraft may enter.</td>
<td>2.20.2.3</td>
</tr>
<tr>
<td>Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.</td>
<td>2.20.2.5</td>
</tr>
<tr>
<td>Markings for temporary closures are specified.</td>
<td>2.20.2.5</td>
</tr>
<tr>
<td>The provision of a contractor’s representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.</td>
<td>2.20.2.7</td>
</tr>
</tbody>
</table>
### Coordination Reference Addressed? Remarks

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
<th>Addressed?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Zone Lighting for Nighttime Construction</td>
<td>If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.</td>
<td>2.21</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Protection of Runway and Taxiway Safety Areas

<p>| Protection of Runway and Taxiway Safety Areas | The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations. | 2.22.1.1, 2.22.3.1 | Yes | |
| Protection of Runway and Taxiway Safety Areas | The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM. | 2.22.1.2, 2.22.3.2 | Yes | |
| Protection of Runway and Taxiway Safety Areas | Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed. | 2.22.3.3 | Yes | |
| Protection of Runway and Taxiway Safety Areas | The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions. | 2.22.1.4 | Yes | |
| Protection of Runway and Taxiway Safety Areas | Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed. | 2.22.1.4 | Yes | |
| Protection of Runway and Taxiway Safety Areas | The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site. | 2.22.1.4 | Yes | |
| Protection of Runway and Taxiway Safety Areas | Grading and soil erosion control to maintain RSA/TSA standards are | 2.22.3.5 | Yes | |</p>
<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The CSPP specifies that equipment is to be removed from the ROFA when not in use.</td>
<td>2.22.2</td>
</tr>
<tr>
<td>The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.</td>
<td>2.22.3</td>
</tr>
<tr>
<td>Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.</td>
<td>2.22.4</td>
</tr>
<tr>
<td>Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.</td>
<td>2.22.4.3.6</td>
</tr>
<tr>
<td>Provisions for protection of runway approach/departure areas and clearways are included.</td>
<td>2.22.6</td>
</tr>
</tbody>
</table>

**Other Limitations on Construction**

<table>
<thead>
<tr>
<th>Coordination</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.</td>
<td>2.23.1.2</td>
</tr>
<tr>
<td>The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.</td>
<td>2.23.1.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Addressed?</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Action Required (Describe)</th>
<th>No Action Required (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation adjacent to runways, taxiways, and aprons improperly backfilled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Action Required (Describe)</td>
<td>No Action Required (Check)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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</tr>
<tr>
<td>approach zones.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.</td>
<td></td>
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</tr>
<tr>
<td>Obliterated or faded temporary markings on active operational areas.</td>
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</tr>
<tr>
<td>Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Action Required (Describe)</td>
<td>No Action Required (Check)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.</td>
<td></td>
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</tr>
<tr>
<td>Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of radio communications with construction vehicles in airport movement areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Action Required (Describe)</td>
<td>No Action Required (Check)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site burning, which can cause possible obscuration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction work taking place outside of designated work areas and out of phase.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

E.1 Project Description.
Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

Figure E-1. Phase I Example

Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.
Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).
E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

**Figure E-2. Phase II Example**

---

**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**Note 2:** Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).
E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

**Figure E-3. Phase III Example**
# Table E-1. Operational Effects Table

<table>
<thead>
<tr>
<th>Project</th>
<th>Runway 15-33 Extension and Repaving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase</td>
<td>Normal (Existing)</td>
</tr>
<tr>
<td>Scope of Work</td>
<td>N/A</td>
</tr>
<tr>
<td>Effects of Construction Operations</td>
<td>N/A</td>
</tr>
<tr>
<td>Construction Phase</td>
<td>N/A</td>
</tr>
<tr>
<td>Runway 15 Average Aircraft Operations</td>
<td>Carrier: 52 /day GA: 26 /day Military: 11 /day</td>
</tr>
<tr>
<td>Runway 33 Average Aircraft Operations</td>
<td>Carrier: 40 /day GA: 18 /day Military: 10 /day</td>
</tr>
<tr>
<td>Runway 15-33 Aircraft Category</td>
<td>C-IV</td>
</tr>
<tr>
<td>Runway 15 Approach Visibility Minimums</td>
<td>1 mile</td>
</tr>
<tr>
<td>Runway 33 Approach Visibility Minimums</td>
<td>¾ mile</td>
</tr>
</tbody>
</table>

*Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.*
<table>
<thead>
<tr>
<th>Project</th>
<th>Runway 15-33 Extension and Repaving</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase</strong></td>
<td>Normal (Existing)</td>
</tr>
<tr>
<td>Runway 15 Declared Distances</td>
<td>TORA</td>
</tr>
<tr>
<td></td>
<td>TODA</td>
</tr>
<tr>
<td></td>
<td>ASDA</td>
</tr>
<tr>
<td></td>
<td>LDA</td>
</tr>
<tr>
<td>Runway 33 Declared Distances</td>
<td>TORA</td>
</tr>
<tr>
<td></td>
<td>TODA</td>
</tr>
<tr>
<td></td>
<td>ASDA</td>
</tr>
<tr>
<td></td>
<td>LDA</td>
</tr>
<tr>
<td>Runway 15 Approach Procedures</td>
<td>LOC only</td>
</tr>
<tr>
<td></td>
<td>RNAV</td>
</tr>
<tr>
<td></td>
<td>VOR</td>
</tr>
<tr>
<td>Runway 33 Approach Procedures</td>
<td>ILS</td>
</tr>
<tr>
<td></td>
<td>RNAV</td>
</tr>
<tr>
<td></td>
<td>VOR</td>
</tr>
<tr>
<td>Runway 15 NAVAIDs</td>
<td>LOC</td>
</tr>
<tr>
<td>Runway 33 NAVAIDs</td>
<td>ILS, MALSR</td>
</tr>
<tr>
<td>Taxiway G ADG</td>
<td>IV</td>
</tr>
<tr>
<td>Taxiway G TDG</td>
<td>4</td>
</tr>
<tr>
<td>ATCT (hours open)</td>
<td>24 hours</td>
</tr>
<tr>
<td>ARFF Index</td>
<td>D</td>
</tr>
<tr>
<td>Project</td>
<td>Runway 15-33 Extension and Repaving</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Phase</td>
<td>Normal (Existing)</td>
</tr>
<tr>
<td>Special Conditions</td>
<td>Air National Guard (ANG) military operations</td>
</tr>
</tbody>
</table>

**Information for NOTAMs**
- Refer above for applicable declared distances.
- Taxiway G limited to 118 ft wingspan
- Refer above for applicable declared distances.
- Refer above for applicable declared distances.
- Airport closed 2000 – 0500.
- Runway 15 glide slope OTS.

**Note:** This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

### Table E-2. Runway and Taxiway Edge Protection

<table>
<thead>
<tr>
<th>Runway/Taxiway</th>
<th>Aircraft Approach Category*</th>
<th>Airplane Design Group*</th>
<th>Safety Area Width in Feet Divided by 2*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A, B, C, or D</td>
<td>I, II, III, or IV</td>
<td></td>
</tr>
</tbody>
</table>

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.
Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

**Table E-3. Protection Prior to Runway Threshold**

<table>
<thead>
<tr>
<th>Runway End Number</th>
<th>Airplane Design Group*</th>
<th>Aircraft Approach Category*</th>
<th>Minimum Safety Area Prior to the Threshold*</th>
<th>Minimum Distance to Threshold Based on Required Approach Slope*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I, II, III, or IV</td>
<td>A, B, C, or D</td>
<td>ft</td>
<td>ft : 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ft</td>
<td>ft : 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ft</td>
<td>ft : 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ft</td>
<td>ft : 1</td>
</tr>
</tbody>
</table>

*See AC 150/5300-13 to complete the chart for a specific runway.
APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends

CONSTRUCTION AHEAD

CONSTRUCTION ON RAMP

RWY 4L TAKEOFF RUN AVAILABLE 9,780 FT
Figure F-2. Orange Construction Sign Example 1

Note: For proper placement of signs, refer to EB 93.
Figure F-3. Orange Construction Sign Example 2

Note: For proper placement of signs, refer to EB 93.
DIVISION 7

WAGE RATES – NOT APPLICABLE
DIVISION 8

TECHNICAL SPECIFICATIONS
SECTION 01 3216  
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Preliminary schedule.
B. Construction progress schedule, bar chart type.

1.02 REFERENCE STANDARDS
B. M-H (CPM) - CPM in Construction Management - Project Management with CPM 2015.

1.03 SUBMITTALS
A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
D. Within 10 days after joint review, submit complete schedule.
E. Submit updated schedule with each Application for Payment.

1.04 QUALITY ASSURANCE
A. Contractor's Administrative Personnel: five years minimum experience in using and monitoring CPM schedules on comparable projects.

1.05 SCHEDULE FORMAT
A. Sheet Size: Multiples of 8-1/2 x 11 inches.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE
A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT
A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
B. Identify each item by specification section number.
C. Identify work of separate stages and other logically grouped activities.
D. Include conferences and meetings in schedule.
E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
F. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS
A. Include a separate bar for each major portion of Work or operation.
B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE
A. Participate in joint review and evaluation of schedule with Architect at each submittal.
B. Evaluate project status to determine work behind schedule and work ahead of schedule.
C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE
A. Maintain schedules to record actual start and finish dates of completed activities.
B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
C. Annotate diagrams to graphically depict current status of Work.
D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
E. Indicate changes required to maintain Date of Substantial Completion.
F. Submit reports required to support recommended changes.
G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

PFC/LOC 19-01 CNCIA
Holdroom Additions/Renovation 01 3216 - 1  Construction Progress Schedule
3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor’s project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION
DESTRUCTION

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Selective demolition of built site elements.
B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS
A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
B. Section 01 1000 - Summary: Sequencing and staging requirements.
C. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
D. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
E. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
F. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
G. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Site Plan: Showing:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.
D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 3 EXECUTION
2.01 SCOPE
A. Remove portions of existing buildings in the following sequence:
B. Remove concrete slabs on grade within construction limits indicated on drawings.
C. Remove other items indicated, for salvage, relocation, recycling, and coordinate with Owner. Salvage 2nd floor window sills. Do not damage window sills. Deliver window sills to Owner.
D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS
A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
6. Do not close or obstruct roadways or sidewalks without permit.
7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.
D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.
E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

2.03 EXISTING UTILITIES
A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

2.04 SELECTIVE DEMOLITION FOR ALTERATIONS
A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction.
C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

2.05 DEBRIS AND WASTE REMOVAL
A. Remove debris, junk, and trash from site.
B. Leave site in clean condition, ready for subsequent work.
C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Selective demolition of built site elements.
B. Selective demolition of building elements for alteration purposes.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Site Plan: Showing:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.
D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 3 EXECUTION

2.01 SCOPE
A. Remove portions of existing buildings in the following sequence:
B. Remove concrete slabs on grade within construction limits indicated on drawings.
C. Remove other items indicated, for salvage, relocation, recycling, and coordinate with Owner. Salvage 2nd floor window sills. Do not damage window sills. Deliver window sills to Owner.
D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS
A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   6. Do not close or obstruct roadways or sidewalks without permit.
   7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
B. Do not begin removal until receipt of notification to proceed from Owner.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.
D. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

2.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

2.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.
2.05 **DEBRIS AND WASTE REMOVAL**

A. Remove debris, junk, and trash from site.
B. Leave site in clean condition, ready for subsequent work.
C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**
SECTION 03 0516
UNDERSLAB VAPOR BARRIER

PART 1 GENERAL
1.01 REFERENCE STANDARDS
A. 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 2018a.

PART 2 PRODUCTS
2.01 MATERIALS
A. Underslab Vapor Barrier:
   1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
   2. Thickness: 15 mils.
   3. Basis of Design:
B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION
3.01 INSTALLATION
A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
C. Lap joints minimum 6 inches.
D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
F. Repair damaged vapor retarder before covering with other materials.

END OF SECTION
SECTION 03 0516
UNDERSLAB VAPOR BARRIER

PART 1 GENERAL
1.01 REFERENCE STANDARDS
   A. 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 2018a.

PART 2 PRODUCTS
2.01 MATERIALS
   A. Underslab Vapor Barrier:  
      1. Water Vapor Permeance: Not more than 0.010 perms, maximum.  
      2. Thickness: 15 mils.  
      3. Basis of Design:  
   B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION
3.01 INSTALLATION
   A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
   B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
   C. Lap joints minimum 6 inches.
   D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
   E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
   F. Repair damaged vapor retarder before covering with other materials.

END OF SECTION
SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1  GENERAL

1.01  RELATED DOCUMENTS
A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 specification Sections apply to the work of this Section.

1.02  SECTION INCLUDES
A. Concrete forming and accessories.
   1. Design engineering for formwork system.
B. Concrete building frame members.
C. Concrete for composite floor construction.
D. Elevated concrete slabs.
E. Floors and slabs on grade.
F. Concrete shear walls and elevator shaft walls.
G. Concrete reinforcing.
H. Joint devices associated with concrete work.
I. Miscellaneous concrete elements, including equipment pads, light pole bases, and similar items.
J. Post-installed anchoring.
K. Concrete curing.

1.03  REFERENCE STANDARDS
C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
F. ACI 305R - Hot Weather Concreting; 2010.
G. ACI 306R - Cold Weather Concreting; 2010.
H. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
J. ACI 347R - Guide to Formwork for Concrete; 2014.
L. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.
P. ASTM A1044/A1044M - Standard Specification for Steel Stud Assemblies for Shear Reinforcing of Concrete; 2010.
1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the installation of foundations with size, location and installation of underground service utilities.
   2. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
   3. Coordinate with work of other Sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
   4. Coordinate the use and application of specified curing methods for slabs and floor surfaces with accepted flooring system manufacturers.

B. Preinstallation Meeting: Conduct a preinstallation meeting prior to the start of the work of this Section.
1. Attendance: Contractor's quality control supervisor or superintendent, Architect, structural engineer, Owner's independent testing agency, all affected trades including reinforcing subcontractor and concrete supplier, and mechanical, electrical, and similar subcontractors when embedded items of these trades are required.

2. Discuss construction document requirements, required clarifications to construction documents, construction schedule, and coordination of affected trades.

**1.05 SUBMITTALS**

**A. Product Data:** Submit manufacturers' data on all specified manufactured products showing compliance with specified requirements and installation instructions.

1. **Curing Compounds:** Provide data on method of removal in the event of incompatibility with floor covering adhesives.

**B. Mix Design:** Submit proposed mix design for each class of concrete specified. Include mix identification number (unique for each submitted mix), intended use of mix, air content, proportions of ingredients, aggregate analysis, cement brand and type, slump, water/cement ratio, and strength test reports for 7 and 28 day strengths.

1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

2. Include mix design for drilled concrete piers and shafts as specified in Section 31 6329.

3. Provide specific aggregate analysis for recycled aggregates proposed for use in concrete mixes.

4. For mixes specifying a maximum allowed drying shrinkage, submit data according to ASTM C157/C157M substantiating conformance with specified requirements.

5. **Fly-Ash Content Submittal:** If any fly ash or ground granulated blast furnace slag is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of Portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

**C. Shop Drawings:**

1. **Reinforcing:** Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

   a. Provide 1/4 inch scale elevations of all walls and grade beams with reinforcing shown.

   b. Show splice locations, if any.

2. **Elevated Slabs, Beams, and Joists:** Submit formwork, reshoring, and backshoring shop drawings and calculations signed and sealed by a Professional Engineer licensed in the State in which the Project is located.

3. **Formwork:** Submit shop drawings for fabrication and erection of specific finished concrete surfaces indicated on architectural Drawings. Show general construction of forms including jointing, special form joints or reveals, location and pattern of form tie placement, and other items which visually affect exposed concrete.

**D. Concrete Placement Drawings:**

1. Submit detailed floor concrete placement and layout drawings; 1/8 inch = 1 foot minimum scale, with all concrete lines edges, surfaces, and similar items dimensioned to column lines. Provide the following:

   a. Concrete thicknesses, depths, beam sizes and joist sizes.

   b. Embedded items (other than rebar).

   c. Recesses, slab breaks, depressions, slopes to drains.

   d. Construction joints, control joints, expansion joints.

   e. Openings and penetrations.

   f. Sleeves, penetrations and embedded conduit for mechanical, electrical, plumbing, fire protection, and similar items. Clearly show and dimension locations and routing.
2. Submit detailed wall and grade beam concrete placement and layout drawings; 1/4 inch = 1 foot minimum scale, with all concrete lines edges, surfaces, and similar items dimensioned in plan and elevation views to column lines. Provide the following:
   a. Wall thicknesses.
   b. Embedded items (other than rebar).
   c. Construction joints, control joints, expansion joints.
   d. Openings and Penetrations.
   e. Sleeves and penetrations for mechanical, electrical, plumbing, fire, etc.
   f. Beam pockets.
   g. Rustications.

E. Manufacturer's Installation Instructions: For concrete accessories, curing compounds, and admixtures, indicate installation procedures and interface required with adjacent construction.

F. Manufacturer's Certificate: Provide written certification for each admixture actually used that admixtures contain no thiocyanates, and admixtures do not exceed 0.06 percent chloride ions.

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

1.06 QUALITY ASSURANCE

A. Perform work of this Section in accordance with ACI 117, ACI 301, and ACI 318, unless amended by requirements specified in this Section.
   1. Maintain one copy of ACI 117 and ACI 301 on site.

   2. Maintain one copy of ACI SP-15 on site.

B. Formwork Designer Qualifications: Design formwork under direct supervision of a Professional Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

C. Follow recommendations of ACI 301 when concreting during hot or cold weather.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Forming Materials:
   1. Deliver prefabricated forms and installation instructions in manufacturer's packaging.

   2. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

1.08 MASS CONCRETE

A. Comply with ACI 301.

B. Mass concrete is defined as a placement of structural concrete with a minimum dimension equal to or greater than 4 feet. Similar considerations should be made for other concrete placements that include Type III cement, accelerating addmixtures or cementitious materials in excess of 660 lb/cy and placements that trap heat.

PART 2 PRODUCTS

2.01 FORMING

A. Formwork Design and Construction: Comply with ACI 301 and ACI 347, except as modified by requirements specified in this Section, to provide formwork that will produce concrete complying with tolerances of ACI 117.
   1. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

B. Limit concrete surface irregularities, designated as abrupt or gradual according to ACI 347, as follows:
   1. Class A: 1/8 inch for "smooth formed" finish surfaces specifically noted on Drawings.
2. Class B: 1/4 inch for permanently exposed formed finished surfaces, unless otherwise specified.
3. Class C: 1/2 inch for indicated formed finished surfaces.
4. Class D: 1 inch for permanently concealed formed finished surfaces.
5. Permissible irregularity is a cumulative value due to all sources including layout, plumbness, member size, formwork offsets, joints, and member levelness. Permissible irregularity also applies between adjacent concrete surfaces on opposite sides of construction joints, expansion joints, or shrinkage pour strip if present.

C. Chamfer outside corners of exposed beams, joists, columns, and walls unless otherwise indicated on Drawings.

D. Steel Flange Forms: Provide factory fabricated flange form units of required sizes and shapes. Fabricate of minimum 16 gauge steel, free of dents, irregularities, sag and rust.
   1. Provide flange forms complete with covers, end closures and tapered shapes required to form true, clean, smooth concrete surfaces as shown.

E. Skip Joist Forms: Provide standard width flange forms with skip plate or wide module forms (Contractor's option).

F. Steel Form Deck: High tensile steel forms; capable of supporting construction loads for spans shown. See Drawings for slab form depth gauge and finish.

G. Void Forms: Factory fabricated, corrugated paper; biodegradable; internal uniform cellular construction, structurally sufficient to support weight of wet concrete and construction loading until concrete reaches design strength, and quickly degrades so that expansive soils do not cause heaving; minimum 6 inches thick, unless otherwise indicated on structural Drawings.

2.02 REINFORCING

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Reinforcing Steel for Welded Connections and Splices: ASTM A706/A706M, deformed low-alloy steel bars.
   1. Unfinished, unless otherwise indicated.

C. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
   1. Form: Flat sheets.
   2. Mesh Size and Wire Gage: As indicated on Drawings.

D. Headed Shear Stud Reinforcing (Stud Rails): ASTM A1044/A1044M; 51,000 psi minimum yield strength.
   1. Complete and finished stud rail required to be ICC evaluated, and welding is required to take place in ICC approved and audited facility.
   2. Acceptable Manufacturers:

E. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 2 inches of weathering surfaces and surfaces exposed to view.
4. Provide plastic, or plastic coated steel components within 2 inches from point of contact with epoxy coated reinforcement.

2.03 CONCRETE MATERIALS
A. Cement: ASTM C150, Cement type as indicated on drawings. Portland type.
   1. Acquire all cement for entire project from same source.
   1. Acquire all aggregates for entire project from same source.
   2. Tested according to ASTM C295/C295M or ASTM C1293 and according to PCA (GS) Section 5.1.
   3. Recycled coarse aggregates may be used in foundation and slab on grade mixes; limit use to 50 percent of total coarse aggregate in each mix by weight.
C. Fly Ash: ASTM C618, Class C or F.
D. Calcined Pozzolan: ASTM C618, Class N.
E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
F. Water: ASTM C1602/C1602M; clean and not detrimental to concrete.

2.04 ADMIXTURES
A. Do not use chemicals that will result in soluble chloride ions in excess of 0.06 percent by weight of cement.
   1. Use of calcium chloride is not permitted.
B. Use of admixtures will not relax cold weather placement requirements.
C. Admixtures:
   1. Air Entrainment Admixture: ASTM C260/C260M.
   2. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
   3. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
   5. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
   6. Accelerating Admixture: ASTM C494/C494M Type C.
   7. Retarding Admixture: ASTM C494/C494M Type B.
   8. 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; maximum permeance of 0.01 as measured according to ASTM E96/E96M; 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. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
B. Non-Shrink Grout: ASTM C1107/C1107M, Grade B; pre-mixed compound consisting of non-metallic aggregate, cement, and manufacturer's specified water reducing and plasticizing agents; non-staining, non-gas-forming, containing no chlorides; plastic consistency as measured according to ASTM C230; capable of developing minimum compressive strength of 3,000 psi in 24 hours and 7,000 psi in 28 days.
C. Post-Installed Concrete Anchors:
   1. Type: Wedge type expansion bolts.
a. Interior Use: For all expansion bolts, nuts, and washers for use in interior conditioned environments free of potential moisture, provide bolt assemblies manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325.

b. Exterior or Exposed Use: For all expansion bolts, nuts, and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials, provide stainless steel bolt assemblies. Provide stainless steel bolts manufactured from 300 series stainless steel, and nuts and washers from 300 series or Type 18-8 stainless steel.

2. Type: Adhesive Bolts; Threaded steel rod meeting minimum requirements of ASTM A307 and a sealed glass, tube, or sausage type capsule containing polyester resin, quartz sand aggregate, and hardener.

a. Interior Use: For all threaded steel rods, nuts, and washer for use in interior conditioned environments free of potential moisture, provide bolt assemblies manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325.

b. Exterior or Exposed Use: For all threaded steel rods, nuts, and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials, provide stainless steel bolt assemblies. Provide stainless steel bolts manufactured from 300 series stainless steel, and nuts and washers from 300 series or Type 18-8 stainless steel.

3. Type: Screw type screw anchors.

a. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors with zinc plating equivalent to DIN EN ISO 4042 (8 micrometer minimum).

4. Acceptable Products and Manufacturers:

a. Provide anchor size, embedment and type indicated in Drawings.

b. Only concrete anchors approved by the International Code Council (ICC) with a published evaluation report by ICC Evaluation Service (ICC-ES) indicating code compliance are acceptable. Submit ICC-ES reports for review.

D. Expanded Polystyrene (EPS):

1. Applications: Over-framing filler.

2. Physical Properties: In compliance with ASTM D6817.

3. Density: 0.9 lb per cubic foot, minimum.

4. Minimum Compressive Resistance: 1.0 percent deformation of 3.6 psi when tested in accordance with ASTM D6817.

2.06 BONDING AND JOINTING PRODUCTS

A. Bonding Agent: Polyvinyl acetate or acrylic base, re-wettable type.

B. Epoxy Filler: Two-part liquid, 100 percent solids epoxy resin; gray color.

C. Epoxy Resin: Two-part, pourable or injection-applied epoxy resin; gray color.

D. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.

1. Configuration: As indicated on Drawings.

2. Size: As indicated on Drawings.

E. Slab-On-Grade Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

1. Provide non-compressible isolation joint filler (bond break) for use where slab-on-grade provides restraint at bottom of foundation walls, bottom of columns and at locations indicated on Drawings. Acceptable materials consist of 15# asphalt roof underlayment, synthetic roof underlayments, vapor barrier sheeting or other non-compressible materials.

F. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
2.07 CURING MATERIALS
A. Curing Compounds: Conform to ACI 301 conforming to ASTM C309 or ASTM C1315.
B. Where slabs are to receive moisture sensitive flooring or adhesively applied flooring or roofing, provide curing materials and methods that will not inhibit adhesion of floor and roof coverings and will prevent failures resulting from moisture and/or alkalinity from emanating from the concrete.
C. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN - GENERAL
A. Proportioning Normal Weight Concrete: Comply with ACI 301 and ACI 211.1 recommendations.
B. Mix Design Durability: Conform to ACI 301 durability exposure categories as required and as indicated on Drawings.
C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

2.09 CONCRETE MIXES
A. See Drawings for specified concrete strengths.
B. Allowed Shrinkage - All Mixes: Maximum 0.045 percent according to ASTM C157/C157M.
C. Normal Weight Structural Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on Drawings.
   2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
   3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
   4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
   5. Water-Cement Ratio: Maximum 40 percent by weight for all garage slabs and unprotected exterior slabs, unless noted otherwise.
   6. Total Air Content: In conformance with ACI 301 for F1 exposure class for all garage slabs and unprotected exterior slabs, unless noted otherwise; determined in accordance with ASTM C173/C173M.
   7. Maximum Aggregate Size: In accordance with ACI 301.

2.10 MIXING
A. General: Comply with ACI 301.
B. Transit Mixers: Comply with ASTM C94/C94M.
   1. Deliver concrete and discharge entire load within 1-1/2 hours, or before drum has turned 300 revolutions, whichever occurs first, after introduction of mixing water.
   2. Maintain slump, air content and temperature according to ACI 301.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify lines, levels, and dimensions before proceeding with work of this Section.

3.02 FORMWORK ERECTION
A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms, reshores, and backshores to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
B. Verify that forms are clean and free of rust before applying release agent.
C. Formwork Tolerances:
   1. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
2. Conform to specified class of surface finish for offset between adjacent formwork facing panels. Maintain concrete cover and cross sections within specified tolerances regardless of class of surface finish.

3. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

4. Camber slabs and beams in accordance with ACI 301.

D. Remove all fins, projections, and other detrimental irregularities on surfaces to receive waterproofing systems; comply with waterproofing system manufacturer’s requirements for surface preparation.

3.03 INSTALLATION - VAPOR RETARDER

A. Install vapor retarder under interior slabs on grade according to manufacturer’s instructions and ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

1. Fine grade under slab soils to smooth and level surface prior to installation of slab on grade edge and construction joint forms.

2. Tamp and level subbase soil materials to within plus zero (0) inches to minus 3/4 inches from required subgrade elevation.

3. Lap vapor retarder up and over foundation elements and seal to foundation walls.

4. Seal all penetrations, including pipes, with specified pipe boots; no penetrations of vapor retarder membrane are permitted except for reinforcing steel and permanent utilities.

5. Do not disturb or damage vapor retarder while placing concrete. Repair damaged vapor retarder by cutting patches of vapor retarder, overlapping damaged area 6 inches minimum and taping all four sides with seal tape.

3.04 INSTALLATION - VOID FORMS

A. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

1. Tape seams or use manufacturer's standard seam pads at joints between units.

2. At intersection of concrete piers and grade beams, use factory fabricated void form with radiused vertical end to conform to pier diameter, fitted tight to pier.

3. At concrete piers in floor slab areas, use two-piece factory fabricated void form with radiused vertical edge adjacent to pier to conform to pier diameter, fitted tight to pier.

3.05 INSTALLATION - 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.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.06 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify Architect/Engineer not less than one week prior to commencement of placement operations.

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

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

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance, leaving a clean surface, and exposing the sand and sound surface mortar.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified in this Section.
G. If the average of the highest and lowest ambient temperature is expected to be less than 40 degrees Fahrenheit for three consecutive days, concrete placement temperatures shall meet the minimum temperature requirements of ACI 301.

H. Concrete placement temperatures shall not exceed the maximum temperatures indicated in ACI 301.

3.07 SLAB JOINTING

A. Slab-On-Grade 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.
   2. Separate piping, conduit, and similar penetrations through slabs on grade to allow free vertical movement of slab or penetrating element.

B. Slab-On-Grade Control Joints: Saw cut joints before concrete begins to cool, with 3/16 inch thick blade and cut at least 1 inch deep.

C. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.

3.08 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

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

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

3.09 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. An independent testing agency will inspect finished slabs for conformance to specified tolerances.

B. Sloping Floors: Account for placement tolerances, deflections, and camber to provide positive drainage and permissible slopes.

C. For slabs poured over metal decking, place screeds along beam lines. Set screeds and adjust as necessary to achieve uniform slab thickness over beams, allowing for beam camber and deflection. Account for additional slab thickness between beams due to metal deck deflection.

D. Correct the slab surface if tolerances are less than specified.

E. Comply with the following minimum F(F) Floor Flatness and F(L) Floor Levelness values:
   1. Parking, Mechanical Rooms, and Non-Public Areas Not Receiving Troweled Finish: Overall value F(F) 20 / F(L) 15; minimum local value F(F) 13 / F(L) 10.
   2. Under Thin Resilient Flooring and Thinset Tile: Overall value F(F) 45 / F(L) 35; minimum local value F(F) 30 / F(L) 23.
   3. Troweled surfaces exposed to view: Overall value F(F) 45 / F(L) 35; minimum local value F(F) 30 / F(L) 23.
   4. All Other Surfaces: Overall value F(F) 35 / F(L) 25; minimum local value F(F) 23 / F(L) 17.

F. Measure F(F) and F(L) in accordance with ASTM E1155 and ACI 117, within 72 hours after slab installation and before forms and shores are removed, and before post-tensioning stressing; report both composite overall values and local values for each measured section.

G. Corrective Measures:
   1. Correct the slab surface if tolerances are less than specified.
   2. 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.
   3. 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.

H. Concrete/Leveling Compound: Include at no additional cost to Owner:
1. Additional concrete required to achieve specified slab surface finish tolerances. Maintain thickness of members within tolerance.
2. Leveling compound/preparation as required for flooring installation tolerances as specified elsewhere but not less than specified by flooring manufacturer.

3.10 CONCRETE FINISHING
A. Repair surface defects immediately after removing formwork.
B. Finishing Formed Surfaces: Unless otherwise specified, comply with ACI 301 Section 5 for “As-cast finish” complying with SF-1.0 on concrete surfaces not exposed to view, and SF-2.0 on concrete surfaces exposed to view.
   1. Provide mock-up of SF-2.0 surface upon Architect/Engineer’s request.
C. Concrete Slabs: Finish to requirements of ACI 301. Unless otherwise specified, use following finishes and corresponding tolerances:
   1. Scratched Finish: For surfaces scheduled to receive bonded cementitous mixtures.
   2. Float Finish: For surfaces scheduled to receive waterproofing, roofing, insulation, or sand-bed terrazzo.
   3. Trowel Finish: For floors scheduled to be exposed or to receive floor coverings.
   4. Broom or Belt Finish: For sidewalks, ramps, and garage floor surfaces.
D. In areas with floor drains, maintain floor elevation at edges; pitch surfaces uniformly to drains as indicated on Drawings. Maintain specified minimum slab thickness.

3.11 INSTALLATION - POST-INSTALLED ANCHORS
A. General: Comply with all manufacturer’s instructions.
   1. Where manufacturer recommends use of special tools for installation of anchors, use such tools.
B. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits. Use drill bits of diameters as specified by anchor manufacturer. Unless otherwise shown on the Drawings, drill holes perpendicular to concrete surface. Where anchors are to be installed in cored holes, use core bits with matched tolerances as specified by manufacturer. Cored holes may only be used if acceptable to the manufacturer.
C. Clear holes of debris after holes are drilled according to manufacturer’s instructions. For adhesive installations, at a minimum, blow out holes with oil-free compressed air and brush with wire or nylon brush. Blow out holes one additional time with oil-free compressed air. Additional hole cleaning requirements may be required by manufacturer.
D. During adhesive curing time period, keep temperature of substrate above minimum substrate temperature required by manufacturer. Determine appropriate means and methods to ensure that temperature is kept above required minimum temperature required before adhesive installation is begun.

3.12 CURING AND PROTECTION
A. Comply with requirements of ACI 301 for curing and protection of concrete.
B. At elevated slabs, formwork shall remain in place for the duration of the curing period required in ACI 301 unless alternate curing methods are provided.
C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
D. Provide protection of concrete during cold weather conditions as required in ACI 301.
E. Where slabs are to receive moisture sensitive flooring or adhesively applied flooring or roofing, provide curing methods that will not inhibit adhesion of floor and roof coverings and will prevent failures resulting from moisture and/or alkalinity from emanating from the concrete. Application of curing and sealing compounds shall be in accordance with the manufacturers requirements in all aspects to achieve manufactures warranty.
F. Do not permit traffic over unprotected concrete floor surface until fully cured.

3.13 FIELD QUALITY CONTROL

A. Tests and Inspections: Conform to ACI 301.

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

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Formwork: Inspected by the testing agency for size, shape, profile, condition of interior surfaces and joints, and attachment of accessories and embedded items prior to each placement of concrete.

E. Concrete: Tested and inspected by the testing agency.

1. Verification of mix design.

2. Compressive Strength Tests: ASTM C39/C39M and ACI 301. For each test, mold and cure concrete test cylinders for reporting 7, 28, and 56 day compressive strength (minimum quantity of cylinders for 28 day tests per ACI 301). Use of 56 day test will be at the discretion and approval of Engineer. Obtain test samples for every 100 cu yd or less of each concrete mix design placed with a minimum of one test per day.

3. Field cured cylinders or maturity meter testing with maturity curves calibrated to the concrete mix design placed shall be provided at elevated slabs to determine compressive strength prior to stressing post-tensioning, form stripping, during cold weather concreting and as indicated in ACI 301.

   a. Contractor to provide adequate quantity of field cure cylinders to determine compressive strength of in place concrete.

   b. Contractor procedure for handling of field cured cylinders to include consideration for potential for low breaks due to cylinders subjected to freezing temperatures or damage.

4. Other Required Tests:

   a. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

   b. Sample concrete used for each set of test cylinders for air content, temperature, and unit weight following procedures of ASTM C173/C173M or ASTM C231/C231M (do not use ASTM C231/C231M method for lightweight aggregate concrete) for air content and ASTM C1064/C1064M for temperature.

   c. Take samples at the point of discharge from the truck chute, except take samples of pumped concrete at the point of deposit (placement) in the field.

F. Reinforcing: Inspected by testing agency prior to closing formwork or placing concrete.

G. Post-Installed Anchoring: Special inspection is required according to applicable building code requirements.

3.14 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect/Engineer and Contractor within 24 hours of test.

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

C. Repair or replacement of defective concrete will be determined by the Architect/Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

E. Repair cracks, holes, and voids exceeding 1/16 inch wide by grinding crack to 1/8 inch wide and fill with epoxy bonding system. Grind smooth and flush with adjacent surface.

2. Cracks: Epoxy filler.

3.15 REMOVAL OF SHORING

A. Comply with requirements of ACI 301 for removal of formwork.

B. At non-post tensioned slabs, shoring shall be provided to support slab self weight and construction loads and shall remain in place a minimum of 7 days and until the concrete reaches the specified 28 day strength. Concrete strength shall be based on field cured cylinders or calibrated maturity meter testing.

END OF SECTION 033000
SECTION 051200
STRUCTURAL STEEL

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 specification Sections apply to the work of this Section.

1.02 SECTION INCLUDES
A. Structural steel framing, loose lintels, and miscellaneous structural steel fabrications.
B. Grouting under base plates and other bearing members.

1.03 RELATED REQUIREMENTS
A. Section 053100 - Steel Decking: Support framing for small openings in deck.
B. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.
C. Division 9 - Painting and Coating

1.04 REFERENCE STANDARDS
A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction Inc.; 2011
B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2005
C. AISC 348 - Specification for Structural Joints Using High-Strength Bolts; American Institute of Steel Construction, Inc.; 2010
D. AISC 360 - Specifications for Structural Steel Buildings; American Institute of Steel Construction, Inc.; 2010

1.05 SUBMITTALS
A. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths and effective throat of pp welds.
   5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts; identify pretensioned and slip-critical high-strength bolted connections.
   6. Indicate items embedded in concrete, including embed plates and anchor rods.
B. Detailing BIM Model: Provide BIM model in viewer format. Tekla BIMsight or SDS2 Viewer are acceptable
   1. Provide BIM model for each shop drawing submittal.
C. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
D. Product Test Reports:
   1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
   1. Where the Fabricator participates in the AISC Certification Program, submittal of current AISC Certification shall satisfy requirement for Welding Certificates.

1.06 QUALITY ASSURANCE
   A. Fabricate and erect structural steel members in accordance with AISC (MAN)"Steel Construction Manual," AISC 360 Chapter N.
      1. Maintain one copy of document on site.
   B. Fabricator Qualifications: Experienced in the fabrication of structural steel for projects of similar size and difficulty.
   C. Erector: Company specializing in performing the work of this Section with minimum five years of documented experience.

1.07 DELIVERY, STORAGE AND HANDLING
   A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
      1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
   B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
      1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
      2. Clean and relubricate bolts and nuts that become dry or rusty before use.
      3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

1.08 COORDINATION
   A. Coordinate installation of all items to be embeded in or attached to other materials. Provide templates or means of securing in place as required.
   B. Coordinate selection of shop primers with finish top coats. Comply with paint and coating manufacturers' recommendations to ensure compatibility between primers and finish coats.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Refer to contract documents for required material designations.
      1. ASTM A6 hot-rolled shapes with a flange thickness exceeding 2” shall be supplied with Charpy V-notch impact test results in accordance with ASTM A6, Supplemental Requirement S30, Charpy V-Notch Impact Test for Structural Shapes - Alternate Core Location, with a minimum average value of 20 ft-lb absorbed energy at +70 degrees F.
      2. Built-up cross sections consisting of plates exceeding 2” in thickness shall be supplied with Charpy V-notch impact test results in accordance with ASTM A6, Supplemental Requirement S5, Charpy V-Notch Impact Test, with a minimum average value of 20 ft-lb absorbed energy at +70 degrees F.
   B. Anchor Rods:
1. All anchor rods shall be made from threaded round stock conforming to ASTM Specifications. Hooked-type anchor rods not allowed. Refer to contract documents for required material grade.
   a. Galvanized rods shall be used with all galvanized base plates.

C. Fasteners:
   1. Refer to contract documents for required material grade.
   2. Purchasing, Handling & Storing Fasteners
      a. All fastener components shall be new and unused. Rusty or dirty bolts will not be allowed.
      b. Bolt Lubrication: High Strength bolts shall be well lubricated at time of installation.
      c. Bolts shall be stored in manufacturer’s sealed containers until time of use.
   3. Shear Connectors (Headed Studs): Shear connectors and their installation shall meet all requirements specified in AWS D1.1. Diameter and finished length of shear connectors are shown on the drawings.
   4. Rebar attached to steel by welding: ASTM A706. Rebar bends shall meet the minimum bend diameters listed in ACI 318, edition referenced by the governing building code.
      a. Electrodes for Welding Rebar: Comply with requirements of AWS D1.4
   5. Electrodes for Welding: Comply with requirements of AWS D1.1.
   6. Expansion Anchors and Adhesive Anchors shall be the type and size indicated on the drawings. Members assumed to be carbon/ zinc plated unless noted otherwise on the drawings.
      a. See Section 033000 for installation of post installed anchors.

D. Non-Shrink Grout:
   1. Contractor shall provide premixed, nonshrink, noncorrosive, nonmetallic, nonstaining product. The product shall require only the addition of water and shall comply with the performance requirements of ASTM C1107 and show positive expansion when tested in accordance with ASTM C827.
      a. Minimum compressive strength, when tested according to ASTM C109 with manufacturer's maximum allowable water content: 3000 psi after one day; 2 times the concrete strength that the baseplate is bearing on after 28 days.
         1) Coordinate selection of grout with concrete mix design table in Drawings to comply with the required strength above.
      b. Grout shall be free of gas-producing or air-releasing agents and oxidizing agents.
      c. Grout shall contain no corrosive iron, aluminum, or gypsum.
      d. Grout shall be placed at a flowable consistency.
      e. Grout shall show a minimum positive expansion of 0.03%
      f. For base plates greater than 21" in width provide a single 3" diameter bleed hole near the center of the plate.


F. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

   A. Fabricate structural steel members in accordance with AISC 303 specifications.
   B. Shop fabricate to greatest extent possible.
   C. Account for distortion and shrinkage due to welding processes as part of detailing and fabrication procedures, both in the shop and in the field.
   D. Mark all members in protected, plainly visible locations in accordance with reference numbers on setting diagrams. Determine and mark the member work point at each end of columns in the shop.
with a center punch or other acceptable means. Place marking on the flanges and web at each end of columns. Define work point in accordance with AISC 303.

E. Finish work in accordance with the approved shop drawings, true and free from twists, kinks, buckles, open joints, and other defects.

F. Perform necessary cutting, fitting, and drilling to accommodate other trades, and secure correct information from other trades before and after steel is delivered. Cutting or drilling will not be permitted on the site without approval of Architect/Engineer.

G. Completely assemble and weld sub-assemblies with milled surfaces before welding.

H. Welding: Comply with AISC specifications and AWS standards.

I. Splices: Splicing of members to obtain the required lengths is not permitted without prior approval of Architect/Engineer, unless specifically detailed on Drawings.

J. Cambering: Provide cambered beams and girders where indicated on Drawings; in-place camber tolerance as defined in AISC 303 Section 6.4

1. For the purpose of inspection, camber shall be measured in the fabricator's shop in the unstressed condition.

K. Substitutions: Where exact sizes and weights specified are not readily available, secure Architect/Engineer's acceptance of suitable sizes in sufficient time to prevent delay due to substitutions.

L. Shear Stud Connectors: Automatically end weld according to AWS D1.1. Shop weld where possible. Thoroughly clean surface where stud is to be attached; remove mill scale by grinding or sandblasting where it is sufficiently thick to interfere with proper welding. At metal deck, field install by welding through deck. Clean metal deck surface where studs are to be attached.

2.03 CONNECTIONS

A. General:

1. Provide connections as shown or noted on the Drawings. Where connections are presented in schedules or tables on the drawings, observe the notes on the drawings and the provisions of the Specifications. Short slotted holes may be used in standard beam-beam and beam-column connections unless noted otherwise. Bearing-type bolts in slotted holes shall not be used to transmit any component of stress in the direction of the slot.

2. Field Connections: Bolt field connections with high-strength bolts, except where welded connections are specifically indicated.

3. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC 348.

   a. Minimum bolt diameter shall be 3/4 inch except as shown otherwise in drawings.

   b. All bolts used in connection design are type "N", unless otherwise noted on the Drawings.

   c. Slip Critical Joints: Where indicated on Drawings, bolts shall be installed in the slip critical (SC) condition. Faying surfaces shall be Class A, unless noted otherwise on Drawings. Comply with all requirements of AISC 348 for Slip Critical Joints.

   d. Fully Tensioned Joints: Bolts shall be installed to the pre-tensioned condition as defined by AISC 348, where indicated on the drawings and in the following joints:

      1) ASTM A490 or F2280 (Group B) fasteners loaded in tension.

      2) Column splices and beam to girder connections in structures greater than 125 feet in height.

      3) All connections of crane rails, runway beams, support brackets, braces, roof trusses and columns supporting cranes of greater than 5 ton capacity.

      4) Support frames that support vibratory machinery.

   e. Snug Tight Joints: All joints not noted as Slip Critical or Fully Tensioned may be tightened to the Snug Tight condition, as defined by AISC 348.
f. Use of ASTM A307 bolts is not permitted in structural connections, except where indicated in Drawings.

B. Simple Beam Connections:

1. Select connections with capacities equal to or greater than the beam reactions indicated on the Drawings. Contractor shall request beam reactions that are inadvertently missing from the drawings.
   a. One-sided shear connections: Single angle, single bent plate and shear plate connections shall be detailed to use the maximum number of bolt rows which can be accommodated within the depth of the supported beam. Refer to the connection tables in the Drawings for typical number of bolts for each beam depth.
   b. Two-sided shear connections: Double angle and double bent plate connection shall be detailed such that the length of the connection angles is at least 60% of the "T" dimension of the web of the supported beam. Refer to the connection tables in the Drawings for typical number of bolts for each depth. Number of bolt rows may be reduced to where the indicated capacity of the reduced number of bolts exceeds the reaction in the drawings and the minimum length indicated above is met.

C. Columns:

1. Lifting Devices and Erection Aids:
   a. The fabricator shall be responsible for designing, detailing and furnishing all lifting devices and erection aids required for erection. Erection aids shall be removed where exposed to view.

2.04 FINISH

A. Reference Division 09 requirements for required cleaning and coating of structural steel. At a minimum all steel shall be cleaned of oil and grease using solvent cleaners and cleaned of dirt and other foreign material by sweeping with a fiber brush or other suitable means.

B. Uncoated Steel

1. The following items of structural steel shall not be shop coated:
   a. Steel that is to receive sprayed fireproofing.
   b. Faying surfaces of Slip-critical connections, unless prepared and coated in conformance with the requirements for Slip-critical joints as set forth by the AISC 348.
   c. Those portions of steel members which are embedded in concrete or mortar.
   d. Milled contact surfaces, unless the characteristics of the coating are such that the performance of the milled surface is not affected.
   e. Surfaces within 2 inches of a field weld, including beam top flanges which are to receive shear connectors welded through metal decking.
      1) Exception: Shop coatings that do not adversely affect weld quality or create objectionable fumes are permitted on welded surfaces.
   f. Steel which is not specifically identified elsewhere in the drawings or specifications as requiring a shop coating.

C. Shop Primer Painted Steel

1. Steel identified elsewhere in the drawings or specifications as being required to be shop primer painted, but for which no particular primer is specified, shall receive one coat of Fabricator’s standard rust-inhibitive primer paint applied to a minimum dry-film thickness of 1 mil.
   a. Cleaning and surface preparation for shop primer painted steel shall conform to the recommendations of the paint manufacturer and shall, as a minimum, meet the requirements of SSPC-SP2.
   b. Primer shall be withheld from surfaces required to be “uncoated” in paragraph A, above.
c. Where shop primer painted surfaces are to receive a finish coating in the field, the shop primer shall be compatible with the finish coating.

D. Steel Requiring a Specified Coating
1. Steel identified elsewhere in the drawings or specifications as being required to receive a specified shop applied coating shall receive the specified coating at the fabrication shop or coating applicator’s facilities prior to shipment to the project site.
   a. The term “coating” as used herein applies to primers, single coat systems, multi-coat systems and powder coating.
   b. Cleaning, surface preparation and application of the coating shall conform to the recommendations of the coating manufacturer and, if applicable, the coating applicator.
   c. Coatings shall be withheld from surfaces required to be “uncoated” in paragraph A, above.

2.05 SOURCE QUALITY CONTROL
A. Comply with AISC 360, Chapter N, except as indicated below.
   1. Exceptions:
      a. All CJP welds shall be tested by UT, MT, PT, or RT in accordance with AWS D1.1.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed. Identified anomalies outside of the standard AISC tolerances shall be provided to the structural Engineer for their consideration a minimum of 3 days prior to concrete placement.

3.02 ERECTION
A. Erect structural steel in compliance with applicable AISC 303 requirements.
B. The Contractor shall verify the elevation of all bearing surfaces and the correct positioning of anchor rods and embedded items to which structural steel is attached before erection is commenced. The Contractor shall notify the Engineer and Structural Steel Erection Contractor of any deviations from the Contract Documents or conditions requiring field modification.
C. Align the various members forming a complete frame or structure after assembly and adjust accurately before fastening.
D. Measure and adjust for distortion and shrinkage of field welded assemblies as erection proceeds.
E. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
F. Clean bearing surfaces for base plates. Clean bottom surface of base plates.
G. Set base, bearing plates, and leveling plates level and at correct elevations. Temporarily support on steel wedges or shims until supported members are plumbed and grouting is completed. Tighten anchor bolts after supported members have been positioned and plumbed. Cut protruding bearing pads or shims back flush with edge of base plates prior to grouting.
H. Field weld components indicated on Drawings.
I. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC 348.
J. Provide bolts of sufficient length to allow at least two full threads beyond nut after tightening.
K. Provide slip critical type connections where shown on Drawings, complying with AISC 348.
L. Provide washers at bolted connections complying with AISC 348.
M. Where bolts will be exposed-to-view, space at regular intervals, in uniform patterns.
N. High-Strength Bolts: Install high-strength bolts using types and grades as specified for type of bolt and type of joint indicated on Drawings.
2. Provide snug tight joints at all joints, unless indicated otherwise.

O. Do not field cut or alter structural members without approval of Architect/Engineer.

P. Where exterior exposed surfaces are field welded, apply Zinc Rich Primer, complying with Division 9 requirements to welded surfaces and abrasions.

Q. Grouting of column base plates and structural steel bearing members: Install non-shrink grout at flowable consistency per manufacturer's instructions utilizing temporary forms. After initial set, remove forms and trim grout to 45 degrees where bearing surface allows. Finish vertical when edge of bearing surface aligns with edge of steel base plate or bearing member.
1. Grout column base plates prior to pouring any elevated slab on deck.

R. Prior to placement of concrete, and with deck in place, contractor shall survey, from an established datum, the in place beam center camber of cambered beams. Inform Engineer prior to concrete placement of any beams that are greater than or equal to +/- 3/4 inch from the camber indicated on the Drawings.

3.03 TOLERANCES
A. Comply with requirements of AISC 303. Measure conformance at mean operating temperature of 70 degrees F. Compensate for difference in temperature at time of erection.

3.04 SUPPORT OF OTHER WORK
A. No permanent loading shall be imposed on concrete slabs supported by steel composite beams and girders until the concrete in such slabs has achieved 75 percent of its design strength, without prior approval by the Architect/Engineer.

B. Provide temporary planking and working platforms as necessary to effectively complete the Work. Construction loads shall not exceed the permanent live loads indicated in the load keys.

3.05 FIELD QUALITY CONTROL
A. Inspection and Testing Requirements: Comply with all QA/QC inspection and testing requirements indicated in AISC 360, Chapter N, with the following modifications.
1. Section N5b shall be modified such that 100% of all CJP Groove Welds are tested by approved Nondestructive Testing Methods. A reduction in the rate of UT tests for an individual welder as indicated in Section N5e is permitted if all requirements are met.

B. High-Strength Bolts: Provide testing and verification of Slip Critical and Pretensioned bolts in accordance with AISC 348 Section 7 for each fastener assembly lot. Inspections shall conform with AISC 360 Chapter N and AISC 348 Section 9.
1. For Slip Critical Joints, inspector shall verify that faying surfaces conform with Class A or Class B surfaces as indicated in Drawings.

C. Field Inspection: Assure that the work conforms to specified requirements, and include:
1. Inspection of field welding in accordance with AWS code and as specified below for welding inspection.
2. Verification of proper fit and alignment.

D. Welding Inspection: Assure that the work conforms to specified requirements, and include:
1. Welding Inspections conform to AISC 360, Chapter N, Section 4 and 5.
2. Visual inspection on 100 percent of fillet welds.
3. Non-Destructive testing on 100 percent of CJP groove welds

E. Shear connectors: Shear connectors, including HSA, DBA and threaded studs shall be tested with the following methods and frequency: 100% Ring Test, 1% Bend Test.
1. Ring Test Acceptance: Strike with hammer, if the stud rings, stud is acceptable. If the stud does not ring, perform bend test.
2. Bend test shall be performed per AWS D1.1 Section 7.

END OF SECTION 051200
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 specification Sections apply to the work of this Section.

1.02 SECTION INCLUDES
   A. Acoustical roof deck.
   B. Steel Roof deck.
   C. Composite Floor deck.
   D. Acoustical insulation in roof deck flutes.

1.03 RELATED REQUIREMENTS
   A. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.
   B. Section 051200 - Structural Steel: Support framing for openings larger than 12 inches and supply of shear studs.
   C. Section 053400 - Acoustical Steel Decking.
   D. Section 078100 - Applied Fireproofing: Spray applied fireproofing.

1.04 REFERENCE STANDARDS
   A. SDI C - Standard for Composite Steel Deck-Slabs; Steel Deck Institute.
   B. SDI RD - Standard for Steel Roof Deck; Steel Deck Institute.
   C. SDI T-CD - Test Standard for Composite Steel Deck- Slabs; Steel Deck Institute.
   D. SDI QA/QC - Standard for Quality Control and Quality Assurance for Installation of Steel Deck; Steel Deck Institute.

1.05 ACTION SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittals procedures.
   B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
   C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

1.06 INFORMATION SUBMITTALS
   A. Certificates: Certify that products furnished meet or exceed specified requirements.
   B. Submit manufacturer's installation instructions.
   C. Welders Certificates: Certify welders employed on the work, verifying current AWS certification for the type of weld being performed.

1.07 QUALITY ASSURANCE
   A. Fabricator Qualifications: Company specializing in the production of steel deck with a minimum of 5 years of experience.
   B. Installer Qualifications: Company specializing in the installation of steel deck with minimum 5 years of experience.
   C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
      1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

D. Basis of Design: Specifications are based on deck types by specified basis of design manufacturer and product(s). Deck types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, weight, and profile are minor, and do not detract substantially from the indicated design intent.

1. Composite Steel Deck basis of design unless noted otherwise: Vulcraft VLI series decking
2. Steel Roof Deck basis of design unless notes otherwise:
   a. 1.5" wide rib deck: Vulcraft type 1.5 B.
   b. 3.0" deep rib roof deck: Vulcraft type 3 N.
   c. 1.0" roof deck: Vulcraft type 1.0 E.
3. Non-composite Steel Floor Deck basis of design unless noted otherwise: Vulcraft C series decking.
4. Comply with requirements specified in Section 014000 and Section 016000.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage and handling.

B. Deck bundles placed on the building frame must be placed near a main supporting beam at a column or wall. In no case are the bundles to be placed on unbolted frames or on unattached and/or unbridged joists. The structural frame must be properly braced to receive the bundles.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacture shall be a member in good standing of the Steel Deck Institute, www.sdi.org.

2.02 STEEL DECK MATERIALS

A. Composite Steel Deck-Slabs
   1. Steel for composite steel deck shall meet the requirements of SDI-C and AISI S100.
   2. Finish: G60 galvanized unless noted otherwise.

B. Steel Roof Deck
   1. Steel for steel roof deck shall meet the requirements of SDI-RD and AISI S100.
   2. Finish: Primed unless noted otherwise.

C. Acoustical Roof Deck: Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center:
   2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
   3. Structural Properties and Profiles: As indicated on Drawings.

2.03 ACCESSORY MATERIALS

A. Welding Materials: In accordance with AWS D1.1 and AWS D1.3 as appropriate.

B. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
   1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
   2. Material: Steel; ASTM A510/A510M, Grade 1077 or equivalent.
a. Hardness: Rockwell C 54.5, minimum.
b. Tensile Strength: 285 kips per square inch, minimum.
c. Shear Strength: 175 kips per square inch, minimum.
d. Washers:
   1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
   2) Exposed Roof Deck Applications: 0.591 inch diameter, minimum.
e. Corrosion Resistance:
   1) Steel Bar Joist Framing Applications: ASTM B633, SC1, Type III zinc electroplate.
   2) Exposed Roof Deck Applications: Provide manufacturer’s standard stainless steel sealing caps with bonded neoprene washer over each fastener.

3. Acceptable Manufacturers:
c. Other approved manufactures: Submit ICC-ES AC43 and AC70 qualification data.

C. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
   1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM)SDI design method for roof deck and floor deck applications and ICC-ES AC43.
   2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
   3. Fasteners for Exposed Steel Roof Deck Application: Manufacturer’s standard stainless steel with bonded neoprene washer.
   4. Acceptable Products:
      b. Other approved manufactures: Submit ICC-ES AC43 and AC70 qualification data.

D. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
E. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.04 FABRICATED DECK ACCESSORIES
A. Sheet steel for accessories shall confirm ASTM A1008 for painted or uncoated steel and ASTM A653 for galvanized steel.
B. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, cover plates, and ridge/valley plates, thickness based on SDI minimum, but no less than 20 ga; of profile and size as indicated; finished same as deck.
C. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION
3.01 EXAMINATION
A. Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section.
B. All OSHA rules for erection must be followed.

3.02 PREPARATION
A. Place deck and accessories in accordance with approved installation drawings.
B. Do not place deck panels on partially cured concrete support structures without permission of the designer (as defined in ANSI/SDI C-2011).
C. Locate deck bundles to prevent overloading of support members.

### 3.03 INSTALLATION OF METAL DECK

A. Erect metal deck in accordance with SDI Design Manual and manufacturer’s instructions. Align and level.

B. On concrete surfaces provide minimum 4 inch bearing, unless otherwise specified on Drawings.

C. On steel supports provide minimum 1-1/2 inch bearing, unless otherwise specified on Drawings.

D. Fasten deck to steel support members at ends and intermediate supports at center-to-center spacing as indicated on Drawings, parallel with the deck flute and at each transverse flute using methods specified.

E. At mechanically fastened male/female side laps fasten at center-to-center spacing as indicated on Drawings.

F. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

G. At welded male/female side laps weld at center-to-center spacing as indicated on Drawings.

H. Weld deck in accordance with AWS D1.3/D1.3M.

I. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fasten 12 inches on center maximum.

J. At floor edges, unless perimeter edge angles are detailed, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

K. At openings between floor deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

L. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

M. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

### 3.04 INSTALLATION OF SHEAR STUDS FOR COMPOSITE STEEL DECK-SLABS

A. Install shear studs in accordance with AWS D1.1 clause 7 and manufactures instructions. Use equipment recommended by stud manufacture.

B. Install studs through deck where deck thickness permits. Remove ceramic ferrules (arc shields) prior to concrete placement.

C. Test stud installation in accordance with AWS D1.1 requirements.

D. Layout studs as indicated on the structural drawings. Maintain minimum spacings and edge distances. Accurately locate member centerlines and mark on deck top surface prior to stud installation.

### 3.05 REPAIRS

A. Before concrete placement or roof insulation, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. The need for the repair or temporary shoring of the damaged deck shall be determined by the Architect or Engineer of Record based on structural performance, unless aesthetics have been specifically addressed in the contract documents.

### 3.06 CONSTRUCTION GUIDELINES

A. Do not use deck units as a working platform or storage area until units are in position and permanently attached to the structure.

B. Construction loads must not exceed load carrying capacity of the deck.
3.07 FIELD QUALITY CONTROL AND ASSURANCE

A. An independent testing agency will perform field quality control tests, as specified in Section 014000.
B. Perform field quality control and assurance in accordance with SDI-QA/QC and AISC 360 Chapter N.
C. Visually inspect all steel decking to verify that all materials are in acceptable condition and have been properly installed as specified.
D. Visually inspect deck welds prior to being covered by other work.

END OF SECTION 053100
SECTION 054000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 specification Sections apply to the work of this Section.

1.02 SECTION INCLUDES
A. Formed steel stud exterior wall framing.

1.03 REFERENCE STANDARDS
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
D. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2011c.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination: Coordinate with work of other Sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and ________.  
   1. Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Drawings: Provided at 1/8 inch = 1 foot scale unless layout requires larger scale.
   2. Wall Sections: Provided at 3/4 inch = 1 foot scale unless layout requires larger scale.
   3. Indicate stud layout of each building area showing member sizes, spacing, locations and details of connections.
   4. Elevate each wall panel, indicating member sizes, spacing, and locations of connections.
   5. Describe method for securing studs to tracks and for bolted framing connections.
   6. Cold-formed steel framing not shown on structural drawings or deviations from the structural drawings shall be designed by a Professional Engineer licensed in the state where the project is located. Provide design engineer's stamp on these shop drawings and calculations.
D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
   1. ClarkDietrich Building Systems LLC: www.clarkdietrich.com
   2. Marinoware: www.marinoware.com
   3. The Steel Network, Inc.: www.SteelNetwork.com

2.02 FRAMING SYSTEM
A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
B. Design Criteria: Provide completed framing system having the following characteristics:
   1. General member design is shown on the structural drawings for the exterior stud framing. Cold-formed steel framing not shown on structural drawings or deviations from the structural drawings shall be designed by a Professional Engineer licensed in the state where the project is located.
      a. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
      b. Design Loads: In accordance with applicable codes and as specified on structural Drawings.
      c. Live load deflection meeting the following, unless otherwise indicated:
         1) Soffits and Horizontal Assemblies: Maximum vertical deflection under live load of L/360 of span.
         2) Exterior Walls: Maximum horizontal deflection under wind load of L/600 for support of masonry veneer, L/240 for support of metal panel and L/360 for other cladding; where L = wall clear height span.
         3) Design non-axial loadbearing framing to accommodate not less than 1 in vertical deflection.
   2. System: Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
      a. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS
A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
   1. Member Size: As indicated on the Drawings.
   2. Stud Depth: As indicated on Drawings.
   4. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).
   5. All framing members shall be designed with the following minimum yield strengths: 10, 12, 14, and 16 gauge studs: Grade D, Fy= 50ksi minimum, 18 gauge and lighter: Grade A, Fy=33ksi minimum.

2.04 ACCESSORIES
A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
B. Plates, Gussets, and Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.05 FASTENERS
A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
B. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
C. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
D. Welding: In conformance with AWS D1.1/D1.1M.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that substrate surfaces and building framing components are ready to receive work.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.
B. Verify field measurements and adjust installation as required.

3.02 PREPARATION
A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

3.03 INSTALLATION OF STUDS
A. Install cold-formed steel framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions", ASTM C1007 requirements, and to manufacturer's written instructions unless more stringent requirements are indicated.
B. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
   1. Cut framing members by sawing or shearing, torch cutting is not permitted.
   2. Fasten cold-formed steel framing members by welding or screw fastening. Wire tying of framing members is not permitted.
   3. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
C. Align floor and ceiling tracks accurately and securely anchor at corners and ends, and at spacings as follows:
   1. Anchor Spacing: As shown on Shop Drawings.
D. Place studs at spacing indicated or as required to achieve specified design requirements not more than 2 inches from abutting walls, and at all sides of openings. Connect studs to tracks using fastener or welding method.
E. Construct corners using minimum of three studs. Install studs at wall openings, door and window jambs according to design requirements, but not less than 2 studs at openings and jambs.
F. Install framing members in one-piece lengths unless splice connections are indicated.
G. Do not bridge building expansion and control joints with cold-formed steel framing. Independently frame both sides of joints.
H. Install intermediate studs above and below openings to align with wall stud spacing.
I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
J. Attach cross studs to studs for attachment of fixtures anchored to walls.
K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
L. Touch-up field welds and damaged galvanized surfaces with primer.
M. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.04 TOLERANCES
A. Maximum Variation from True Position: 1/8 inch.
B. Maximum Variation of any Member from Plane: 1/8 inch.
C. Maximum Variation from Plumb and Level: 1/8 inch in 10 feet, non-cumulative.

END OF SECTION 054000
SECTION 055100
METAL STAIRS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Stairs with grating treads.
B. Structural steel stair framing and supports.
C. Handrails and guards.
D. Design engineering for stair and railing assemblies.

1.02  RELATED REQUIREMENTS
A. Section 033000 - Cast-in-Place Concrete: Concrete fill in stair pans; mesh reinforcement for landings.
B. Section 033000 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

1.03  REFERENCE STANDARDS

1.04  SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

1.05  QUALITY ASSURANCE
A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
B. Fabricator Qualifications:
   1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

PART 2  PRODUCTS

2.01  MANUFACTURERS
A. Factory Fabricated Stair Treads and Nosings:
   1. Nystrom, Inc; ______: www.nystrom.com/#sle.
   3. Wooster Products, Inc; Alumogrit Type 101: www.woosterproducts.com/#sle.
2.02 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Dimensions: As indicated on Drawings.
   3. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   4. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   5. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:
   1. Industrial: All joints made neatly.
      a. Welded Joints: Welded on back side wherever possible.
      b. Welds Exposed to Touch: Ground smooth.
      c. Bolts Exposed to Touch in Travel Area: No nuts or screw threads exposed to touch.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.03 METAL STAIRS WITH GRATING TREADS

A. Jointing and Finish Quality Level: Industrial, as defined above.

B. Risers: Closed.

C. Treads: Steel bar grating.
   1. Grating Type: Welded.
   2. Bearing Bar Depth: 3/4 inch, minimum.
   3. Top Surface: Standard.
   6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.

D. Stringers: HSS tubes.
   1. Stringer Depth: 12 inches, minimum.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.

E. Railings: Steel pipe railings.

F. Finish: Galvanized after fabrication.

2.04 HANDRAILS AND GUARDS

A. Guards:
   1. Top Rails: Round pipe or tube rails unless otherwise indicated.
      a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
   2. Infill at Pipe Railings: Pipe or tube rails sloped parallel to stair.
      a. Outside Diameter: 1 inch.
      b. Material: Steel pipe or tube, round.
c. Vertical Spacing: Maximum 4 inches on center.
d. Jointing: Welded and ground smooth and flush.

3. End and Intermediate Posts: Same material and size as top rails.
a. Horizontal Spacing: As indicated on Drawings.
b. Mounting: Welded to top surface of stringer.

2.05 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
B. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
   1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.
B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Provide welded field joints where specifically indicated on Drawings. Perform field welding in accordance with AWS D1.1.
D. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
E. Obtain approval prior to site cutting or creating adjustments not scheduled.
F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
G. Luminous Markings: Install luminous markings on stairs and other associated egress path elements and locations according to requirements of applicable building code.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION 055100
SECTION 05 7000
DECORATIVE METAL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Decorative metals plates, column wraps, signs, exposed structural elements

1.02 REFERENCE STANDARDS

1.03 ADMINISTRATIVE REQUIREMENTS
A. Pre-Installation Meeting: Schedule and conduct a preinstallation meeting one week before starting work of this section. Attendees shall include, but not be limited to:
   1. Contractor.
   3. Owner's representative.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturer's product data including description of materials, components, finishes, fabrication details, glass, anchors, and accessories.
C. Shop Drawings: Indicate system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
D. Samples: Verify material match with Architect's approval. The design intent is to match the existing Casper, Wyoming, David Street Station style of metal and wood scale, finishes, materials, and colors. Reference David Street Station at the intersection of Yellowstone St. and David St. in downtown Casper.

1.05 MOCK-UP
A. Provide mock-up of all decorative components at actual size and location on site at or near the actual location for installation, illustrating each type of material, cladding, and finish.
B. Locate where directed.
C. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in factory provided protective coverings and packaging.
B. Protect materials against damage during transit, delivery, storage, and installation at site.
C. Inspect materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged
parts and finishes, replace damaged items.

D. Prior to installation, store materials and components under cover, in a dry location.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Components:
   1. Sections, Shapes, Plate and Bar: ASTM A36/A36M.
   3. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

2.02 ACCESSORIES

A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
   1. Exposed Fasteners: standard finish for interior application.


PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate and site conditions are acceptable and ready to receive work.
B. Verify field dimensions of locations and areas to receive work.
C. Notify Architect immediately of conditions that would prevent satisfactory installation.
D. Do not proceed with work until detrimental conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's drawings and written instructions.
B. Anchor securely to structure.
C. Weld connections that cannot be shop welded due to size limitations.
   1. Weld in accordance with AWS D1.1/D1.1M.
   2. Match shop welding and bolting.
   3. Clean welds, bolted connections and abraded areas.
   4. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.

3.04 CLEANING

A. Remove protective film from exposed metal surfaces.
B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

3.05 PROTECTION

A. Protect installed components and finishes from damage after installation.
B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
   1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Exposed timber structural framing.
B. Rough opening framing for doors, windows, and roof openings.
C. Preservative treated wood materials.
D. Fire retardant treated wood materials.
E. Communications and electrical room mounting boards.
F. Concealed wood blocking, nailers, and supports.
G. Miscellaneous wood nailers, furring, and grounds.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials and application instructions.
C. Samples: For rough carpentry members that will be exposed to view, submit two samples, 12" by 12" inch in size illustrating wood grain, color, and general appearance.

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

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.
   4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Grading Agency: Western Wood Products Association; WWPA G-5.
B. Sizes: Nominal sizes as indicated on drawings, S4S. Blocking: 2x6 minimum
C. Moisture Content: S-dry or MC19.
D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.
2.03 EXPOSED DIMENSION LUMBER
   A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
   B. Sizes: Nominal sizes as indicated on drawings.
   C. Surfacing: S4S.
   D. Moisture Content: S-dry or MC19.
   E. Rafter and Small Beam Framing (2 by 6 through 4 by 16):
      1. Species: As specified by Structural Engineer.
      2. Grade: Select or as specified by Structural Engineer.

2.04 TIMBERS FOR CONCEALED APPLICATIONS
   A. Sizes: Nominal sizes as indicated on drawings, S4S.
   B. Moisture Content: S-dry (23 percent maximum).
   C. Beams and Posts 5 inches and over in thickness:
      1. Grade: Select Structural or as specified by Structural Engineer.

2.05 EXPOSED TIMBERS
   A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
   B. Moisture Content: Kiln-dry (20 percent maximum).
   C. Surfacing: Rough (unfinished).
   D. Species: as Specified by Structural Engineer.
   E. Grade: Select Structural.

2.06 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. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
      2. 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. Fire Retardant Treatment:

PART 3 EXECUTION

3.01 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.

3.02 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 framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
   C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
   D. 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.
E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Provide the following specific non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Towel and bath accessories.
   6. Wall-mounted door stops.
   7. Wall paneling and trim.

3.03 INSTALLATION OF CONSTRUCTION PANELS
   A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches 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: May be field verified with architect.

3.04 TOLERANCES
   A. Framing Members: 1/4 inch from true position, maximum.
   B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

3.05 FIELD QUALITY CONTROL
   A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.06 CLEANING
   A. Waste Disposal: Comply with the requirements of Section .
      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 2000
FINISH CARPENTRY

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Finish carpentry items.
B. Hardware and attachment accessories.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
   2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
C. Samples: Submit two samples of finish wood, 8” x 8” inch in size illustrating wood grain and specified finish.

1.04 QUALITY ASSURANCE
A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.05 MOCK-UP
A. Locate where directed.
B. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
B. Protect from moisture damage.
C. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS
2.01 FINISH CARPENTRY ITEMS
A. Interior Woodwork Items:
   1. Column Wraps and Miscellaneous Trim: Wood species materials to match David Street Station located at 2nd Street between David St. and Ash St. in Casper, WY. Stain finish to closely match the exterior aged patena. Provide Architect with a minimum of Three (3) finish samples for approval.

2.02 FASTENINGS
A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
B. Fasteners: Of size and type to suit application; minimize finish in concealed locations and minimize fasteners finish in exposed locations.

2.03 ACCESSORIES
A. Adhesive: Type recommended by fabricator to suit application.
B. Primer: 09 9000 - Painting and Coating.
C. Wood Filler: Latex base, tinted to match surface finish color.

2.04 SITE FINISHING MATERIALS
A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
2.05 FABRICATION
   A. Shop assemble work for delivery to site, permitting passage through building openings.
   B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.06 SHOP FINISHING
   A. Apply wood filler in exposed nail and screw indentations.
   B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
   C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
      1. Transparent:
         b. Stain: As selected by Architect.
         c. Sheen: Flat.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify adequacy of backing and support framing.
   B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION
   A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
   B. Set and secure materials and components in place, plumb and level.
   C. Carefully scribe work abutting other components, with maximum gaps of 1/16th inch. Do not use additional overlay trim to conceal larger gaps.

3.03 TOLERANCES
   A. Maximum Variation from True Position: 1/16 inch.
   B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION
SECTION 07 1113
BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Bituminous dampproofing.

1.02 REFERENCE STANDARDS

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

1.04 FIELD CONDITIONS

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Other Acceptable Bituminous Dampproofing Manufacturers:

2.02 BITUMINOUS DAMPPROOFING
A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
   1. Composition - Vertical Application: ASTM D1227 Type III or ASTM D1187/D1187M Type I.
   2. Composition - Horizontal and Low-Slope Application: ASTM D1227 Type II or III.
   3. VOC Content: Not more than permitted by local, State, and federal regulations.
B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify existing conditions are acceptable prior to starting this work.
B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 PREPARATION
A. Protect adjacent surfaces not designated to receive dampproofing.
B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer’s instructions.
C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
D. Apply mastic to seal penetrations, small cracks, or minor honeycombs in substrate.

3.03 APPLICATION
A. Foundation Walls: Apply two coats of asphalt dampproofing.
B. Foundation Walls: Patch disturbed areas of existing dampproofing with two additional coats of dampproofing of the same generic type.
C. Perform this work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

D. Prime surfaces in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

E. Prime surfaces at a rate approved by manufacturer for application indicated, and allow primer to dry thoroughly.

F. Apply bitumen with roller.

G. Apply bitumen at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.

H. Seal items watertight with mastic, that project through dampproofing surface.

I. Immediately backfill against dampproofing to protect from damage.

END OF SECTION
SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Board insulation at perimeter foundation wall, underside of floor slabs, and over roof deck.
B. Batt insulation and vapor retarder in exterior ceiling and roof construction.
C. Batt insulation for filling crevices in exterior wall and roof.

1.02 REFERENCE STANDARDS

1.03 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 Certificate: Certify that products meet or exceed specified requirements.
E. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

1.04 QUALITY ASSURANCE
A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. 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.

1.05 FIELD CONDITIONS
A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Thermal Insulation Manufacturers:
   1. Substitutions: See Section 01 6000 - Product Requirements.

2.02 APPLICATIONS

2.03 FOAM BOARD INSULATION MATERIALS
A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
6. Manufacturers:
   a. Dow Chemical Company; STYROFOAM HIGHLAND 100: www.dowbuildingsolutions.com/#sle.

2.04 BATT INSULATION MATERIALS
A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
B. 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: 50 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.
C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Manufacturers:
      b. Knauf Insulation; EcoBatt Insulation: www.knaufinsulation.com/#sle.
      c. ROCKWOOL (ROXUL, Inc); COMFORTBATT: www.rockwool.com/#sle.
      d. Thermafiber, Inc; SAFB: www.thermafiber.com/#sle.

2.05 ACCESSORIES
PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER
A. Adhere a 6 inch wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
   1. Tape seal joints.
   2. Extend sheet full height of joint.
B. Install boards horizontally on foundation perimeter.
C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION UNDER CONCRETE SLABS
A. Place insulation under slabs on grade after base for slab has been compacted.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
C. Prevent insulation from being displaced or damaged while placing slab.

3.04 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Install in exterior wall and roof 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.

3.05 FIELD QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for additional requirements.
B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
   1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).
   2. Cooperate with ABAA testing agency.
   3. Allow access to air barrier work areas and staging.
   4. Do not cover air barrier work until tested, inspected, and accepted.

3.06 PROTECTION
   A. Do not permit installed insulation to be damaged prior to its concealment.

   END OF SECTION
SECTION 07 2119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Foamed-in-place insulation.
   1. In exterior framed walls.
   2. In exterior wall crevices.
   3. At junctions of dissimilar wall and roof materials.
B. Foamed-in-place intumescent insulation, monolithic system.

1.02 REFERENCE STANDARDS

1.03 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
C. Certificates: Certify that products of this section meet or exceed specified requirements.
D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
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 all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.
C. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: 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 MOCK-UP
A. Provide installation mock-up, the full height of the exterior wall by 5 feet wide; include insulation overcoat, wall construction, window and frame, and door frame in mock-up.
B. Locate where directed.
C. Mock-up may remain as part of the Work.
1.07 FIELD CONDITIONS
   A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
   B. Do not apply foam when temperature is within 5 degrees F of dew point.

PART 2 PRODUCTS
2.01 MANUFACTURERS
   A. Foamed-In-Place Insulation:
      3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS
   A. Foamed-In-Place Insulation: Low-density, flexible, open or closed cell, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
      1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
      2. Thermal Resistance: R-value of 3.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
      3. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
      4. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
      5. Basis of Design:

   B. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, open or closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
      1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
      2. Thermal Resistance: R-value of 5.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
      3. Water Vapor Permeance: Vapor retarder; 2 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
      4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
      5. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
      6. Closed Cell Content: At least 90 percent.
      7. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.03 ACCESSORIES
   A. Primer: As required by insulation manufacturer.
   B. Protective Coating: type, spray applied; flame spread index (FSI).

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify work within construction spaces or crevices is complete prior to insulation application.
   B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION
   A. Mask and protect adjacent surfaces from over spray or dusting.
   B. Apply primer in accordance with manufacturer’s instructions.

3.03 APPLICATION
   A. Apply insulation in accordance with manufacturer’s instructions.
   B. Apply insulation by spray method, to a uniform monolithic density without voids.

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C. Patch damaged areas.
D. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
E. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 FIELD QUALITY CONTROL
   A. Field inspections and tests may be performed by an independent testing agency.
   B. Inspection will include verification of insulation and overcoat thickness and density.

3.05 PROTECTION
   A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of preformed steel panels.

1.02 REFERENCE STANDARDS


1.03 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.
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 square, representing actual roofing metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.
   2. Include typical fastening detail.
F. Manufacturer Qualification Statement: Provide documentation showing metal roof panel fabricator is accredited under IAS AC472.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Roof Panels:
2. Drexel Metals Inc; 100SS Profile: www.drexmet.com/#sle.
3. Englert, Inc; A1300: www.englertinc.com/#sle.
5. Firestone Building Products LLC; [_____]: www.firestonebpco.com/#sle.

2.02 ARCHITECTURAL METAL ROOF PANELS
A. Architectural Metal Roofing: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstand ing 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).
   2. Profile: Standing seam, with minimum 2.0 inch seam height; concealed fastener system for snap-on application of matching standing seam batten.
   3. Texture: Smooth.
   4. Length: Maximum possible length to minimize lapped joints. Where lapped joints are unavoidable, space laps so that each sheet spans over three or more supports.
   5. Width: Maximum panel coverage of 24 inches.

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.
B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.05 FINISHES
A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected by Architect from manufacturer's standard line.
   1. Manufacturers:
      a. PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
      b. Valspar; Fluoron: www.valsparcoilextrusion.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ACCESSORIES
A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, closure strips, 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. Thermal Insulation: Provide flexible blanket, rigid, or semi-rigid type, faced with white, flexible, non-dusting vapor retarder tested for maximum flame spread index of 50, per
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, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

D. Insulation: Install insulation between roof covering and supporting members to present a neat appearance. Fold, staple, and tape seams unless otherwise approved by Architect.

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
PART 1 GENERAL

1.01 REFERENCE STANDARDS

1.02 PRE-INSTALLATION MEETING
   A. Preinstallation Meeting: Convene one week before starting work of this section.

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturer documentation on tested structural capabilities of assembled panel.
   C. Shop Drawings: Indicate dimensions.
   D. Samples: Submit two samples of {CH#40215}, {CH#40216} in size illustrating finish color, sheen, and texture.
   E. Design and Performance Data: Indicate panel profile and dimensions.
   F. Manufacturer's Installation Instructions: Indicate special handling criteria.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
   B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years experience.

1.05 MOCK-UP
   A. Construct mock-up, 4 feet long by 6 feet wide, including panels, attachments to building frame, sealants and seals, and building corners.
   B. Demonstrate component assembly including panel and glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
   C. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
   B. Store pre-finished material off ground with weather protection to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
   C. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Basis of Design: Metal wall panels are 4 inches nominal thickness. R-value is based on R-13 + R-7.5 CI. Foam-in-place insulation (spray fwill be included in metal stud cavity to increase the R-value to reach R-13, so R-7.5 CI and increase the air-tightness of the wall system. Exterior texture and finish to be Heavy Embossed HE40. Color is to match existing adjacent airport terminal building.
   B. Color and texture: Provide samples 12x12 inches to Architect for review and approval.
   C. Insulated Metal Wall Panels:
      1. All Weather Insulated Panels, a Vicwest company; Heavy Embossed Wall Panel HE40: www.awipanels.com/#sle.
      4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEM
   A. Metal Panel System: Factory-assembled metal panel system, with trim, related flashings and accessory components.
      1. Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
2. Accommodate tolerances of building structural framing.
3. Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section sheets A-311 and A-312

2.03 PANELS AND TRIM
  A. Wall Panels: Exterior and interior metal sheet skin, factory-assembled, with foamed in place insulation; exterior and interior sheet interlocking at edges, fitted with continuous gaskets.
     1. Panel Width: 24 inch.
     2. Panel Thickness: 4 inch.
     3. Exterior Sheet: Pre-finished aluminum, 20 gage, 0.032 inch minimum thickness.

2.04 PANEL MATERIALS
  A. Foamed-in-Place Insulation: Urethane type.

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.

1.02 REFERENCE STANDARDS
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
B. Coordinate with roofing work for scheduling installation of counterflashing, rain drainage and similar items related to roofing.
C. Coordinate with the work of Section 07 9200 for installation of related sealants.
D. Sequencing: Do not proceed with installation of flashing and sheet metal work until substrate construction, cants, blocking, reglets, and other construction are ready to receive the work of this Section.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturer's technical data sheets for each product to be used, including metal finishes and sealants.
C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
D. Samples: Submit two samples 6 x 6 inch in size illustrating metal finish color.

1.05 QUALITY ASSURANCE
A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.
B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with three years of documented experience.

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.

1.07 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a one year period after Date of Substantial Completion. Defective work includes failure of watertightness or seals.
C. Provide 20 year manufacturer warranty for prefinished sheet metal materials. Warranty shall include degradation of metal finish.
PART 2 PRODUCTS

2.01 SHEET METAL FLASHING AND TRIM ASSEMBLIES
   A. Flashing Assemblies:
      1. Capable of withstanding structural movement, thermally induced movement, and exposure to wind and weather without failure or permanent deformation.
      2. Physically protect roofing systems, roof accessories, and other building elements and systems from damage that would permit water leakage into building enclosure assemblies under all weather conditions.

2.02 SHEET MATERIALS
   A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
      1. Where exposed face exceeds 8 inches, provide 22 gage minimum, and where exposed face exceeds 10 inches, provide 20 gage minimum.
   B. Applications: Flashings and counterflashings exposed to public view, and where specifically indicated on Drawings.
   D. Color: As selected by Architect from manufacturer's full colors.

2.03 ACCESSORIES
   A. Fasteners Exposed to View: Stainless steel, with soft neoprene washers.
   B. Concealed Fasteners: Galvanized steel or stainless steel, with soft neoprene washers.
   C. Primer: Zinc chromate type.
   D. Protective Backing Paint: Zinc molybdate alkyd.
   E. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
   F. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
   G. Plastic Cement: ASTM D4586, Type I.
   H. Reglet Cement: ASTM D4586, Type I.
   I. Reglet Trim: Surface mounted type, galvanized steel.

2.04 FABRICATION
   A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
   B. Fabricate cleats and starter strips of same material as exposed sheet, one gage thickness heavier than exposed sheet, and interlockable with exposed sheet.
      1. Provide continuous cleat strips for metal copings and flashings.
   C. Form pieces in longest possible lengths.
   D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
   E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
   F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
   G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
   H. Fabricate flashings to allow toe to extend minimum 2 inches over roofing terminations. Return and brake edges.
   I. Fabricate flashings to include end dams with overlapped and sealed corners are required at terminations and transitions.
   J. Reglet Counter flashings: Form upper edge with snap-lock flange to engage the reglet receiver, and to provide spring action pressure at bottom edge against roof base flashings.
   K. Fold and return counter flashing at exposed ends, to provide fully closed, neatly finished ends.
   L. Formed Metal Copings: Fabricate cross joints between coping sheets with 3/16 inch expansion joint between sheets, and 6 inch wide back-up plate formed to profile of coping.
Form cross joints in coping according to SMACNA (ASMM). Miter, seam, and seal corners of coping.

1. Comply with SMACNA (ASMM) Figures 3-3 18 and 3-7A.

M. Provide for thermal expansion/contraction of all exposed sheet metal work exceeding 15 feet in running length, except as otherwise indicated.
1. Wall Caps, Flashing and Trim: 10 feet maximum spacing, and not closer than 24 inches from corners and intersections.

2.05 DOWNSPOUT FABRICATION

A. Downspouts: Form to profiles and sizes indicated on Drawings and as required to properly collect and remove water. Fabricate complete with required connection pieces and strap anchors to maintain watertight joints.
1. Gutters: Comply with SMACNA (ASMM) Figure 1-12.
2. Downspouts: Comply with SMACNA (ASMM) Figures 1-32E/1-32H.
3. Conductor Heads: Comply with SMACNA (ASMM) Figure 1-25C.

B. Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).

C. Scuppers: Fabricate to SMACNA (ASMM) and as detailed on Drawings. Fabricate in two sections, with roof side flanges secured first, then outside flanges attached after insertion through wall opening. Form edges of outside flange with snap-lock flange to engage scupper receiver and to create spring action against the outer wall surface.
1. Comply with SMACNA (ASMM) Figure 1-26.
2. Comply with SMACNA (ASMM) Figure 1-28 at canopies.

D. Accessories: Profiled to suit gutters and downspouts.
1. Anchorage Devices: In accordance with SMACNA requirements.
2. Gutter Supports: Brackets.
3. Downspout Supports: Brackets.
   a. Space downspouts 1/2 inch clear from wall surfaces.

E. Downspout Boots: If connected to storm drain provide: Cast Iron Boots, prefinished.
1. Model No.: R1510-12 (4 x 3).
2. Substitutions: See Section 01 6000 - Product Requirements.

F. Seal metal joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

4.01 INSTALLATION - GENERAL


B. Cleats and Edge Strips: Secure edges of sheet metal members over 12 inches wide, and at other indicated locations with cleats. Fasten cleats at maximum 12 inches on center unless otherwise indicated. Provide continuous edge strips at eaves and gable ends for attaching exposed terminating edge of copings, gravel stops, or fascias. Provide minimum 1/8 inch butt joints as required to accommodate thermal movement.

C. Formed Metal Copings: Extend front and back edges of coping down over continuous interlocking edge strip. Terminate rear edge with hemmed and folded edge over roof base flashings, or interlock with adjacent flashings as indicated. Miter, seam, and seal corners.

D. Seal joints with butyl sealant between back-up plate and coping sections.
E. Recessed Reglet Flashings and Counterflashings: Insert flashings full depth into recessed reglet. Anchor by mechanical means, including driven wedges of lead or other compatible metal spaced at 12 inches on center. Seal joint with elastomeric sealant specified in Section 07 9200.

F. Surface Mounted Reglet Flashings and Counterflashings: Place surface mounted reglet not less than 9 inches above top of cant strip. Place sealant in preformed groove on back of reglet and on lap before installation. Secure reglet to wall with power driven pins through neoprene washers spaced not less than 16 inches on center. Fill top groove with elastomeric sealant specified in Section 07 9200. After roofing is installed, install snap-lock counterflashings.

G. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted and only on vertical surfaces.

H. Apply plastic cement compound between metal flashings and felt flashings.

I. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

J. Seal metal joints watertight.

4.02 INSTALLATION - PRE-FINISHED SHEET METAL

A. Take special care in the handling and installation to avoid damage to finish.

B. Remove protective film from each unit after installation.

C. Touch up minor damage or defects to match factory finish. Replace units which are excessively damaged as determined by Architect.

4.03 INSTALLATION - DOWNSPOUTS

A. Install as recommended by SMACNA (ASMM) and gutter manufacturer. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces to be in contact with dissimilar materials.

C. Slope gutters minimum 1/8 inch per foot.

D. Secure downspouts to wall with 3 inch wide steel straps or concealed clamp supports, spaced not more than 8 feet oc. Fasten straps or clamps to building with non-corrosive expansion screws.

E. Set splash pad under each downspout.

END OF SECTION
SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Snow guards.

1.02 RELATED REQUIREMENTS
A. Section 07 6100 - Sheet Metal Roofing: Custom snow guards in association with custom sheet metal roofing.

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.
C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

1.04 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 SNOW GUARDS
A. Unit Snow Guards: Individual projecting polycarbonate shapes, attached between standing seams of roof panel, and mechanically fastened or adhered to roof deck.
   1. Projecting Polycarbonate Shapes: Clear polycarbonate plastic with UV stabilizers, semi-circular design.
   2. Placement: Intervals of 18 inches to 2 feet along length of roof.
   3. Manufacturers: (Metal Standing Seam Metal Roof Supplier)

PART 3 EXECUTION

3.01 EXAMINATION
A. Do not begin installation 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. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING
A. Clean installed work to like-new condition.

3.05 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Firestopping systems, materials, and accessories.
B. Perimeter fire/smoke barriers.
C. Fire-resistive joint systems.
D. Firestopping at electrical junction boxes in fire-rated walls.
E. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on
   Drawings or not, and other openings indicated.
F. Contractor’s responsibility for determining required scope of firestopping system work, and for
determining applicable tested/listed systems for the entire project, and for securing jurisdictional
authority approval of firestopping systems.

1.02 DEFINITIONS
A. Firestopping: A material or combination of materials used to retain the integrity of fire- and
   smoke-rated construction by maintaining an effective barrier against the spread of flame, and to
   impede the passage of smoke, gases, and moisture through penetrations, blank openings,
   construction joints, and perimeter fire/smoke containment in or adjacent to fire-and smoke-rated wall,
   floor, ceiling, and other rated construction assemblies.
B. Assembly: Particular arrangement of materials specific to type of construction described or detailed in
   referenced UL or other approved design.
C. Barrier: Time-rated fire walls, smoke barrier walls, time-rated floor/ceiling assemblies, and structural
   floors.
D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full
   thickness of rated materials is interrupted.
E. Membrane Penetration: An opening made through one side of an assembly without passing
   completely through the assembly.
F. Construction Gaps: Gaps between adjacent sections of walls, exterior walls, top of wall and ceiling,
   structural floors or roof decks, and adjacent sections of structural floors.
G. System: Specific products and applications, classified and numbered by UL or other approved testing
   agency to close specific barrier penetrations.
H. Sleeve: Metal fabrication or pipe section extending through thickness of barrier used to permanently
   guard penetration.
I. VOC: Volatile organic compound(s).

1.03 REFERENCE STANDARDS
   Construction and Manufactured Housing; 2012.
D. ASTM E1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and
   Using Intermediate-Scale, Multi-story Test Apparatus; 2015a.
F. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall
   Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi;
   2015.
H. IFC - International Firestop Council Recommended Guidelines for Evaluating Firestop Systems
   Engineering Judgements; current edition.
1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of firestopping systems with affected trades and adjacent work.

B. Sequencing: Sequence work to permit firestopping materials to be installed after adjacent and surrounding work is complete.
   1. Do not cover or conceal firestopping installations until Owner's inspection agency and jurisdictional authority have inspected each installation.
   2. Provide one week advanced notification to Owner and Owners inspection agency to schedule inspections.

1.05 SUBMITTALS

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

B. Jurisdictional Authority Submittal: Prior to submission to Architect, submit to jurisdictional authority and local fire department complete product data indicating proposed product characteristics, performance characteristics, limitation criteria, and documentation of proposed firestop materials and systems for actual project conditions.
   1. Include manufacturer's complete installation instructions and UL Design or other approved testing agency data sheets for each proposed firestop system.
   2. Include complete test data forms or jurisdictional acceptance for proposed assemblies not conforming to specific UL Design numbers or other approved testing agency system designs.
   3. Submit certificate from authority having jurisdiction indicating approval of materials and systems to be used, with one complete copy, for information only, of the approved jurisdictional authority submittal.
   4. If the jurisdictional authority does not require a submission, submit this same package to Architect.

C. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

D. Product Data: Provide data on product characteristics, performance ratings, and limitations.

E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
   3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Installer Qualifications: Company specializing in performing the work of this Section and:
   1. Trained by the manufacturer.
   2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
      a. With minimum 3 years documented experience installing work of this type.
      b. Able to show at least 5 satisfactorily completed projects of comparable size and type.
      c. Licensed by authority having jurisdiction.

C. Obtain firestop systems for each type and condition of penetration from a single manufacturer; intermixing of system components for each type and condition of penetration by different manufacturers is not permitted.
D. Listed and tested assemblies and systems must be utilized, if they exist, before alternative systems requiring Engineering Judgement (EJ) or Equivalent Fire Resistance Rated Assembly (EFERRA) will be considered. Comply with IFC and FCIA for EJ and EFERRA design and submittal requirements.

1.07 REGULATORY REQUIREMENTS
A. Comply with execution requirements of authority having jurisdiction including, if applicable, the requirement that all firestopping work be performed by a single qualified firm or subcontractor.
B. Perform all firestopping work by a single qualified firm or subcontractor.

1.08 DELIVERY, STORAGE, AND PROTECTION
A. Deliver materials in original unopened containers identified with manufacturer's brand designation and applicable UL label.
B. Do not use damaged or expired materials.

1.09 FIELD CONDITIONS
A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
B. Provide ventilation in areas where solvent-cured materials are being installed.

1.10 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Include agreement to repair or replace joint sealers which fail in joint adhesion, extrusion resistance, migration resistance, general durability, or apparent deterioration beyond manufacturer's printed limitations for stipulated warranty period from Date of Substantial Completion.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Acceptable Manufacturers:
   2. 3M Fire Protection Products: www.3m.com.
   11. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRESTOPPING - GENERAL REQUIREMENTS
A. General: Use firestopping systems which are acceptable for those applications for which they are specifically designed. Use of other UL listed systems is Contractor's Option, subject to compliance with specified performance, regulatory, and quality assurance requirements.
   1. Fire Ratings: See Drawings for required systems and ratings.
   2. Where there is no specific tested and classified firestop system for an indicated condition, obtain from the firestopping system manufacturer an Engineering Judgement (EJ) or Equivalent Fire Resistance Rated Assembly (EFERRA) according to IFC and FCIA.
B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
C. Scope: Install firestopping at all locations requiring protected openings where piping, conduit, cables, sleeves, ductwork and similar items penetrate fire-resistive, fire-rated, and smoke assemblies, including but not limited to:
   1. Penetrations through wall, floor, and roof assemblies, including empty openings and openings containing penetrations.
   2. Membrane penetrations where items penetrate one side of the barrier assembly.
3. Joints between rated assemblies to allow independent movement.
4. Perimeter barriers between exterior wall assemblies and floor and roof assemblies.
5. Joints, through-penetrations, and membrane penetrations in smoke-rated assemblies.

D. Materials: Comply with ASTM E814, UL 1479, and UL 2079 as applicable to achieve indicated fire ratings.

E. General Characteristics:
1. Surface Burning: ASTM E84 and UL 723; flame spread less than 25, smoke developed less than 450.
3. Air Leakage of Perimeter Firestopping Barriers and Penetrations: UL 2079; L-rating less than 2.0 cfm/sf or 5.0 cfm/lf as applicable to the type and location of joint.
7. Long Term Side Effects: None.

F. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
2. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
3. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.

G. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.

H. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.


J. Fire Rated Construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces and types of construction, at separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

K. Smoke Barrier Construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction, at separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

203 MATERIALS

A. Putty Compound: 100 percent solids intumescent or vinyl-type formulation, free of asbestos, silicones, solvents, halogens, PCB’s, and inorganic fibers; flame spread/smoke developed rating 0/0 when tested in accordance with ASTM E84; paintable, not sensitive to freezing afterset.
B. Sealant Compound: One-part intumescent, endothermic, ablative, or elastomeric acrylic water-based calking material required by applicable UL Design; flame spread/smoke developed rating 0/0 when tested in accordance with ASTM E84.

C. Spray-Applied Compound: Water-based, flexible coating which dries to form a flexible seal; tested in accordance with ASTM E1399, complying with wind sway and thermal category, 500 cycles at minimum 10 cycles/minute.

D. Foam Compound: Two-part, liquid-silicone elastomer formulated to foam in place when mixed; flame spread/smoke developed rating 0/0 when tested in accordance with ASTM E84.

E. Plastic Pipe Device: Intumescent strip material, factory or site fabricated in flexible metal collar with adjustable, screw-tightened stainless steel clamp; UL classified for use with PVC, CPVC, CCPVC, CCABS, PVDF, PP, PB, and FRPP plastic pipe.

F. Fire-Safing Insulation: ASTM C665, Type I; high-melt mineral fibers and resinous binders formed into blankets, density not less than 4.0 lbs/cu ft, tested for 3-hour fire containment for required depths and dimensions.

G. Firestopping Pads: Intumescent, dielectric fire putty formed to 7 x 7 or 9.5 x 9.5 inch self-adhering pads, 2-hour fire rating listed by UL.

2.04 ACCESSORIES
A. Provide necessary accessory materials specified in UL Design to achieve complete firestop system at each penetration. Include collars, sleeves, attachment devices, intumescent materials, and other items required.

B. Primers, Sleeves, Forms, and Accessories: Type required for tested assembly design, and as recommended by firestopping manufacturer for specific substrate surfaces.

C. Dam Material: Mineral fiberboard, mineral fiber matting, sheet metal, alumina silicate fire board, or other permanent material required as part of the firestopping system, or removable if not specifically required as part of the firestopping system.

D. Retainers: Impale type clips to support mineral fiber safing blankets.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify openings are ready to receive the work of this Section.

3.02 PREPARATION
A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing or damming materials required to arrest liquid material leakage.

3.03 INSTALLATION - GENERAL
A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Apply firestopping materials in sufficient thicknesses to achieve scheduled fire ratings, to uniform density and texture.

C. Install material at openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.

D. Remove dam material after firestopping material has cured only if dam material is not required as part of the firestopping system; otherwise dam material to remain permanently in place.

E. Do not cover installed firestopping until inspected by authority having jurisdiction.

F. Install labeling required by code.

3.04 INSTALLATION - FIRE SAFING INSULATION
A. Install safing insulation to completely fill spaces between floor slab edges and spandrel construction as detailed.
FIRESTOPPING

B. Install safin insulation to completely fill voids between floor and roof deck flutes and top of wall construction where wall ratings are indicated.

C. Install and support safin insulation permanently in position to comply with tested fire assembly and applicable building code requirements.

3.05 FIELD QUALITY CONTROL


B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.06 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.07 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION
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 REFERENCE STANDARDS

1.03 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.
      5. Substrates for which use of primer is required.
      6. Substrates for which laboratory adhesion and/or compatibility testing is required.
      7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   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.
   D. Color Cards for Selection: Where sealant color is not speciﬁed, submit manufacturer's color cards showing standard colors available for selection.
   E. Samples for Veriﬁcation: Where custom sealant color is speciﬁed, obtain directions from Architect and submit at least two physical samples for veriﬁcation of color of each required sealant.
   F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
   G. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
   H. Preinstallation Field Adhesion Test Reports: Submit ﬁlled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.04 QUALITY ASSURANCE
   A. Maintain one copy of each referenced document covering installation requirements on site.
B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

C. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
   1. Identification of testing agency.
   2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
      a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
      b. Test date.
      c. Location on project.
      d. Sealant used.
      e. Stated movement capability of sealant.
      f. Test method used.
      g. Date of test.
      h. Copy of test method documents.
      i. Age of sealant upon date of testing.
      j. Test results, modeled after the sample form in the test method document.
      k. Indicate use of photographic record of test.

D. Field Adhesion Test Procedures:
   1. Allow sealants to fully cure as recommended by manufacturer before testing.
   2. Have a copy of the test method document available during tests.
   3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
   4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
   7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

E. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
   1. Record results on Field Quality Control Log.
   2. Repair failed portions of joints.

F. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
   1. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

G. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.
PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. 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. 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.
   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.
C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.03 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.
   2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   3. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   4. Color: To be selected by Architect from manufacturer’s standard range.
   5. Service Temperature Range: Minus 40 to 180 degrees F.
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: To be selected by Architect from manufacturer’s standard range.
C. Polymer Sealant: ASTM C920; single component, cured sealant is paintable and mold/mildew resistant, low odor and VOC, and ultraviolet (UV) resistant.

2.04 SELF-LEVELING SEALANTS
A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
   2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer’s standard range.
   4. Service Temperature Range: Minus 40 to 180 degrees F.
2.05 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.
      1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
      2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
      3. Open Cell: 40 to 50 percent larger in diameter than joint width.
      4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
   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.
   D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
      1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
      2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
      3. Record each test on Preinstallation Adhesion Test Log as indicated.
      4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
      5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

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. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
   D. Install bond breaker backing tape where backer rod cannot be used.
   E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
   F. 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.
G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 **FIELD QUALITY CONTROL**

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION
SECTION 07 9513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Expansion joint assemblies for wall, and roof surfaces.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish.
C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations.
D. Samples: Submit two samples 12 inch long, illustrating profile, dimension, color, and finish selected.
E. Manufacturer’s Installation Instructions: Indicate rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

1.04 QUALITY ASSURANCE
A. Basis of Design: Specifications and Drawing details are based on joint assemblies by the specified basis of design manufacturer. Types and assemblies manufactured by other acceptable manufacturers are permitted, subject to compliance with performance requirements; and provided that deviations in dimensions, profiles, and configurations are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Basis of Design Manufacturer:
   1. Inpro Architectural Products, www.inprocorp.com; 615 Series Flush Mount Exterior & 104 Series Interior Floor/Wall+Ceiling Assemblies
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS
A. Interior Non-Fire-Rated Wall/Ceiling Joints Subject to Seismic Movement:
   1. Size: 5 inches.
   2. Model Number:FWF-500M.
   3. Finish: Aluminum.
   4. Resilient Seals: Colors to be selected by Architect from manufacturer's full range.
B. Exterior Wall Joints Subject to Seismic Movement:
   1. Size: 5 inches.
   2. Model Number:FWFC-500M
   3. Finish: Aluminum.
   4. Resilient Seals: Colors to be selected by Architect from manufacturer's full range.
C. Roof Expansion Joints
EXPANSION JOINT COVER ASSEMBLIES

1. Size: 5 inches.
2. Model Number: BRJW-500 CF; provide thermal insulation to match roof insulation R-value.
3. Finish: Manufacturer's standard.

2.03 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
   1. Joint Dimensions and Configurations: As indicated on drawings.
   2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
   3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.

B. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 allow, T6 temper.

B. Resilient Seals:
   1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.

C. Compressible Foam Seals: ASTM D1056, Type 2, Class B, Grades 2 and 3.
   1. Pre-formed closed cell polyethylene foam, UV stable.
   2. Tear Strength: 15 pli minimum.
   3. Water Absortion: 0.03 lb/ft² 3% vol/vol maximum.

D. Anchors and Fasteners: As recommended by cover manufacturer.

E. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.

F. Threaded Fasteners: Stainless steel.

G. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphalritic type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 PREPARATION

A. Provide anchoring devices for installation under Section 03 1000.
   1. Provide templates and rough-in measurements.

3.03 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.04 PROTECTION

A. Do not permit traffic over unprotected floor joint surfaces.

B. Provide strippable coating to protect finish surface.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Non-fire-rated hollow metal doors and frames.
B. Hollow metal frames for wood doors.
C. Fire-rated hollow metal doors and frames.
D. Thermally insulated hollow metal doors with frames.
E. Hollow metal borrowed lites glazing frames.
F. Accessories, including glazing and insect screens.

1.02 REFERENCE STANDARDS
C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate with wall construction for anchor placement.
   2. Coordinate installation of hardware.
   3. Coordinate installation of glazing.
   4. Coordinate installation of electrical connections to electrical hardware items.

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.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE
A. Conform to requirements of ANSI A250.8 - SDI-100, and as supplemented in this Section.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

1.06 REGULATORY REQUIREMENTS
A. Conform to applicable Building Code for fire rated assemblies.
B. Fire rated assembly construction to conform to UL 10C.
C. Installed Frame and Door Assemblies: Comply with NFPA 80 for fire rated class indicated.
D. Installed Fire-rated Window Assemblies: Comply with NFPA 257 for fire rated class indicated.
E. Installed Smoke Control Frame and Door Assemblies: Comply with NFPA 105.

1.07 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.
C. Inspect hollow metal products upon delivery for damage. Minor damage may be repaired provided refinishing is equal in all respects to new work and is acceptable to Architect; otherwise replace damaged items with new products as specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Acceptable Manufacturers:
   4. Southwest Hollow Metal: swhm@bacavalley.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GENERAL DOOR AND FRAME REQUIREMENTS
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. Inverted bottom channel to allow for cutting of door.
   4. Door Edge Profile: Manufacturers standard for application indicated.
   5. Typical Door Face Sheets: Flush, unless otherwise indicated on Drawings.
   6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on Drawings.
   7. 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.
      a. Prepare doors and frames for hardware in accordance with templates provided under Section 08 7100.
      a. Hinge: 3/16" x 12" steel plate.
      b. Strike: 14-gauge steel.
      c. Closer: 12-gauge steel.
      d. Head over 42 " width: 14 gauge frame or 12 gauge angle or channel stiffner.
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; where two requirements conflict, comply with the most stringent.

203 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 4 - Maximum-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: 14 gage, 0.067 inch, minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
   2. Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
   4. Weatherstripping: Refer to Section 08 7100.
   5. Door Finish: Factory primed and field finished.

B. Interior Doors, Non-Fire-Rated:
   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, minimum.
      2. Core Material: Vertical steel stiffeners.

C. Interior Doors, Fire-Rated: 14 gage.
   1. Grade: ANSI A250.8 Level 4, physical performance Level A, Model 1, full flush.
   2. Fire Rating: As indicated on Drawings, tested in accordance with UL 10C ("positive pressure").
      a. Provide units listed and labeled by UL.
      b. Attach fire rating label to each fire rated unit.

204 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements. Frames are to be continuously electric-welded at all exposed joints, miters and stops. Miter and weld corners the full length of all exposed joint surface's full width and depth, and grind smooth.

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 A60/ZF180 coating.
   2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
   3. Frame Finish: Factory primed and field finished.
   4. Weatherstripping: Separate, see Section 08 7100.

C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
   2. Frame Finish: Factory primed and field finished.

D. Door Frames, Fire-Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.
   2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
   3. Frame Finish: Factory primed and field finished.

E. Mullions for Pairs of Doors: Removable type, with profile similar to jambs. Provide mullion storage kit mounted adjacent to doors as located by Architect, MT54 as manufactured by Von Duprin, coordinate size of mullion storage kit with size of mullion.
F. Borrowed Lites Glazing Frames: Construction and face dimensions to match typical interior metal door frames, and as indicated on Drawings; minimum 16 gage thickness, unless otherwise indicated.

G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

H. Reinforcing Frame:
1. Hinge reinforcement for metal frames with wood doors:
   a. Thickness: 3/16”.
   b. Length: 12”.
   c. Width: full width of frame (frame face to frame face).
   d. Number of spotwelds above and below each cutout: 6, and shall be 3/16” in diameter.
2. Hinge reinforcement for metal frames with metal doors:
   a. Thickness: 1/4”.
   b. Length: 18”.
   c. Width: full width of frame (frame face to frame face).
   d. Number of spotwelds above and below each cutout: 8, and shall be 3/16” in diameter.
3. For continuous hinged door, reinforcing shall be full width and full length of frame. Reinforcing shall have minimum thickness of 1/8”, welds shall be 1” long located on 8” centers at each face of frame.
4. Strike, flush bolt, hold-open and all surface-mounted hardware: 12-gauge.
5. Closer and brackets: 3/16” on frame. 12 gauge angle on door.
6. For door openings wider than 42” and for multiple openings, head members shall be reinforced full-length with 12-gauge angle or channel stiffeners.
7. Reinforcing plates shall be one-piece integral units, bent for flush mounting of hinges.

I. Frames for Exterior Entry Doors: Provide cutout in frame to allow for installation of Concealed Electrical Power Transfers.

J. Provide cover boxes in back of all hardware cutouts.

K. Provide metal adjustable clip angles spot-welded to bottom of each door jamb member; provide holes in angles to receive floor anchorage.

205 ACCESSORIES

A. Frame Anchors
1. Concrete or masonry walls: UL welded-on 16-gauge adjustable strap anchors at least 2-1/2” x 10”. Stirrup straps shall be appropriately corrugated and/or perforated.
3. Provide three (3) masonry anchors for frames up to 7'-6” in height, and four (4) anchors for frames up to 8'-0” in height. For masonry and frame openings over 8'-0” in height, add one (1) anchor for each 2'-0” in height or fraction thereof.
4. Provide four (4) stud frame anchors for frames up to 7'-6” in height and five (5) anchors for frames up to 8'-0”. For stud openings over 8'-0” in height, add one (1) anchor for each 2'-0” in height or fraction thereof.

B. Glazing: As specified in Section 08 8000.

C. Removable Stops: 18 gauge welded steel channel, mitered corners; prepared for countersink style tamper proof screws. All glazing stops shall be mounted on the interior side of rooms from corridors and from the exterior for security measures.

D. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

E. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

206 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.
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.
B. Coat inside of other frames with bituminous coating to a thickness of 1/16 inch.
C. Frames shall be properly cut, mortised, reinforced, drilled and tapped for hinges, strikes, holders where required. Do not drill and tap for surface-mounted closers and brackets.

3.03 INSTALLATION
A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
B. Install fire rated units in accordance with NFPA 80.
C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
D. All bolted frame anchors shall be countersunk and shall have flat-head countersunk screw heads filled and ground smooth prior to painting.

3.04 TOLERANCES
A. Clearances Between Door and Frame: Comply with related requirements of specified door and frame standards.
B. Maximum Diagonal Distortion (Warp): 1/8 in measured with straight edge, corner to corner.

3.05 ADJUSTING
A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE
A. Refer to Door and Frame Schedule on Drawings.

END OF SECTION
SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SUMMARY

A. Provide all labor, material and equipment necessary to furnish and install aluminum windows as shown on drawings and specifications herein. Window shapes and accessories as specified and detailed shall establish the type of units and materials to be used to provide the functional performance and aesthetic requirements desired. Details indicate the required depth and profile.

1.02 RELATED REQUIREMENTS

A. Section 01600 – Product Requirements
B. Section 07900 – Joint Sealers
C. Section 08800 – Glass and Glazing

1.03 REFERENCE STANDARDS

B. AAMA 502 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"
C. AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum"
D. AAMA 701/702 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals"
E. AAMA 1503 “Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections”
F. AAMA 2603 "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels"
J. ASTM E 283 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
L. ASTM E413 “Classification for Rating Sound Insulation”
M. ASTM E 547 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential"
N. ASTM E966 "Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Facade Elements"
O. ASTM E1332 “Standard Classification for Determination of Outdoor-Indoor Transmission Class”
Q. ASTM E 2190 "Standard Specification for Insulating Glass Unit Performance and Evaluation"
R. NFRC 100 “Procedure for Determining Fenestration Product U-Factors”
S. NFRC 200 “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”
T. NFRC 500 “Procedure for Determining Fenestration Product Condensation Resistance Values”
1.04 PERFORMANCE REQUIREMENTS

A. Performance Requirements: PW AW PG100

B. Uniform Load Structural Test
   1. With sash in a closed position window shall be tested in accordance with ASTM-E-330. At a static air pressure difference of 100.0 (150.0) pounds per square foot with pressure applied both positively and negatively.
   2. Static air pressure difference shall be 1.5 times the design pressure used in 1.03 A. (1.5 is the factor used to provide a margin of safety in aluminum windows and is the minimum recommended by the AAMA).
   3. At conclusion of test, there shall be no glass breakage; permanent damage to fasteners, hardware parts, support arms, or actuating mechanisms. Nor any other damage which would cause the window to be inoperable. Permanent deformation of any frame, sash, or ventilator member shall not exceed 0.04% of its span.

C. Air Infiltration
   1. With sash in a closed and locked position window shall be tested in accordance with ASTM-E283 and shall meet the following performance requirements.
      a. Air infiltration on windows with less than 18 feet of operable sash crack perimeter shall not exceed 2.8 cfm per square foot of window area when tested in a static pressure drop of 1.57 psf (equivalent to 25 mph wind velocity) or 6.3 cfm total when tested at 6.24 psf (equivalent to 50-mph wind velocity).
      b. Air infiltration on windows with 18 or more feet of operable sash crack perimeter shall not exceed .05 cfm per square foot of window area at a static pressure drop of 1.57 psf or .15 cfm at 6.24psf.

D. Water Resistance
   1. All tests shall be conducted in accordance with ASTM E 331. No water shall pass the innermost plane of the window when tested at a static air pressure difference of 12.0 psf.

E. Thermal Performance
   1. When tested in accordance with AAMA-1503 or according to NFRC-100 the thermal transmittance due to conduction (Uc) shall not exceed 0.32 on the entire specimen.
   2. When tested in accordance with AAMA-1503 or according to NFRC-500 the Condensation Resistance Factor (CRF) shall not be less than 66 on the entire specimen.

F. Forced Entry Resistance
   1. When tested in accordance with ASTM F 588, window shall perform to a minimum Performance Level 10.

G. Sound Transmission
   1. Sound Transmission Class (STC). When tested in accordance with ASTM E1425, window shall perform to a minimum STC 41. Testing shall be performed in a NVLAP Certified Test Laboratory.
   2. Outdoor Indoor Transmission Class (OITC). When tested in accordance with ASTM E1332, window shall perform to a minimum of OITC 33. Testing shall be performed in a NVLAP Certified Test Laboratory.

1.05 QUALITY ASSURANCE

A. All testing shall be performed by an independent architectural testing laboratory accredited by the American Architectural Manufacturers Association (AAMA), the National Voluntary Laboratory Accreditation Program (NVLAP) and the International Conference of Building Officials (ICBO) and such other accreditation as may be required by state of local building regulations.

B. The manufacturer shall provide the architect and owner a notarized affidavit of compliance certifying that the doors furnished for this project are identical in every aspect of design, component parts (including sealants and the application thereof, reinforcing members, etc.) and fabrication techniques as the doors tested in the laboratory for which test reports have been furnished.

1.06 SUBMITTALS

A. Window manufacturer shall supply test reports from an AAMA- and NVLAP- accredited laboratory certifying compliance with performance specifications for each type of window.
supplied for this project.

B. Window manufacturer shall supply product data for each type of window required, including:
   1. Construction details and fabrication methods.
   2. Data on hardware and accessories.
   3. Recommendations for maintenance and cleaning of exterior surfaces.

C. Before proceeding with the manufacture of windows, the window contractor shall submit
   complete shop drawings with installation details for the Architect’s approval. These
   drawings shall also show window elevations, details of all window sections, collateral
   materials, details of anchorage, associated hardware.

D. Window manufacturer shall submit three [3] samples of finish.

E. Window manufacturer shall submit a copy of the product warranty to be applied to this
   project.

2.01 WARRANTY

A. The manufacturer shall warrant the product against material defects or defects in
   manufacturing. If a defect is discovered and brought to the attention of the Manufacturer,
   the defect will be corrected at no cost to the owner. Warranty shall not be pro-rated.
   Warranties requiring the owner to return windows to the factory for repair or replacement
   shall not be accepted.
   1. Windows: warrant for Ten [10] years against defects in material or workmanship under
      normal use.
   2. Insulating glass units: warrant seal for Ten [10] years against visual obstruction from
      film formation or moisture collection between internal glass surfaces, excluding that
      caused by glass breakage or abuse.
   3. Finish:
      a. Organic finish conforming to AAMA 2605-05: warrant for Ten [10] years against
         chipping, peeling, cracking, chalking, or fading.

PART 2 PRODUCTS

2.02 MANUFACTURER

2.03 BASIS OF DESIGN: ST. CLOUD WINDOW, INC., 390 INDUSTRIAL BLVD, SAUK RAPIDS,
   MN 56379, PHONE: 800-383-9311, FAX: 320-255-1513,
   WWW.STCLOUDWINDOW.COM
   A. SCW3060 –Fixed Lite

2.04 NO SUBSTITUTIONS WILL BE ACCEPTED.

2.05 TERMINOLOGY USED HEREIN MAY INCLUDE REFERENCE TO THAT
   MANUFACTURER’S PROPRIETARY PRODUCTS. SUCH REFERENCES SHALL BE
   CONSTRUED ONLY FOR THE PURPOSE OF ESTABLISHING THE QUALITY OF
   MATERIALS AND WORKMANSHIP TO BE APPLIED UNDER THIS SECTION, AND SHALL
   NOT BE CONSTRUED AS LIMITING COMPETITION.

2.06 REQUESTS FOR SUBSTITUTIONS OF PRODUCTS OR MANUFACTURERS OTHER THAN
   THE BASE BID MUST BE SUBMITTED TO THE ARCHITECT TEN [10] BUSINESS DAYS
   PRIOR TO THE BID DATE. REQUESTS FOR SUBSTITUTIONS MUST DEMONSTRATE
   THAT THE PRODUCT SEEKING APPROVAL MEETS OR EXCEEDS THE DESIGN AND
   PERFORMANCE SPECIFICATIONS OF THE BASE BID. PRODUCTS NOT PRE-
   APPROVED BY THE ARCHITECT IN WRITING VIA ADDENDUM WILL NOT BE ACCEPTED.
   SUBSTITUTIONS MUST COMPLY WITH THE REQUIREMENTS OF SECTION 01 60 00 –
   PRODUCT REQUIREMENTS.

2.07 MATERIALS

A. Aluminum Extrusions
   2. All primary sash and frame structural members shall have a minimum wall thickness of
      0.10”, unspecified wall thicknesses shall be .08”

B. Thermal Barrier
1. Provide continuous extruded high performance nylon 6/6 polyamide with multi-directional 25% glass fiber reinforcing as manufactured by Technof orm or equal. All polyamide material must be from a minimum of 90% virgin components, with a maximum 10% pre-consumer regrind. Aluminum components shall be mechanically crimped into cross knurled cavities and obtain a minimum composite shear value of 800 pounds for a 4” section. Rolled in PVC, single directional glass fiber reinforced polyamide and pour and de-bridge Urethane thermal break systems will not be acceptable.

C. Glazing
1. All glazing shall comply with the performance requirements outlined in section 08800 – Glass and Glazing.
2. All windows to be fully factory glazed with 1.25” thick overall insulated glass.
3. All glass shall be glazed with removable stops and shall be replaceable without dismantling the sash or frame members.
4. A continuous polyshim tape will be used on the exterior glazing leg and a continuous silicone cap bead over the polyshim bonding to the glass edge to prevent moisture from intruding into the window system. A continuous rubberized vinyl compression bulb to be used on the interior glazing stops.
5. Nominal glass thickness and type shall be:
   a. Exterior glass lite

2.08 THICKNESS: 1/4”
2.09 TINT: BRONZE
2.10 TYPE: CLEAR PVB LAMINATE
2.11 COATING: NONE
   a. Air Space
2.12 3/4” (90% ARGON FILLED)
   a. Interior Glass Lite
2.13 THICKNESS: 1/4”
2.14 TINT: CLEAR
2.15 TYPE: CLEAR PVB LAMINATE
2.16 COATING: CARDINAL 272 LOWE
   A. Muntin:
      1. Muntin grids shall be extruded aluminum with exposed surfaces finished to match window exterior and interior colors
      2. Muntin grids shall be applied to the interior and exterior of the glass lite to simulate a true-divided lite.
      3. Insulated glass units shall incorporate between glass grids to simulate a true-divided lite.
      4. Grid patterns to be designated by architect.
   B. Strap Anchors:
      1. A continuous aluminum slip-on F-channel mounting clip will be used on the interior side of window frame perimeter to anchor window frames in place. A fastener will be anchored through mounting clip into the wall section 6” from each frame edge and at 16” on center or a determined spacing as set forth by engineered load calculations. After fasteners are in place, a trim cover plate will be snapped over the mounting clip to conceal all fasteners.

2.17 FABRICATION
   A. All joints of the frame shall be butt type and secured by means of thread-cutting stainless steel screws anchored into screw ports which shall be an integral part of the frame members. The vent frame shall use miter-type joinery and be secured together with the use of aluminum corner keys and crimped. All corner joints shall be joined neatly and all sharp edges shall be de-burred and filed smooth. Joints to be sealed for weather tightness with the use of small joint sealer material.

2.18 FINISH
   A. Interior:

PFC/LOC 19-01 CNCIA
Holdroom Additions/Renovation 08 4313 - 4 ALUMINUM-FRAMED STOREFRONTS
1. **Anodized Finish:** Class I (etched and anodized to 0.7 mil), conforming to AAMA 611-98  
   a. Color to be: Dark Bronze (Field verify color match to existing)

**B. Exterior:**  
1. **Anodized Finish:** Class I (etched and anodized to 0.7 mil), conforming to AAMA 611-98  
   a. Color to be: Dark Bronze (Field verify color match to existing)

**PART 3 EXECUTION**  
**2.19 INSTALLATION**  

A. All window and related window components shall be installed in accordance with requirements of the owner and the approved shop drawings of the Manufacturer. Installation shall be by a contractor who is experienced and who shall document at least one other projects of similar nature and scope for which the window products were successfully installed.

B. All materials shall be erected plumb, level and true, relative to the building structure. The maximum variation from plumb and level shall not exceed 1/8” (plus or minus) over ten feet.

C. Approved insulation materials shall be installed in the frame cavity on the interior portion of the window frame. Area adjacent to the exterior of the window frame shall remain uninsulated. The window installer shall use caution in the insulation operation to avoid overlapping insulation materials across the thermal-barrier connector thus bridging the two separate frame members.

D. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

E. Provide alignment attachments and shims to permanently fasten system to building structure.

F. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

G. Provide thermal isolation where components penetrate or disrupt building insulation.

H. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

I. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

L. **CAULKING**  
   1. A grade “A” type neutral cure silicone caulking: Pecora, Tremco, Vulkem, or equal as approved by the Architect, shall be applied per the installation drawings and details at all points where the aluminum master frame and/or panning intersects the masonry or other exterior wall finish. The caulking material shall be applied in a manner which insures a continuous air- and water-tight perimeter seal. Color to match the color of the aluminum windows unless specified otherwise by the Architect.

M. **TESTING**  
   1. Laboratory Testing  
      a. At the discretion of the owner, one or a number of window units shall be selected prior to installation. The selected stock shall be tested by a certified testing laboratory to verify that glass, glazing, hardware and finish are in conformance to the project specification. Should any component of the test specimen fail to conform to project specification, action shall be taken by the window manufacture to correct each deficiency for every window on the project at no additional cost to the owner  
      b. The owner shall assume the cost of the initial verification testing. However, should product be found to be non-compliant, the manufacture shall reimburse the owner for the cost of the initial test. At the architect’s discretion, subsequent testing may be required and the cost of this test shall be borne by the
2. Field Testing
   a. On-site testing shall be conducted at owner’s discretion and expense. Up to three test specimens shall be selected by owner or architect.
   b. On-site testing shall be conducted for air infiltration and water leakage as specified in section 1.04 – A and b, by an AAMA-certified architectural testing laboratory in accordance with AAMA 502, Method B.
   c. On-site testing shall be conducted for sound transmission as specified in section 1.04 – F and G, by NAVLAP-certified acoustic testing laboratory in accordance with ASTM E966 and including flanking test. Using ASTM E413 and ASTM E1332, respectively, specimens tested in the field shall be within five (5) points of the laboratory STC test results and three (3) points of the laboratory OITC test results furnished with product qualification.
   d. If a test specimen shall fail any aspect of the field test, it shall be repaired or replaced and re-tested. At the architect’s direction, up to three (3) additional windows may be tested. Upon completion of re-testing, all window units shall be repaired or replaced in the same manner as the test specimen(s) to assure compliance with project performance specification.
   e. The cost of re-testing and all subsequent repairs and other associated expenses shall be borne by the window manufacturer and/or window installation contractor

N. ADJUSTMENTS, PROTECTION, AND CLEANING
   1. After installation, the erector shall remove all sealants, caulking and other misplaced materials from all surfaces, including adjacent work. The window frame, sash and glass shall be cleaned thoroughly with materials and methods recommended by the window and glass manufacturers and shall not cause any defacement of the work.
   2. Installer shall make any and all adjustments to window sash and hardware to cause the operating sash to function properly and in accordance with the manufactures standards.
   3. Protection of glass and window materials: Protect from contact with contaminating substances resulting from construction operations. After installation and cleaning of windows by window contractor, the general contractor shall be responsible for maintaining the cleanliness and protection of the window from damage from other trades.
   4. Remove all sealant, caulking and other misplaced materials from all surfaces, including adjacent work. The window frames, casing, and glass shall be thoroughly cleaned with materials and methods recommended by the window and glass manufacturer and shall not cause any defacement of the work.
   5. The general contractor shall be responsible for the protection of the work from damage by other trades.

3.01 EXAMINATION
   A. Verify dimensions, tolerances, and method of attachment with other work.
   B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 TOLERANCES
   A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
   B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.03 FIELD QUALITY CONTROL
   A. Provide services of storefront manufacturer’s field representative to observe for proper installation of system and submit report.
   B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
      1. Perform a minimum of two tests in each designated area as indicated on drawings.
      2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
C. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.04 CLEANING
A. Remove protective material from pre-finished aluminum surfaces.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.05 PROTECTION
A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
   a. Swinging doors.

2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

3. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier’s responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section “Alternates” for alternates affecting this section.
2. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
5. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories
1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute
   1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:
   1. Submit in accordance with Conditions of Contract and Division 01 requirements.
   2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
   3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:
   1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
   2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
      a. Wiring Diagrams: For power, signal, and control wiring and including:
         1) Details of interface of electrified door hardware and building safety and security systems.
         2) Schematic diagram of systems that interface with electrified door hardware.
         3) Point-to-point wiring.
         4) Risers.
   3. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
      a. Door Index; include door number, heading number, and Architects hardware set number.
      b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
      c. Quantity, type, style, function, size, and finish of each hardware item.
      d. Name and manufacturer of each item.
      e. Fastenings and other pertinent information.
      f. Location of each hardware set cross-referenced to indications on Drawings.
g. Explanation of all abbreviations, symbols, and codes contained in schedule.

h. Mounting locations for hardware.

i. Door and frame sizes and materials.

j. Name and phone number for local manufacturer's representative for each product.

k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.

1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

4. Key Schedule:

a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.

b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.

c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.

d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.

e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.

1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

5. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Product data for electrified door hardware:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

2. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.

b. Catalog pages for each product.

c. Factory order acknowledgement numbers (for warranty and service)

d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule, edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project’s vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer’s standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
   a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.
G. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
   a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
   b. Preliminary key system schematic diagram.
   c. Requirements for key control system.
   d. Requirements for access control.
   e. Address for delivery of keys.

H. Pre-installation Conference

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.
6. Conference can be done remotely via web or conference call.

I. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
   1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:
   1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
   2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
   1. Promptly replace products damaged during shipping.
   2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
   a. Closers:
      1) Mechanical: 30 years.
   b. Exit Devices:
      1) Mechanical: 3 years.
      2) Electrified: 1 year.
   c. Locksets:
      1) Mechanical: 3 years.
      2) Electrified: 1 year.
   d. Continuous Hinges: Lifetime warranty.

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:


B. Requirements:
1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
4. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and
   one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges
   of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins
8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches
   (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door,
   frame, and wall conditions to allow proper degree of opening.
9. All hinges to be ball bearing.

2.04 CONTINUOUS HINGES

A. Stainless Steel

1. Manufacturers:
   a. Scheduled Manufacturer: Ives.

2. Requirements:
   a. Provide pin and barrel continuous hinges conforming to ANSI/BHMA A156.26.,
      Grade 1.
   b. Provide pin and barrel continuous hinges fabricated from 14 gauge, type 304
      stainless steel.
   c. Provide twin self-lubricated nylon bearings at each hinge knuckle, with 0.25-inch (6
      mm) diameter stainless steel pin.
   d. Provide hinges capable of supporting door weights up to 600 pounds, and
      successfully tested for 1,500,000 cycles.
   e. On fire-rated doors, provide pin and barrel continuous hinges that are classified for
      use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Provide pin and barrel continuous hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
g. Install hinges with fasteners supplied by manufacturer.
h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

B. Aluminum Geared
   1. Manufacturers:
      a. Scheduled Manufacturer: Ives.
   2. Requirements:
      a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
      b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
      c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
      d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
      e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
      f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
      g. Install hinges with fasteners supplied by manufacturer.
      h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 BARN DOOR HARDWARE
   A. Manufacturers:
      1. Scheduled Manufacturer: KN Crowder.
   B. Requirements:
      1. Provide complete sets of sliding door hardware as recommended by manufacturer for door type and weight.
         a. Include track, channels, brackets, hangers, fasteners, guides, pulls, stops, and other hardware as required for complete installation.

2.06 ELECTRIC POWER TRANSFER
   A. Manufacturers:
      a. Scheduled Manufacturer: Von Duprin EPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer’s template and UL requirements, unless interference with operation of door or other hardware items.

2.07 FLUSH BOLTS

A. Manufacturers:
   1. Scheduled Manufacturer: Door Controls.

B. Requirements:
   1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.08 MORTISE LOCKS

A. Manufacturers and Products:
   2. Acceptable Manufacturers and Products: None.

B. Requirements:
   1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.
   2. Indicators:
      a. Outside Occupancy Indicator: Provide indicator above cylinder or emergency release for visibility while operating the lock that identifies an occupied/unoccupied status of the lock or latch.
   3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
   4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
   5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
   6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
   a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.09 EXIT DEVICES

A. Manufacturers and Products:

B. Requirements:
   1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
   2. Cylinders: Refer to "KEYING" article, herein.
   3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
   4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
   5. Provide exit devices with dead latching feature for security and for future addition of alarm kits and/or other electrified requirements.
   6. Provide flush end caps for exit devices.
   7. Provide exit devices with manufacturer’s approved strikes.
   8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
   9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
   10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
   11. OPTION: Provide dogging indicators (CDSI/HDSI) for visible indication of dogging status.
   12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
   13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
   14. Provide electrified options as scheduled.
   15. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
   a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.10 ELECTRIC STRIKES

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: Von Duprin 6000 Series.
B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.11 POWER SUPPLIES

A. Manufacturers and Products:


B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.
   i. Tested and certified to meet UL294.
   j. NEMA 1 enclosure.
   k. Hinged cover w/lock down screws.
   l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage Everest 29 T.
2. Acceptable Manufacturers and Products: None.

B. Requirements:

1. Provide cylinders/cores, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
a. Conventional Patented Restricted: cylinder with interchangeable core with patented, restricted keyway.


C. Construction Keying:

1. Replaceable Construction Cores.
   a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
      1) 3 construction control keys
      2) 12 construction change (day) keys.
   b. Owner or Owner’s Representative will replace temporary construction cores with permanent cores.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

C. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
   a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.

3. Provide keys with the following features:
   a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
   b. Patent Protection: Keys and blanks protected by one or more utility patent(s).

4. Identification:
   a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication “Keying Systems and Nomenclature” for identification. Do not provide blind code marks with actual key cuts.
   b. Identification stamping provisions must be approved by the Architect and Owner.
   c. Stamp cylinders/cores and keys with Owner’s unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with “DO NOT DUPLICATE” along with the “PATENTED” or patent number to enforce the patent protection.
   d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
   e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
5. Quantity: Furnish in the following quantities.
   a. Change (Day) Keys: 3 per cylinder/core.
   b. Permanent Control Keys: 3.

2.14 DOOR CLOSERS (LCN 4010/4110/4020)

A. Manufacturers and Products:

B. Requirements:
   1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
   2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
   3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter double heat-treated pinion journal.
   4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
   5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
   6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
   7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
   8. Pressure Relief Valve (PRV) Technology: Not permitted.
   9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
   10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 PROTECTION PLATES

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Requirements:
   1. Provide kick plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
   2. Sizes of plates:
2.16 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturers: Glynn-Johnson.

B. Requirements:
   1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
   2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
   3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
   4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.17 DOOR STOPS AND HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives.

B. Provide door stops at each door leaf:
   1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
   2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
   3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.18 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

B. Requirements:
   1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

3. Size of thresholds:
   a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
   b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width

4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.19 MAGNETIC HOLDERS

A. Manufacturers:
   1. Scheduled Manufacturer: LCN.

B. Requirements:
   1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Where on-site modification of doors and frames is required:
   1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
   2. Field modify and prepare existing door and frame for new hardware being installed.
   3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
   a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
   b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
   c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
   2. Custom Steel Doors and Frames: HMMA 831.

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
   1. Replace construction cores with permanent cores as indicated in keying section.

I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
   1. Conduit, junction boxes and wire pulls.
   2. Connections to and from power supplies to electrified hardware.
   3. Connections to fire/smoke alarm system and smoke evacuation system.
   4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
   5. Testing and labeling wires with Architect’s opening number.
J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

L. Closer/ Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

R. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.
### 3.06 Door Hardware Schedule

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

**Hardware Group No. 01**

For use on Door #s:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
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<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SET</td>
<td>EXTERIOR HINGE</td>
<td>5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)</td>
<td>630 IVE</td>
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<tr>
<td>1 EA</td>
<td>PANIC HARDWARE</td>
<td>LD-99-NL-SNB</td>
<td>626 VON</td>
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</tr>
<tr>
<td>1 EA</td>
<td>RIM CYLINDER</td>
<td>20-057-ICX</td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>MORTISE CYLINDER</td>
<td>20-061-ICX - WITH REQUIRED CAM AND TRIM RING(S) @ LOCAL ALARM</td>
<td>626 SCH</td>
<td></td>
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<tr>
<td>2 EA</td>
<td>FSIC CORE</td>
<td>23-030</td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC STRIKE</td>
<td>6111 FSE</td>
<td>630 VON</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER (W/Spring Stop)</td>
<td>4111 SCUSH TBWMS</td>
<td>689 LCN</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B-CS</td>
<td>630 IVE</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>RAIN DRIP</td>
<td>142A</td>
<td>AL ZER</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>GASKETING</td>
<td>326AA @ HEAD &amp; JAMBS</td>
<td>AA ZER</td>
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<tr>
<td>1 EA</td>
<td>DOOR SWEEP</td>
<td>39A</td>
<td>A ZER</td>
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<td>THRESHOLD</td>
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<td>AL ZER</td>
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</tr>
<tr>
<td>1 EA</td>
<td>LOCAL ALARM</td>
<td>EA-708V</td>
<td>SDC</td>
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<td>2 EA</td>
<td>CARD READER</td>
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<td>BLK SCE</td>
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<tr>
<td>1 EA</td>
<td>LOW VOLTAGE POWER</td>
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<tr>
<td>1 EA</td>
<td>DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY VENDOR</td>
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<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>WIRING, PT TO PT DIAGRAM &amp; ELEVATION DIAGRAM</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
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<td></td>
</tr>
</tbody>
</table>

FREE EGRESS AT ALL TIMES. IF CREDENTIAL IS NOT PRESENTED AT CARD READER; THEN OPENING DOOR WILL SIGNAL DOOR POSITION SWITCH TO SOUND LOCAL ALARM. ALARM CAN BE SHUNTED WITH KEY. VALID CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE, ALLOWING OCCUPANT TO OPEN DOOR. DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.
Hardware Group No. 02
For use on Door #100
Provide each door(s) with the following:

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<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
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<th>MFR</th>
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<td>1</td>
<td>SET EXTERIOR HINGE</td>
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<td>630</td>
<td>IVE</td>
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<tr>
<td>1</td>
<td>EA INSTITUTION LOCK</td>
<td>L9082T 06A</td>
<td>626</td>
<td>SCH</td>
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<tr>
<td>2</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>6211 FSE</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER (W/SPIRING STOP &amp; HOLD OPEN))</td>
<td>4111 SHCUSH TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA GASKETING</td>
<td>326AA @ HEAD &amp; JAMBS</td>
<td>AA</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>39A</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>AS REQ'D BY SILL CONDITION</td>
<td>AL</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>EA CARD READER</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td>BLK</td>
<td>SCE</td>
</tr>
<tr>
<td>1</td>
<td>EA LOW VOLTAGE POWER</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY VENDOR</td>
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<tr>
<td>1</td>
<td>EA WIRING, PT TO PT DIAGRAM &amp; ELEVATION DIAGRAM</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
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<td></td>
</tr>
</tbody>
</table>

CARD READER ON EITHER SIDE OF DOOR MOMENTARILY RELEASES ELECTRIC STRIKE TO ALLOW OCCUPANT TO OPEN DOOR. DOOR HAS ABILITY TO BE HELD OPEN WITH HOLD OPEN CLOSER. DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.

Hardware Group No. 03
For use on Door #100B
Provide each door(s) with the following:

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<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
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<td>1</td>
<td>SET EXTERIOR HINGE</td>
<td>5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)</td>
<td>630</td>
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</tr>
<tr>
<td>1</td>
<td>EA STOREROOM LOCK</td>
<td>L9080T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER (W/SPIRING STOP)</td>
<td>4111 SCUSH TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA RAIN DRIP</td>
<td>142A</td>
<td>AL</td>
<td>ZER</td>
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<tr>
<td>1</td>
<td>EA GASKETING</td>
<td>326AA @ HEAD &amp; JAMBS</td>
<td>AA</td>
<td>ZER</td>
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<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
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<td>A</td>
<td>ZER</td>
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<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>AS REQ'D BY SILL CONDITION</td>
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<td>ZER</td>
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FREE EGRESS AT ALL TIMES. KEY REQUIRED TO ENTER.
Hardware Group No. 04
For use on Door #(s): 121E

Provide each door(s) with the following:

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<td>2</td>
<td>CONTINUOUS HINGE W/ EPT PREP</td>
<td>700 EPT</td>
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<td>IVE</td>
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<tr>
<td>2</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>QEL-9949-E0-LBL-SNB 24 VDC</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC HARDWARE</td>
<td>QEL-9949-NL-LBL-SNB 24 VDC</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>20-057-1CX</td>
<td>626</td>
<td>SCH</td>
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<tr>
<td>1</td>
<td>FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>AUTOMATIC OPERATOR</td>
<td>BY SECTION 087113 (SIMULT. PR)</td>
<td>628</td>
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<td>630</td>
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<td>2</td>
<td>SILENCER</td>
<td>SR64</td>
<td>GRY</td>
<td>IVE</td>
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<td>CARD READER</td>
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<td>SCE</td>
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<td>2</td>
<td>DOOR POSITION SWITCH</td>
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<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 900-4RL</td>
<td>LGR</td>
<td>SCE</td>
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<td>WIRING, PT TO PT DIAGRAM &amp; ELEVATION DIAGRAM</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
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</tr>
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</table>

NORTH TO SOUTH: MOTION SENSOR DETECTS OCCUPANT APPROACHING DOORS AND SIGNALS LATCHBOLTS ON PANIC HARDWARE TO RETRACT AND AUTO OPERATOR TO OPEN BOTH DOORS SIMULTANEOUSLY.

SOUTH TO NORTH: NORMALLY LOCKED AGAINST ENTRY. CARD READER SIGNALS LATCHBOLTS ON PANIC HARDWARE TO RETRACT AND AUTO OPERATOR TO OPEN BOTH DOORS SIMULTANEOUSLY.

DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.

ON LOSS OF POWER, ELECTRIFIED HARDWARE IS DISABLED. DOOR IS LATCHED. TRIM REMAINS SECURE.

Hardware Group No. 05
For use on Door #(s): 100A

Provide each door(s) with the following:

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<td>1</td>
<td>STOREROOM LOCK</td>
<td>L9080T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4011 TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
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<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CCV</td>
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<td>1</td>
<td>GASKETING</td>
<td>488S-BK @ HEAD &amp; JAMBS</td>
<td>S-Bk</td>
<td>ZER</td>
</tr>
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</table>

FREE EGRESS AT ALL TIMES.
KEY REQUIRED TO ENTER.

PFC/LOC 19-01 CNCIA HOLDROOM 08 71 00-21 DOOR HARDWARE Addition/Renovation
Hardware Group No. 06
For use on Door #229
Provide each door(s) with the following:

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<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>SET CONSTANT LATCHING FLUSH BOLT</td>
<td>845/945 AS REQ'D BY DOOR MATERIAL</td>
<td>626</td>
<td>DCI</td>
</tr>
<tr>
<td>1</td>
<td>EA DUST PROOF STRIKE</td>
<td>DP1/DP2 AS REQ'D</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA STOREROOM LOCK</td>
<td>L9080T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA COORDINATOR</td>
<td>COR X FL X MB AS REQ'D</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>EA SURFACE CLOSER</td>
<td>4011 TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 1&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA WALL STOP</td>
<td>WS406/407CCV</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA GASKETING F @ HEAD &amp; JAMBS</td>
<td>488S-BK</td>
<td>S-Bk</td>
<td>ZER</td>
</tr>
<tr>
<td>1</td>
<td>EA OVERLAPPING ASTRAGAL</td>
<td>383AA</td>
<td>AL</td>
<td>ZER</td>
</tr>
</tbody>
</table>

DOOR STOP AT RH LEAF HAS BEEN INTENTIONALLY OMITTED.
FREE EGRESS AT ALL TIMES.
KEY REQUIRED TO ENTER.

Hardware Group No. 07
For use on Door #228
Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>SET INTERIOR HINGE</td>
<td>5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTANT LATCHING FLUSH BOLT</td>
<td>805/905 AS REQ'D MATERIAL (TOP BOLT ONLY)</td>
<td>626</td>
<td>DCI</td>
</tr>
<tr>
<td>1</td>
<td>EA DUST PROOF STRIKE</td>
<td>DP1/DP2 AS REQ'D</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA STOREROOM LOCK</td>
<td>L9080T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA COORDINATOR</td>
<td>COR X FL X MB AS REQ'D</td>
<td>628</td>
<td>IVE</td>
</tr>
<tr>
<td>2</td>
<td>EA SURFACE CLOSER</td>
<td>4011 TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 1&quot; LDW B-BS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA GASKETING F @ HEAD &amp; JAMBS</td>
<td>140A-S</td>
<td>A</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>EA MORTISED AUTO DOOR BOTTOM</td>
<td>364AA</td>
<td>AA</td>
<td>ZER</td>
</tr>
<tr>
<td>2</td>
<td>EA MEETING STILE</td>
<td>55AA / 555AA</td>
<td>AA</td>
<td>ZER</td>
</tr>
</tbody>
</table>

DOOR STOPS HAVE BEEN INTENTIONALLY OMITTED.
FREE EGRESS AT ALL TIMES.
KEY REQUIRED TO ENTER.
### Hardware Group No. 08

For use on Door #1(s): 107 108

Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SET INTERIOR HINGE</td>
<td>5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA PRIVACY LOCK (W/ OCC/VAC INDICATOR)</td>
<td>L9456T 06A L583-363 L283-722</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>4011 TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA WALL STOP</td>
<td>WS406/407CCV</td>
<td>626</td>
<td>IVE</td>
</tr>
<tr>
<td>3</td>
<td>EA SILENCER</td>
<td>SR64</td>
<td>GRY</td>
<td>IVE</td>
</tr>
</tbody>
</table>

FREE EGRESS AT ALL TIMES.
DOOR IS NORMALLY UNLOCKED.
TURNING INSIDE THUMBTURN THROWS DEADBOLT AND DISPLAYS OCCUPIED INDICATOR.

### Hardware Group No. 09

For use on Door #1(s): 200A

Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SET INTERIOR HINGE</td>
<td>5BB1 (SIZE, QTY, WEIGHT, NRP AS REQ'D)</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA PASSAGE SET</td>
<td>L9010 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>4111 TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA FIRE/LIFE WALL MAG</td>
<td>SEM7800 SERIES</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA GASKETING</td>
<td>488S-BK @ HEAD &amp; JAMBS</td>
<td>S-Bk</td>
<td>ZER</td>
</tr>
</tbody>
</table>

DOOR IS NORMALLY HELD OPEN ON MAGNETIC HOLD OPEN. UPON LOSS OF POWER OR SIGNAL FROM FIRE ALARM; MAGNETIC HOLD OPEN RELEASE DOOR, ALLOWING DOOR TO CLOSE AND LATCH.

### Hardware Group No. AL-01

For use on Door #1(s): 121B

Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EA CONTINUOUS HINGE</td>
<td>112HD (MATCH STOREFRONT FINISH)</td>
<td>CPC</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA INSTITUTION LOCK</td>
<td>L9082T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>2</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>6211 FSE</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>4111 EDA TBWMS</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>SET CLOSER BRACKET(S)</td>
<td>AS REQ'D TO INSTALL CLOSER</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA FIRE/LIFE WALL MAG</td>
<td>SEM7800 SERIES</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>PROVIDED BY ALUM DOOR/FRAME MFG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PFC/LOC 19-01 CNClA HOLDROOM 08 71 00-23 DOOR HARDWARE
Addition/Renovation
<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>PROVIDED BY ALUM DOOR/FRAME MFG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>AS REQ'D BY SILL CONDITION AL ZER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA CARD READER</td>
<td>PROVIDED BY SECURITY BLK SCE VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA LOW VOLTAGE POWER</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA WIRING, PT TO PT</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CARD READER ON EITHER SIDE OF DOOR MOMENTARILY RELEASES ELECTRIC STRIKE TO ALLOW OCCUPANT TO OPEN DOOR.
DOOR HAS ABILITY TO BE HELD OPEN ON MAGNETIC HOLD OPEN AT 180 DEGREES.
DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.

Hardware Group No. AL-02
For use on Door #1(s):
121D
Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EA CONTINUOUS HINGE</td>
<td>112HD (MATCH STOREFRONT FINISH)</td>
<td>CPC</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA INSTITUTION LOCK</td>
<td>L9082T 06A</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>2</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>6211 FSE</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER (W/ SPRING STOP &amp; HOLD OPEN)</td>
<td>4111 SHCUSH TBWMS 689 LCN</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>SET CLOSER BRACKET(S)</td>
<td>AS REQ'D TO INSTALL CLOSER</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>PROVIDED BY ALUM DOOR/FRAME MFG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>PROVIDED BY ALUM DOOR/FRAME MFG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>AS REQ'D BY SILL CONDITION AL ZER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA CARD READER</td>
<td>PROVIDED BY SECURITY BLK SCE VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA LOW VOLTAGE POWER</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY VENDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA WIRING, PT TO PT</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PFC/LOC 19-01 CNCIA HOLDROOM 08 71 00-24 DOOR HARDWARE
Addition/Renovation
CARD READER ON EITHER SIDE OF DOOR MOMENTARILY RELEASES ELECTRIC STRIKE TO ALLOW OCCUPANT TO OPEN DOOR.
DOOR HAS ABILITY TO BE HELD OPEN WITH HOLD OPEN CLOSER.
DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.

Hardware Group No. BD-01
For use on Door #(s):
228-A 229-A
Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SET BARN DOOR TRACK</td>
<td>CRT-101 COMPLETE KIT FOR ONE DOOR</td>
<td>BLK</td>
<td>KNC</td>
</tr>
<tr>
<td>1</td>
<td>EA FLUSH PULL</td>
<td>950</td>
<td>626</td>
<td>IVE</td>
</tr>
</tbody>
</table>

OUTSIDE PULL HAS BEEN INTENTIONALLY OMITTED.

Hardware Group No. EX-01
For use on Door #(s):
112A 121C
Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EA PANIC HARDWARE</td>
<td>LD-99-NL-SNB</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>EA RIM CYLINDER</td>
<td>20-057-ICX</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA MORTISE CYLINDER</td>
<td>20-061-ICX - WITH REQUIRED CAM AND TRIM RING(S) @ LOCAL ALARM</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>2</td>
<td>EA FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>6300 FSE</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>EA LOCAL ALARM</td>
<td>EA-708V</td>
<td></td>
<td>SDC</td>
</tr>
<tr>
<td>2</td>
<td>EA CARD READER</td>
<td>PROVIDED BY SECURITY</td>
<td>BLK</td>
<td>SCE</td>
</tr>
<tr>
<td>1</td>
<td>EA LOW VOLTAGE POWER</td>
<td>PROVIDED BY SECURITY</td>
<td>VENDOR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY</td>
<td>VENDOR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA WIRING, PT TO PT DIAGRAM &amp; ELEVATION DIAGRAM</td>
<td>PROVIDED BY HARDWARE SUPPLIER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA RE-USE BALANCE OF EXISTING HARDWARE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REMOVE EXISTING MAGNETIC LOCK AND PUSH/PULL HARDWARE.
FREE EGRESS AT ALL TIMES. IF CREDENTIAL IS NOT PRESENTED AT CARD READER; THEN OPENING DOOR WILL SIGNAL DOOR POSITION SWITCH TO SOUND LOCAL ALARM. ALARM CAN BE SHUNTED WITH KEY.
VALID CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE, ALLOWING OCCUPANT TO OPEN DOOR.
DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.
Hardware Group No. EX-03
For use on Door #(s):
113A

Provide each door(s) with the following:

<table>
<thead>
<tr>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>CATALOG NUMBER</th>
<th>FINISH</th>
<th>MFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRIM</td>
<td>990-NL-RV</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>RIM CYLINDER</td>
<td>20-057-ICX</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>MORTISE CYLINDER</td>
<td>20-061-ICX - WITH REQUIRED CAM AND TRIM RING(S) @ LOCAL ALARM</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>2</td>
<td>FSIC CORE</td>
<td>23-030</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC STRIKE</td>
<td>6300 FSE</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>LOCAL ALARM</td>
<td>EA-708V</td>
<td></td>
<td>SDC</td>
</tr>
<tr>
<td>2</td>
<td>CARD READER</td>
<td>PROVIDED BY SECURITY</td>
<td>BLK</td>
<td>SCE</td>
</tr>
<tr>
<td>1</td>
<td>LOW VOLTAGE POWER</td>
<td>PROVIDED BY SECURITY</td>
<td>BLK</td>
<td>BCE</td>
</tr>
<tr>
<td>1</td>
<td>DOOR POSITION SWITCH</td>
<td>PROVIDED BY SECURITY</td>
<td>BLK</td>
<td>BCE</td>
</tr>
<tr>
<td>1</td>
<td>WIRING, PT TO PT DIAGRAM &amp; ELEVATION DIAGRAM</td>
<td>PROVIDED BY HARDWARE</td>
<td>SUPPLIER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>RE-USE BALANCE OF EXISTING HARDWARE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REPLACE EXISTING 996 LEVER TRIM WITH 990 NIGHT LATCH TRIM. RE-USE EXISTING PANIC DEVICE.
FREE EGRESS AT ALL TIMES. IF CREDENTIAL IS NOT PRESENTED AT CARD READER; THEN OPENING DOOR WILL SIGNAL DOOR POSITION SWITCH TO SOUND LOCAL ALARM. ALARM CAN BE SHUNTED WITH KEY. VALID CREDENTIAL MOMENTARILY RELEASES ELECTRIC STRIKE, ALLOWING OCCUPANT TO OPEN DOOR.
DOOR CONTACT MONITORS WHEN DOOR OPENS AND CLOSES.

END OF SECTION
SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Insulating glass units.
   B. Monolithic glazing units.
   C. Glazing compounds and accessories.

1.02 REFERENCE STANDARDS
   J. GANA (GM) - GANA Glazing Manual; 2009.
   R. FAA Aircraft Noise Screening Tools and Methodologies.

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
   C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
   D. Samples: Submit two samples 12 by 12 inch in size of glass units.
   E. Manufacturer's Certificate: Certify that glass and glazing products meets or exceeds specified requirements.
   F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
1.04 QUALITY ASSURANCE
A. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
B. Installer Qualifications: Company specializing in performing the work of this Section with minimum three years documented experience.
C. Provide each type of glass, primary sealant, and gasket from a single manufacturer with not less than five years documented experience in the production of required materials.
D. Basis of Design: Specifications for certain glass products are based on specific glass types by the specified basis of design manufacturer. Glass types manufactured by other acceptable manufacturers are permitted, subject to compliance with all performance requirements; and provided that deviations in performance and coloration are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.05 MOCK-UPS
A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
B. Mock-up: Provide mock-up of glazing type indicated on Drawings as part of exterior wall mock-up, as indicated on Drawings, including glass and air barrier and vapor retarder seal.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Comply with manufacturer's instructions for shipping, handling, storing, and protection of glass and glazing materials. Exercise exceptional care to prevent edge damage to glass, and damage to coatings.
B. Where insulating glass units will be exposed to substantial altitude changes during shipping, comply with manufacturer's recommendations for venting and sealing.

1.07 FIELD CONDITIONS
A. Do not install glazing when ambient temperature is less than 40 degrees F.
B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
C. Install sealants only when ambient temperature conditions can be maintained at or above 40 degrees F during installation and 48 hours immediately following installation.

1.08 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS
201 MANUFACTURERS
A. Acceptable Glass Fabricators:
   5. Substitutions: Refer to Section 01 6000 - Product Requirements.

202 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES
A. Select type and thickness of exterior glazing assemblies to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with applicable codes.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and
maximum lateral deflection of supported glass.
3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
4. Design glazing units to reliably perform and remain reliably engaged on all edges under all service and thermal stresses, including those associated with partial shading.
5. Limit center of glass deflection to the lesser of 3/4 inch or L/100 (where L is short side dimension of glass unit), or flexure limit of glass, whichever is less, with full recovery of glazing materials.
6. Assure and confirm compatibility of all materials in contact with each other.
7. Glass thicknesses listed are minimum.

B. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 5.2/6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 5.2/6.3 computer program.

203 GLASS MATERIALS
A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
3. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

204 INSULATING GLASS UNITS
A. Insulating Glass Units: Types as indicated on Drawings.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
7. Purge interpane space with dry air, hermetically sealed.
B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
1. Basis of Design: As specified in this Section below.
2. Applications: Exterior glazing unless otherwise indicated.
3. Total Thickness: 1 inch.
C. Type IG-2 - Insulating Glass Units: Safety glazing.
1. Applications:
   a. Glazed lites in exterior doors.
   b. Glazed sidelights and panels next to doors.
   c. Other locations required by applicable federal, state, and local codes and regulations.
   d. Other locations indicated on the drawings.
2. Glass Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.
3. Total Thickness: 1 inch.

205 BASIS OF DESIGN - INSULATING GLASS UNITS
A. All exterior window systems to include laminated glazing with a low sound transmission coefficient (STC) to achieve a 45 dB DNL Interior Exposure during aircraft maximum operation.

B. Type IG-1 - Insulating Glass Units: Vision glazing, with Low-E coating.
   1. Applications: Exterior insulating glass glazing unless otherwise indicated.
   2. Space between lites filled with air.
   3. Total Thickness: 1 inch.
   5. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
      a. Low-E Coating: PPG Solarban 60 on #2 surface.
      b. Tint: Solargray.
      a. Tint: Clear.
   7. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another acceptable manufacturer.
   8. Substitution Procedures: See Section 01 6000 - Product Requirements.
      a. For any product not identified as "Basis of Design", submit information as specified for substitutions.

206 MONOLITHIC GLAZING UNITS

A. General - Combined Requirements: If a particular glass unit is indicated to comply with more than one type of requirement, such as color, safety characteristics, or other requirements. Comply with all specified requirements for each type as scheduled on Drawings.

B. Type G-1 - Monolithic Interior Vision Glazing:
   1. Applications: Interior glazing unless otherwise indicated.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.
   5. Glazing Method: Dry glazing method, tape and tape.

C. Fire-Protection-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
   1. Applications:
      a. Glazed lites in fire doors.
      b. Fire windows.
   2. Glass Type: Fully tempered float glass.
   3. Labeling: Provide permanent label on fire-rated glazing in compliance with 1 and authorities having jurisdiction.
   4. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
   5. Safety Glazing Certification: 16 CFR 1201 Category II.
   6. Fire-Protection-Rating Period: As indicated on drawings.
   7. "NT" Marked Products: Where D-H-90 (or D-H-NT-90), D-H-60 (or D-H-NT-60), D-H-45 (or D-H-NT-45), D-H-20 (or D-H-NT-20), or any "OH" fire-protection-rated glazing marking is indicated, provide one of the following products or any "T" fire-protection-rated glazing marked product of equal or higher rating period:
      d. Substitutions: Refer to Section 01 6000 - Product Requirements.

D. Type G-2 - Monolithic Safety Glazing: Non-fire-rated.
   1. Applications:
      a. Glazed lites in doors, except fire doors.
      b. Glazed sidelights to doors, except in fire-rated walls and partitions.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the Drawings.
   2. Glass Type: Fully tempered safety glass as specified.
3. Tint: Clear.
4. Thickness: 1/4 inch, nominal.
5. Glazing Method: Dry glazing method, tape and tape.

207 GLAZING COMPOUNDS

A. General Requirements:
1. Provide black exposed glazing accessory materials, unless specifically indicated otherwise.
2. Provide materials of hardness as recommended by manufacturer for required application and condition of installation in each case. Provide only compounds which are known to be fully compatible with surfaces contacted, including glass products, seals, and glazing channel surfaces.
B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; black color.

208 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
B. Spacer Shims: Silicone, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
1. Size gaskets as required by manufacturer of glazing channel frame to provide proper pressure and bite on glazing units.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
B. Verify that the minimum required face and edge clearances are being provided.
C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.
D. Sealed Insulating Glass Units: Seal breather tubes immediately prior to glass unit installation with bead of silicone sealant according to sealed insulating glass unit manufacturers requirements; do not crimp, bend, or otherwise damage breather tubes.

3.03 INSTALLATION - GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
B. Install glazing sealants in accordance with ASTM C1193, GANA Sealant Manual, and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)
A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)
A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

E. Place glazing tape on free perimeter of glazing in same manner described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Carefully trim protruding tape with knife.

3.06 CLEANING
A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.07 PROTECTION
A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Glass mirrors.
      1. Tempered safety glass.

1.02 REFERENCE STANDARDS
   C. GANA (GM) - GANA Glazing Manual; 2009.
   D. GANA (TIPS) - Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors); 2011.

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
   C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE
   A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.

1.05 FIELD CONDITIONS
   A. Do not install mirrors when ambient temperature is less than 50 degrees F.
   B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.06 WARRANTY
   A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
   B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
   B. Mirror Glass: Clear, tempered safety glass; ASTM C1048, with copper and silver coatings, and protective overcoating.
      1. Thickness: 1/4 inch.
      2. Edges: Arrised.
      3. Size: As noted on Drawings.

2.02 ACCESSORIES
   A. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness.
   B. Mirror Attachment Accessories: Stainless steel clips.
   C. Mirror Adhesive: Chemically compatible with mirror coating and wall substrate.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that openings for mirrored glazing are correctly sized and withintolerance.
   B. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.
MIRRORS

3.02 PREPARATION
   A. Clean contact surfaces with solvent and wipe dry.
   B. Seal porous mirror frames or recesses with substrate compatible primer or sealer. Prime surfaces scheduled to receive sealant.
   C. Prepare installation in accordance with ASTM C1193 for solvent release sealants, and install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION
   A. Install mirrors in accordance with GANA (TIPS) and manufacturers recommendations.
   B. Set mirrors plumb and level, and free of optical distortion.
   C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.
   D. Frameless Mirrors: Set mirrors in proper place with adhesive applied in accordance manufacturer's instructions and clips anchored rigidly to wall construction.

3.04 CLEANING
   A. Remove labels after work is complete.
   B. Clean mirrors and adjacent surfaces.

END OF SECTION
SECTION 08 9100
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Louvers, frames, and accessories.

1.02 REFERENCE STANDARDS
B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012.
C. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate work of this Section with installation of metal siding.
   2. Coordinate with installation of mechanical ductwork.
   3. Coordinate with installation of flashings.

1.04 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 in size illustrating finish and color of exterior and interior surfaces.
E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this Section, with minimum three years of documented experience.

1.06 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.
   1. Finish: Include coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Acceptable Manufacturers:
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS
A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
   2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
   1. Free Area: 50 percent, minimum.
   2. Blades: Sloped at 45 degrees.
   3. Frame: 4 inches deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
   4. Aluminum Thickness: Frame 12 gage, 0.0808 inch minimum; blades 12 gage, 0.0808 inch minimum.
   5. Aluminum Finish: Class I natural anodized.

2.03 MATERIALS
   A. Extruded Aluminum: ASTM B221 (ASTM B221M); manufacturer's standard alloy and temper.

2.04 FINISHES
   A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

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. Insect Screen: 18 x 16 size aluminum mesh.
   C. Fasteners and Anchors: Galvanized steel.
   D. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION
   A. Install louver assembly in accordance with manufacturer's instructions.
      1. Comply with ASTM E2112 for installation of weather barrier materials in conjunction with installation of louvers.
   B. Install louvers level and plumb.
   C. Install perimeter sealant system in accordance with section 07 9200.
   D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
   E. Secure louver frames in openings with concealed fasteners.

3.03 CLEANING
   A. Strip protective finish coverings.
   B. Clean surfaces and components.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Acoustic insulation.
D. Gypsum sheathing.
E. Cementitious backing board.
F. Gypsum wallboard.
G. Joint treatment and accessories.

1.02 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
N. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
O. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood studs or Steel Studs; 2014.
GYPSUM BOARD ASSEMBLIES

Y. ASTM E413 - Classification for Rating Sound Insulation; 2010.
AC. ICC (IBC) - International Building Code; 2015.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate with mechanical and electrical work. Do not attach or support metal framing to ducts, pipes, conduit, or similar items.
   2. Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of documented experience.
B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Stud Framing: Products that do not comply with ASTM C645 or C754 are not permitted.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store and protect products in accordance with referenced standards.
B. Handle gypsum boards to prevent damage to ends, edges, and surfaces.

1.07 FIELD CONDITIONS

A. Maintain ambient temperatures at not less than 40 degrees F for non-adhesive attachment of gypsum board, and not less than 50 degrees F for adhesive attachment.
B. Maintain ambient temperatures at not less than 50 degrees F for a period 48 hours before gypsum board finishing, during installation, and after installation of board materials.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
C. Fire Rated Assemblies: Provide completed assemblies specified on Drawings.
   1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
   2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
   3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
   4. Where any specified rated assembly requires the use of proprietary gypsum board system products, installation methods or procedures, comply with specified rated assembly requirements including requirements associated with assembly options which may be selected by Contractor.

202 METAL FRAMING MATERIALS
A. Acceptable Manufacturers:
   2. CEMCO; California Expanded Metal Company: www.cemcosteel.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.
B. Metal Framing - General: Provide framing materials complying with specified standards and tested assemblies; galvanized sheet steel, 25 gage unless specified, noted, scheduled, or detailed otherwise.
   1. Use minimum 20 gage studs at door jambs, tile backing support, impact resistant board support, and other locations indicated.
   2. Use minimum 16 gage studs at double door jambs.
   3. Use minimum 18 gage studs at walls that are taller than one story.
C. Metal Framing System Components - Non-Loadbearing: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Studs: "C" shaped with flat or formed webs.
   2. Runners: U shaped, sized to match studs.
   3. Stud System Accessories: Manufacturer's standard clips, shoes, ties, reinforcements, fasteners, and other accessories as required for a complete stud framing system.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
   6. Resilient Furring Channels: 1/2 inch depth, for attachment to substrate through one leg only.
D. Load-Bearing Metal Stud Framing (Cold Formed Metal Framing) for Application of Gypsum Board: Specified in Section 05 4000.
E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI SG02-1.
   3. Deflection Track: Steel sheet top runner designed and manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above wall; thickness and width to match studs.
   4. Firestop Track: Top runner designed and manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; thickness and width to match studs; include manufacturer’s required accessories according to tested assembly requirements.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on Drawings; minimum track length of 12 feet.

203 CEILING SUSPENSION SYSTEM COMPONENTS
A. Gypsum Board Interior Ceiling Suspension System:
GYPSUM BOARD ASSEMBLIES

1. Ceiling Hangers: Type and size as specified in ASTM C754 for conditions and spacing required.
2. Ceiling Hanger Wire: ASTM A641/A641M, Class 1 coating; soft temper, pre-stretched, yield stress load at least three times design load, but not less than 12 gage.
3. Ceiling Hanger Angles: Not less than 7/8 x 7/8 inch x 16 gage galvanized steel formed angles; ASTM A653/A653M, G90 coating, with minimum 5/16 diameter bolted connections.
4. Ceiling Hanger Anchors: Size for three times imposed loads, as determined by ASTM E488/E488M; corrosive resistant materials with loops or holes for attachment of hanger wires.

B. Support Channels and Hangers for Exterior Soffits: Galvanized steel; size for five times design load indicated in ASTM C635, Table 1, direct hung; type to suit application, to rigidly secure gypsum board ceiling system with maximum deflection of L/360.

C. Direct Hung Grid Suspension System for Interior Ceilings: ASTM C635; direct-hung system composed of main runners and cross-furring runners that interlock; size for three times imposed loads, as determined by ASTM E488/E488M; corrosive resistant materials; fire-rated system where indicated.

204 BOARD MATERIALS

A. Acceptable Manufacturers - Gypsum-Based Board:
6. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Board: Gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Applications: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
3. Thickness: As indicated on Drawings.
   c. Multi-Layer Assemblies: Thicknesses as indicated on Drawings.

C. Impact-Resistant Wallboard:
1. Applications: High-traffic areas indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
4. Type: Fire resistance rated Type X, UL or WH listed.
5. Thickness: 5/8 inch.
7. Acceptable Products:
   a. Georgia-Pacific Gypsum; DensArmor Plus Impact-Resistant.
   b. National Gypsum Company; Gold Bond HI-Impact XP Gypsum Board.
   c. Substitutions: See Section 01 6000 - Product Requirements.

D. Backing Board For Wet Areas:
1. Applications: Surfaces behind tile in wet areas including tub and shower surrounds, shower ceilings, and toilet rooms.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. ANSI Cement-Based Backing Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
   a. Thickness: 1/2 inch.
   b. Acceptable Products:
      3) USG Corporation; Durock: www.usg.com.
      4) Substitutions: See Section 01 6000 - Product Requirements.
4. ASTM Cement-Based Backing Board (Exterior) for Adhered Masonry and Fiber Cement Siding: Non-gypsum-based, cementitious board complying with ASTM C1288.
   b. Acceptable Products:
      1) James Hardie Building Products, Inc.; Hardibacker Cement Board.
      2) Substitutions: See Section 01 6000 - Product Requirements.
5. Glass-Mat-Faced Backing Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
   a. Standard Type Thickness: 1/2 inch.
   b. Fire Resistant Type Thickness: Type X core, 5/8 inch.
   c.Acceptable Products:
      1) Georgia-Pacific Gypsum; DensShield Tile Backer.
      2) National Gypsum Company; Gold Bond eXP Tile Backer.
      3) Substitutions: See Section 01 6000 - Product Requirements.
6. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Applications: Ceilings and vertical surfaces in "wet" areas but not behind thinset tile.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Type: Regular and Type X, in locations indicated.
   5. Type X Thickness: 5/8 inch.
   6. Thickness: As indicated on Drawings.
7. Exterior Gypsum Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Applications: Exterior sheathing and parapet sheathing, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Glass-Mat-Faced Sheathing Board: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
   4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   5. Thickness: 5/8 inch.
   6. Acceptable Glass-Mat-Faced Products:
      a. American Gypsum Company; M-Glass Exterior Sheathing Type X.
      b. American Gypsum Company; M-Glass Exterior Sheathing.
      c. Georgia-Pacific Gypsum; DensGlass Sheathing.
      d. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing.
      e. National Gypsum Company; Gold Bond eXP Sheathing.
      f. Substitutions: See Section 01 6000 - Product Requirements.
   1. Application: Roof sides of parapets for adhesive application of roofing parapet wall and base flashings.
   2. Thickness: 1/2 inch unless otherwise indicated.
   3. Acceptable Products:
      a. Georgia-Pacific Gypsum, LLC; DensDeck Prime RoofBoard.
      b. Substitutions: See Section 01 6000 - Product Requirements.

205 ACCESSORIES
A. Acoustic Insulation - General: Use type of acoustical insulation to comply with indicated assembly requirements.
   1. Where any specified rated assembly requires the use of proprietary acoustical insulation products, installation methods or procedures, comply with specified rated assembly requirements including requirements associated with assembly options which may be selected by Contractor.
B. Acoustic Insulation: 1; preformed glass fiber, friction fit type, unfaced.
GYPSUM BOARD ASSEMBLIES

1. Thickness: Full thickness of indicated wall framing, and 3-1/2 inches thick to comply with specified floor/ceiling assembly rating requirements.

C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

D. Weather Barrier System: As specified in Section 07 2500.

E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
   3. Control Joints: One-piece, v-grooved control joint with integral perforated flanges; removable tape to protect v-groove during finishing.
      a. Applications: Locations specifically noted on Drawings; also located at internal corners, wall locations at re-entrant soffit corners, and ceiling locations at re-entrant soffit corners whether or not specifically noted on Drawings.

F. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

G. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

H. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

I. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this Section before commencing work of this Section.

3.02 FRAMING INSTALLATION

A. Framing Systems: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Building Expansion Joints: Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other support as indicated.

C. Suspended Ceilings and Soffits:
   1. Level ceiling and soffit system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.
   3. Space ceiling framing and furring members 16 inches on center, except as otherwise indicated.
   4. Space ceiling framing and furring members at water-resistant gypsum board locations not to exceed 12 inches on center.

D. Studs: Space studs at 16 inches on center or as specified below.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
   4. Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support free from axial loading. Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from plane of faces of adjacent framing.
   5. At partitions supported by on-grade slabs, provide top slip joint to accommodate 1-1/2 inch vertical movement. Provide deflection tracks or firestop tracks at slip joints where specified, or detailed on Drawings.
E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double 20 gage studs at jambs and attach to underside of structure above.
   1. Access Doors: Coordinate placement of openings for access doors and hatches with Architect before framing opening. Avoid placing openings at highly visible locations on wall and ceilings. Refer to Section 08 3100.

F. Isolate non-load-bearing partitions located on slabs on grade at intersection with exterior walls and fixed structural abutments. Isolate partition studs from exterior wall or structural abutment framing to allow differential vertical movement.

G. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
   2. Spacing: At 16 inches on center.

H. Blocking: Install fire-treated wood blocking for support of:
   1. Framed openings.
   2. Wall mounted cabinets.
   3. Plumbing fixtures.
   4. Toilet partitions.
   5. Toilet accessories.
   6. Wall mounted door hardware.
   7. Owner provided equipment as indicated on Drawings.
   8. Similar items indicated on Drawings.

3.03 DIRECT HUNG CEILING SUSPENSION SYSTEM INSTALLATION
A. Attach perimeter wall track or angle where support system meets vertical surfaces.
B. Mechanically join support members to each other and cut to fit into wall track.
C. Space main runners at 48 inches on center and cross tees at 24 inch on center, except as otherwise indicated.
D. Attach ceiling suspension systems to structural members only. Attachment of suspension systems to steel deck is prohibited.

3.04 ACOUSTIC ACCESSORIES INSTALLATION
A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
C. Where sound-rated wallboard work is indicated, seal the work at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions.
   1. Comply with ASTM C919 and manufacturer's recommendations for location of beads, and close off sound-flanking paths around or through the work, including sealing of partitions above acoustical ceilings.

3.05 BOARD INSTALLATION
A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
   1. Space fasteners in accordance with ASTM C840 and manufacturer's recommendations, unless fastener spacing is otherwise specified on structural Drawings for structural load-bearing walls.
   2. Install interior wall and partition boards vertically, except where fire or sound rating requires a particular direction; comply with the method stated in the tested assembly data.
   3. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
B. Single-Layer Non-Rated Applications: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.
C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
   1. Limit annular space between gypsum wall board edges and electrical device boxes to maximum 1/8 inch, or as limited by applicable Code.

D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

E. Exterior Sheathing Board Applications: Comply with ASTM C1280. Install sheathing horizontally, with edges butted tight and ends occurring over firm bearing.

F. Cementitious Backing Board Applications: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer’s instructions.

G. Isolate perimeter of non-load-bearing wallboard partitions on slabs on grade at intersection with exterior walls and fixed structural abutments. Provide 1/4 inch space to allow differential vertical movement and trim edges with L-type edge trim. Seal joints with acoustical sealant.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces as indicated on Drawings; if not specifically indicated, provide control joints as follows:
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
      a. For level 5 finish, embed tape in joint compound and apply three separate coats of joint compound over joints, angles, fasteners heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration. Use the following joint compound combinations:
         1) Embedding and first coat: Ready-mixed, drying type, all purpose or taping compound.
         2) Fill (Second coat): Ready-mixed, drying type, all purpose or topping compound.
         3) Finish (Third coat): Ready-mixed, drying type, all purpose or topping compound.
   2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

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.

C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Tile for floor applications.
B. Tile for wall applications.
C. Cementitious backer board as tile substrate.
D. Coated glass mat backer board as tile substrate.
E. Crack isolation membranes.
F. Waterproofing membranes.
G. Ceramic trim.
H. Non-ceramic trim.

1.02 REFERENCE STANDARDS
Q. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2012 (Revised).

1.03 DEFINITIONS
A. Module Size: Actual tile size, with minor facial dimension as measured by ASTM C499, plus joint width indicated.
B. Facial Dimension: Actual tile size, with minor facial dimension as measured by ASTM C499.
   1. Large Format Tile: Any tile unit that maintains an edge of 15 inches or greater in any dimension.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination: Coordinate location of tiling movement joints on concrete floor substrates with locations of concrete floor expansion and control joints; align substrate joints and tiling system joints where required by specified reference standards.
B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.
   1. Convene under general provisions of Section 01 7000.
   2. Review installation procedures and coordination requirements.

1.05 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
D. Samples: Submit manufacturer’s color boards consisting of actual tiles showing full range of colors, textures, and patterns available for each type and composition of tile specified.
   1. Include samples of specified accessories requiring color selection.
   2. Submit manufacturer’s color samples of available grout consisting of actual sections of grout showing full range of colors available for each type of grout specified.
E. Verification Samples:
   1. Full-sized units of each type and composition of tile and for each color and finish specified. For ceramic mosaic tile in color blend patterns, provide one full sheet of each specified color blend.
   2. Include samples of specified accessories requiring color selection.
3. Submit manufacturer’s color samples of available grout consisting of actual sections of grout showing full range of colors available for each type of grout specified.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

H. 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 Tile: 1 percent of each size, color, and surface finish combination, but not less than Twenty (20) square feet of each type.

1.06 QUALITY ASSURANCE
   A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.
   B. Installer Qualifications:
      1. Company specializing in performing tile installation, with minimum of five years of documented experience.
   C. Provide materials obtained from only one manufacturer for each type and color of tile, and for each type of mortar, grout, adhesive, and sealant.
   D. Basis of Design: Specifications are based on certain tile products by specified basis of design standard manufacturers. Tile products manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, appearance, and performance are minor, and do not detract substantially from the indicated design intent

1.07 MOCK-UP
   A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
   B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
      1. Minimum size of mock-up is indicated on drawings or Two feet by Two feet.
      2. Approved mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING
   A. Protect adhesives from freezing or overheating in accordance with manufacturer’s instructions.

1.09 FIELD CONDITIONS
   A. Comply with referenced standards and manufacturer’s recommendations for protection and maintenance of environmental conditions during and after installation.
   B. Do not install solvent-based products in an unventilated environment.
   C. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials and for at least seven days after installation. Maintain higher temperatures for proprietary mortars and grouts when recommended by manufacturer.
   D. Vent temporary heaters to the exterior to prevent damage to tile work due to carbon dioxide accumulation.

PART 2 PRODUCTS

2.01 TILE
   A. Manufacturers: All products by the same manufacturer.
      1. Materials and Colors: Manufacturers and products specified on Drawings.
      5. Substitutions: See Section 01 6000 - Product Requirements.
         a. Acceptability of substituted items may be determined solely on the basis of design, appearance or finish.
   B. Ceramic Tile: ANSI A137.1 standard grade.
   C. Glazed Wall Tile, Type [___]: ANSI A137.1 standard grade.
      1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
      2. Size and Shape: As indicated on Drawings.
3. Edges: Cushioned.
5. Color(s): As indicated on drawings.

D. Porcelain Floor Tile: ANSI A137.1 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: As indicated on drawings.
   3. Thickness: 3/8 inch.
   4. Edges: Cushioned.
   5. Surface Finish: Non-slip.
   6. Color(s): As indicated on drawings.
   7. Pattern: Contractor to provide a mock-ups of approval by Architect in the room(s) where materials will be applied.
   8. Mock-ups patterns may be dry set.
   9. Trim Units: Matching bullnose, double bullnose, cove base, and cove shapes in sizes coordinated with field tile.

2.02 TRIM AND ACCESSORIES
   A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
      1. Applications:
         a. Open Edges: Bullnose.
         b. Inside Corners: Jointed.
         c. Floor to Wall Joints: Cove base.
      2. Manufacturers: Same as for corresponding tile.

2.03 SETTING MATERIALS
   A. Use only the types of mortar bed materials to set the types of tile for which the mortar is labeled.
      1. Applications: For floor applications in new construction, provide high-bond Portland cement mortar for large format tile.
         a. Products:
            1) Custom Building Products; MegaLite Crack Prevention Mortar, ProLite Tile & Stone Mortar, or Complete Contact Fortified Mortar.
            2) LATICRETE International, Inc.; LATICRETE 255 MultiMax or Sure Set.
            3) Mapei Corporation; Mapei Ultralite or Ultracontact.
            4) Substitutions: See Section 01 6000 - Product Requirements
      2. Applications: For wall applications, provide non-sagging, latex Portland cement mortar complying with ANSI A118.4 for mortar of this type
         a. Products:
            1) Custom Building Products; MegaLite or FlexBond Crack Prevention Mortar.
            2) LATICRETE International, Inc.; LATICRETE 254 Platinum.
            3) Mapei Corporation; Mapei Ultraflex 3.

2.04 GROUTS
   A. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
      1. Color(s): As selected by Architect from manufacturer's full line.
      2. Products:
         a. Custom Building Products; CEG-IG 100% Solids Industrial Grade Epoxy Grout: www.custombuildingproducts.com/#sle.
         c. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORY MATERIALS
   A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
      1. Crack Resistance: No failure at 1/16 inch gap, minimum.
      2. Fluid or Trowel Applied Type:
         a. Thickness: 40 mils, maximum.
3. Crack Isolation Sheet: ASTM C627, rated extra heavy duty service; chlorinated polyethylene (CPE) sheet with non-woven polyester laminated to both faces, 0.030 inch nominal thickness; include manufacturer’s recommended bonding adhesives and installation accessories.

B. Backer Board: Cementitious type complying with ANSI A118.9: high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.

C. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.

D. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. 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 tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 0561.
   2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer’s instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.

B. Blending: For tile exhibiting color or pattern variations within the ranges of accepted submittals, verify that tile has been blended in the packages so that tile units taken from one package show same range in colors or patterns as those taken from other packages. If not blended in the packages, blend tile in the field before installation.

C. Floor System Coverage: Where specified for individual setting methods, install floor tile units with 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile units in referenced ANSI A108 specifications.

D. Wall System Coverage: Where specified for individual setting methods, install wall tile units with 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile units in referenced ANSI A108 specifications.

E. Install crack isolation membrane to comply with ANSI ANSI A108.10 and membrane manufacturer's written instructions for full floor coverage.

F. Movement Joints: Comply with TCNA (HB) Method EJ171F requirements for locations, spacing, and installation of applicable movement joints, whether or not specifically indicated or detailed on Drawings, and as follows:
   1. Spacing - Interior: Maximum 24 feet on center in each direction; reduce spacing to maximum 10 feet on center in areas exposed to direct sunlight or moisture.
2. Joint Width: Match adjacent grouted joint widths, unless TCNA (HB) Method EJ171F requires a specific joint width based on joint location or joint service conditions.

3. Apply sealant joint to junction of tile and dissimilar materials and junction of dissimilar planes, including but not limited to floor to wall joints, corners, and metal trim and non-ceramic accessory items.


5. Form internal angles and corners square, not grouted, with sealant joint.

6. Form external angles and corners square, not grouted, with sealant joint.

7. Apply specified sealant to joints.

G. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

H. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

1. Where floor and wall tile are of same dimensional module, align floor and wall joints.

I. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

J. Form internal angles square, not grouted, with sealant joint and external angles bullnosed.

K. Install non-ceramic trim in accordance with manufacturer's instructions.

L. Sound tile after setting. Replace hollow sounding units.

M. Keep control and expansion joints free of mortar, grout, and adhesive.

N. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

O. Grout tile joints, except where movement joints are indicated or specified.

P. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

Q. Allow completed tiling assemblies to cure full 72 hours before allowing heavy foot or equipment traffic on final installations.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

1. Provide 100 percent coverage of setting mortar over tile back surfaces.

2. Use crack isolation membrane under all tile meeting or exceeding definition of large format tile units in nominal face dimension, and also where specified.

3. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F131.

3.05 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method CH#60533, CH#60534.

1. Provide 100 percent coverage of setting mortar over tile back surfaces.

2. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F132, bonded.

B. Cleavage Membrane: Lap edges and ends.

C. Mortar Bed Thickness: 1-1/4 inch, unless otherwise indicated.

3.06 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.

1. Provide 100 percent coverage of setting mortar over tile back surfaces.

B. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.

3.07 TOLERANCES

A. Comply with applicable requirements of ANSI A108.2, unless otherwise specified in this Section.

B. Flatness - Finished Tiling Surfaces:

1. Ceramic Tile: 1/4 inch in 10 feet.

2. Stone Tile: 1/8 inch in 10 feet.
C. Lippage - Adjacent Tile Units:
   1. Glazed Wall Tile and Mosaic Tile: 1/32 inch; joint width 1/16 inch to 1/8 inch; 1 x 1 inch to 6 x 6 inch tile size.
   2. Pressed Floor Tile and Porcelain Tile: 1/32 inch; joint width 1/16 inch to less than 1/4 inch; all tile sizes.
   3. Pressed Floor Tile and Porcelain Tile: 1/16 inch; joint width greater than 1/4 inch; all tile sizes.

3.08 CLEANING
   A. Clean tile and grout surfaces.
   B. Unglazed tile may be cleaned with sulfamic acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after completion of installation. Protect metal surfaces, iron, and vitreous fixtures from effects of acid cleaning. Flush surfaces with clean water before and after acid cleaning.
   C. Leave finished installation clean and free of cracked, chipped, broken, un-bonded, or otherwise defective tile work.

3.09 PROTECTION
   A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION
SECTION 09 5100
SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Suspended metal grid ceiling system.
   B. Acoustical units.

1.02 REFERENCE STANDARDS
   D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Sequencing: Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
      1. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on suspension system components and acoustical units.
   C. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
   D. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
   E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
   F. 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 Acoustical Units: Quantity equal to two (2) percent of total installed of each type, pattern, color, but not less than 10 units.

1.05 QUALITY ASSURANCE
   A. System Installer Qualifications: Company specializing in the installation of products specified in this Section with minimum three years documented experience.

1.06 FIELD CONDITIONS
   A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 20 to 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Acceptable Manufacturers - Acoustic Panels:
      4. Substitutions: See Section 01 6000 - Product Requirements.
   B. Acceptable Manufacturers - Suspension Systems:
5. Substitutions: See Section 01 6000 - Product Requirements.

202 ACOUSTICAL UNITS
A. Acoustical Units - General: ASTM E1264, Class A.

203 CEILING MATERIALS
A. Acoustical Panels - Type C1: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
1. Size: 24 by 48 inches.
2. Thickness: 3/4 inches.
3. Light Reflectance: 80 percent, determined in accordance with ASTM E1264.
4. NRC Range: 0.70 to 0.80, determined in accordance with ASTM E1264.
5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
7. Surface Color: White.
8. Surface Pattern: No pattern.
10. Acceptable Products:
   a. Armstrong Cirrus 533, or corresponding product manufactured by other acceptable manufacturer.
   b. Substitutions: See Section 01 6000 - Product Requirements.

B. Acoustical Panels - Type C2: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
1. Size: 24 x 48 inches.
2. Thickness: 3/4 inches.
3. Light Reflectance: 82 percent, determined in accordance with ASTM E1264.
4. NRC Range: 0.50 to 0.60, determined in accordance with ASTM E1264.
5. Ceiling Attenuation Class (CAC): 40, determined in accordance with ASTM E1264.
7. Surface Color: White.
8. Surface Pattern: No pattern.
10. Acceptable Products:
   a. Armstrong World Industries, Inc.; Cirrus Second Look - Scored, or corresponding product manufactured by other acceptable manufacturer.
   b. Substitutions: See Section 01 6000 - Product Requirements.

C. Acoustical Panels - Type C3: Vinyl faced glass fiber, ASTM E1264 Type XII, with the following characteristics:
1. Size: 24 by 48 inches.
2. Thickness: 5/8 inches.
3. Edge: Square.
5. Humidity-resistant and non-sag core composition.
7. Acceptable Products:
   a. Armstrong World Industries, Inc.; Clean Room VL, or corresponding product manufactured by other acceptable manufacturer.
   b. Substitutions: See Section 01 6000 - Product Requirements.

204 SUSPENSION SYSTEMS
A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System - Type 1: Formed steel, commercial quality cold rolled; intermediate-duty.
1. Profile: Tee; 15/16 inch wide face.
2. Construction: Double web.

205 ACCESSORIES
A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
B. Perimeter Trim Profiles: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
C. Acoustical Insulation: Specified in Section 07 2100.
   1. Comply with recycled content product requirements specified in Section 01 6000.
   2. Thickness: 3-1/2 inches.
D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify existing conditions before starting work.
B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM
A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this Section.
B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
C. Locate system on room axis according to reflected plan.
D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
   1. Support all fixtures weighing less than 56 lb by at least two supplementary No. 12 gage hangers if required by applicable building code; hangers may be slack.
I. Do not eccentrically load system or induce rotation of runners.
J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS
A. Install acoustical units in accordance with manufacturer's instructions.
B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
C. Lay directional patterned units with pattern parallel to shortest room axis, unless otherwise indicated or directed.
D. Fit border trim neatly against abutting surfaces.
E. Install units after above-ceiling work is complete.
F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
2. Make field cut edges of same profile as factory edges; finish cut edges to match factory finished edges if cut edge is exposed to view.

H. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions.

I. Install hold-down clips on panels within 20 ft of an exterior door.

**3.04 TOLERANCES**

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION
SECTION 09 6800
CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Carpet, direct-glued.
B. Accessories.

1.02 REFERENCE STANDARDS
A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
B. CRI 104 - Standard for Installation of Commercial Carpet; 2015.
C. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: For installations over 500 square yards, indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings, and other installation features.
C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
D. Samples: Submit two samples 24 by 24 inch in size illustrating color and pattern for each carpet and cushion material specified.
E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional requirements.
   2. Extra stock shall include full-size pieces equal to twenty (20) percent of the total area of each type of carpet installed, but not less than the equivalent of eight (8) square yards of each type of carpet installed.

1.04 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in installing carpet with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver carpeting materials in original mill protective wrapping, with mill register numbers and tags attached.
B. Store inside, in well ventilated area, protected from weather, moisture, and soiling.

1.06 FIELD CONDITIONS
A. Stage materials in area of installation for minimum period of 24 hours prior to installation.
B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.
C. Ventilate installation area during installation and for 72 hours after installation.
D. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work has been tested, approved, and completed.

1.07 WARRANTY
A. Provide an extended warranty underwritten by the carpet manufacturer for a minimum period of 15 years.
   1. Coverage limits shall not be pro-rated at any time during the warranty period.
CARPETING

2. Coverage shall not be restricted to any amount less than the cost of material and labor for complete replacement of carpet.

3. Warranty coverage shall include, at minimum, surface wear exceeding 15% of pile fiber, edge ravel, loss of seam integrity, delamination, loss of adhesion to the floor, yarn pulls, zippering, and moisture penetration.

B. Installation Contractor shall provide a written warranty for a period of one (1) year. Warranty shall guarantee the completed installation to be free from defects in materials and workmanship.

PART 2 PRODUCTS

201 MANUFACTURERS

A. Acceptable Manufacturers - Carpet:
1. Manufacturers and products specified on Drawings.
2. Substitutions: See Section 01 6000 - Product Requirements.
   a. Acceptability of substituted items may be determined solely on the basis of design, appearance or finish.

202 ACCESSORIES

A. Sub-Floor Filler: Type recommended by carpet manufacturer.
B. Adhesives: Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.
   1. Seam Adhesive: Recommended by manufacturer.
C. Non-Metallic Edge Strips: Extruded or molded heavy duty vinyl or rubber type; 1-1/2 inch wide, with minimum 2 inch wide anchorage flange; colors selected by Architect from manufacturer's standards.
D. Miscellaneous Materials: Provide other items recommended by carpet manufacturer and installer for the indicated conditions of carpet use, and as required for complete installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.
B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesives to sub floor surfaces.
C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with ASTM F710.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
D. Clean substrate.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install carpet and cushion in accordance with manufacturer's instructions and CRI 104 (Commercial).
C. Verify carpet match before cutting to ensure minimal variation between dye lots.
D. Carpet Installation:
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
4. Locate change of color or pattern between rooms under door centerline.
5. Provide monolithic color, pattern, and texture match within any one area.

E. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.
B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
D. Roll with appropriate roller for complete contact of adhesive to carpet backing.
E. Trim carpet neatly at walls and around interruptions.
F. Complete installation of edge strips, concealing exposed edges. Bind cut edges where not concealed by edge strips.

3.05 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.
B. Clean and vacuum carpet surfaces.

END OF SECTION
SECTION 09 7200
WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Surface preparation and prime painting.
B. Wall covering and borders.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on wall covering and adhesive.
C. Shop Drawings: Indicate wall elevations with seaming layout.
D. Samples: Submit two samples of wall covering, 12” by 12” inch in size illustrating color, finish, and texture.
E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
F. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
G. 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 Wall Covering Materials: 25 linear feet of each color and pattern of wall covering; store where directed.
   3. Package and label each roll by manufacturer, color and pattern, and destination room number.

1.04 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing the type of work specified in this Section with minimum five years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in original packages or containers clearly labeled to identify manufacturer, brand name, quality and grade, and fire hazard classification.
B. Inspect roll materials at arrival on site, to verify acceptability.
C. Protect packaged adhesive from temperature cycling and cold temperatures.
D. Store materials in a well ventilated area protected from weather, moisture, soiling, and extreme temperatures and humidity. Maintain temperature is storage area above 40 degrees F.
E. Protect packaged adhesive from temperature cycling and cold temperatures.
F. Do not store roll goods on end.

1.06 FIELD CONDITIONS
A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Acceptable Manufacturers:
   1. Manufacturers and products specified on Drawings.
   2. Substitutions: See Section 01 6000 - Product Requirements.
a. Acceptability of substituted items may be determined solely on the basis of design, appearance or finish.

202 MATERIALS

A. Requirements for Wall Coverings:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.

B. Adhesive: Water based type, zero (0) VOC content, spray application.
   a. Substitutions: See Section 01 6000 - Product Requirements.

C. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

D. Substrate Primer and Sealer: Free of volatile organic compounds (VOC); wall covering manufacturer's recommended type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work, and conform to requirements of the wall covering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces that affect work of this Section. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those that may bleed through surface finishes.

F. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

G. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

A. Apply adhesive and wall covering in accordance with manufacturer's instructions.

B. Use wall covering in roll number sequence.

C. Razor trim edges. Do not razor cut on gypsum board surfaces.

D. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tightly.

E. Horizontal seams are not acceptable.

F. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

G. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.

H. Do not install wall covering more than 1/4 inch below top of resilient base.

I. Cover spaces above and below windows, above doors, in pattern sequence from roll.

J. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.
3.04  CLEANING
A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
B. Reinstall wall plates and accessories removed prior to work of this Section.

3.05  PROTECTION
A. Do not permit construction activities at or near finished wall covering areas.

END OF SECTION
SECTION 09 7700
SPECIAL WALL SURFACES

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Pre-manufactured panel system including mounting hardware and specified accessories.

1.02 RELATED SECTIONS
A. Section 06100 - Rough Carpentry; furring, blocking, and other carpentry work that is not exposed to view.
B. Section 06402 - Interior Architectural Woodwork; for interior woodwork other than wall systems not included in this section.
C. Section 09260 - Gypsum Board Assemblies; for metal support systems not included in this section.

1.03 REFERENCES
   1. Class 1/A - Flame Spread 0-25, Smoke Developed 450 or less.
   2. Class 2/B - Flame Spread 26-75, Smoke Developed 450 or less.
   3. Class 3/C - Flame Spread 76-200, Smoke Developed 450 or less
B. Architectural Woodwork Institute (AWI) Quality Standards.
C. National Electrical Manufacturer's Association (NEMA)

1.04 SUBMITTALS
A. Submit under provisions of Section 01300.
B. Product Data: Manufacturer's Safety Data Sheets (MSDS) on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with adjacent work.
D. Selection Samples: For each finish product specified, one complete set of color samples representing manufacturer's standard range of available colors and patterns.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications:
   1. Firm experienced in successful production of wall systems similar to that indicated for the Project, with sufficient production capacity to produce required units without causing delay in the work.
   2. Provide certificate signed by panel manufacturer certifying that products comply with specified requirements.
B. Installer Qualifications: Demonstrate successful experience in installing architectural woodwork similar in type and quality to those required for this project.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Do not deliver wall system until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate wall system have been completed in installation areas as specified by AWI 1700-G-3.
B. If panels are stored prior to installation, store them flat in completely enclosed areas, out of the weather. If panels must be stored in other than installation areas, store only in areas where environmental conditions comply with manufacturers recommendations. Do not expose panels to continuous direct sunlight, nor to extremes in temperature and humidity. Store products in manufacturer's packaging until ready for installation.
C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
1.07 PROJECT CONDITIONS

A. Do not deliver or install wall system until building is enclosed, wet work is complete and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period as specified by AWI 1700-G-3.

B. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished. This includes, but not limited to, design lighting (wall washers, spot lights and flood lights, and similar fixtures) and natural lighting.

C. Wall, ceilings, floors, and openings must be level, plumb, straight, in-line and square as specified by AWI 1700-G-3.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits. Panels shall be conditioned in the environment in which they will be installed for a minimum of 72 hours prior to installation. The recommended environment is 75 degrees F (24 degrees C) and 45 percent relative humidity.

E. Environmental Conditions: Comply with Woodwork Manufacturer's recommendations for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

1.08 WARRANTY

A. Manufacturer warrants any product it has manufactured and sold against defects in materials or workmanship for a period of five years from the date of original purchase and acceptance for use. This warranty extends to products assembled / installed and used in the manner intended and does not cover damage or failure caused by: misuse, abuse or accidents, exposure to extreme temperature, improper installation, improper maintenance and exposure to water or excessive humidity or excessive moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Panel Specialists, Inc.; psiwalls@panelspec.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 6000.

2.02 PANEL SYSTEMS

A. Provide prefinished decorative panels where shown on the drawings, as specified herein, and as needed for a complete and proper installation.

B. Comply with applicable requirements of "Architectural Woodwork Quality Standards" in the production and installation of the wall panel system as published by the Architectural Woodwork Institute (AWI) unless otherwise indicated.

C. Panel System: #410 as manufactured by Panel Specialists, Inc. Maximum panel length for horizontal installations is 96 inches (2438 mm).

1. Panel Thickness: 7/16 inches (11.1 mm).
2. Horizontal Reveal: System to provide a reveal of 1/16 inch (1.5mm) between panels.
3. Vertical Reveal: System to provide a recessed reveal of 1/16 inch (1.5mm) between panels.
4. Panel Edge Finish: Panel edges to be finish with .018 inch (.5mm) PVC edge banding or wood veneer.
5. Panel Finish: Refer to Room Finish Schedule and drawings.
6. Main Laminated Panel Fire Rating: (Select one)
   a. Fire Rating: ASTM E84, Class A.
   b. Fire Rating: ASTM E84, Class B.
   c. Fire Rating: ASTM E84, Class C.
7. Marker Board Fire Rating: As scheduled. (Select one)
   a. Fire Rating: ASTM E84, Class B.
   b. Fire Rating: ASTM E84, Class C.
8. Media Board Fire Rating: Erasable projection panel as scheduled. (Select one)
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   a. Fire Rating: ASTM E84, Class B.
   b. Fire Rating: ASTM E84, Class C.
10. Contour Paneling: Contour paneling matching laminate clad panels where indicated or required at radius conditions of 12 inches (305 mm) diameters or greater. (Select one)
    a. Fire Rating: ASTM E84, Class B.
    b. Fire Rating: ASTM E84, Class C.
11. Panel Dimensions: Refer to drawings.
    a. #410A Divider Molding
    b. #103L-90 90°Outside Corner Molding
    c. #304-90 End Cap for top and bottom of 90° outside corner molding
    d. #304 Edge Trim Molding
    e. #304A Edge Trim Molding (2-piece)
    f. #412H Divider Molding available for use with marker boards, media board, resilient tack board, specialty panels and contour panels.
    g. #412C Chair Rail Top Trim with #412RI flat or #312RI concave reveal insert for use in wainscot height installations
13. Finishes:
    a. Manufacturers: Wilsonart, Formica, Pionite, Nevamar, Lab Designs
    b. Panel Face and Pattern: (enter finish descriptions here)
       1) Finishes: as shown on the Drawings
       2) Aluminum Molding Finish: (select one or enter custom color choice)
          (a) Clear Anodize

203 MATERIALS

A. High Pressure Decorative Laminates (VGS,VGP,VGF & HGS) and non-decorative backers (BKV) used to surface wall panels systems shall be manufactured to meet or exceed the National Electrical Manufacturing Association (NEMA LD3-2005) for thickness, performance properties and appearance.
B. Wood Veneers: PSI standard offering of wood veneer species shall be manufactured to meet or exceed all applicable national standards for thickness, fire rating, performance and appearance.
C. Decorative Resin Laminates: PSI standard offering of decorative resin laminates shall meet or exceed all applicable national standards for thickness, fire rating, performance and appearance.
D. Resin Infused Composite Panels: PSI standard offering of resin infused composite panels shall meet or exceed all applicable national standards for fire rating, performance and appearance.
E. Particleboard: 45# density shall be used in Class III panel composition. Fire-rated particle board shall be used for Class I and Class II panel compositions (refer to AWI Section 200)
F. Medium Density Fiberboard (MDF): 45# density shall be used in Class III panel composition. Fire-rated MDF shall be used for Class I and Class II panel compositions (refer to AWI Section 200)
G. Bulletin Board:
   1. Linoleum resilient homogeneous tackable surface material shall be of natural materials consisting linseed oil, granulated cork, resin binders and dry pigments, mixed and bonded to a natural jute backing.
   2. Linoleum as scheduled in the Room Finish Schedule or as indicated on the drawings.
   3. Resilient tackable panel from manufacturer’s standard line.

PART 3 EXECUTION

301 EXAMINATION

A. Do not begin installation until substrates have been properly prepared according to AWI 1700-G-3.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
3.02 FIELD DIMENSIONS
A. Where wall system is indicated to be fitted to other construction, check actual dimensions of other constructions by accurate field measurements before manufacturing wall system; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work.
B. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with manufacture of wall system without field measurements coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

3.03 PREPARATION
A. Panels must be acclimated to ambient temperature and humidity conditions in accordance with manufacturer’s specifications prior to installation. Refer to manufacturer for proper, handling, storage and acclimation procedures.
B. Clean surfaces thoroughly prior to installation.
C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.04 INSTALLATION
A. Install in accordance with manufacturer’s instructions.
B. When interior paneling is on an exterior wall or in a wet area, provide a barrier sheet of plastic film between the outside wall and the panels in order to prevent condensation affecting the stability of the panels.
C. Field cutting of all wall systems should be accomplished using carbide tools. All face penetrations and cutouts should have a minimal 1/8 inch (3 mm) radius in corners according to NEMA Standards Publication LD 3-2005.
D. All wall systems should receive an “S” bead of panel mastic on the back of the panel during installation.
E. For vertical applications, wall systems shall be mechanically fastened to horizontal metal furring strapping spaced 24 inches (610 mm) O.C. Furring straps shall be no less than 18-ga 3-1/2 inches (89 mm) wide, continuously. Metal strapping to be installed to the drywall studs prior to the application of the gypsum board by the framing contractor.

3.05 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Final Completion.

END OF SECTION
SECTION 09 7733
FIBER GLASS REINFORCED PLASTIC (FRP) PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Glass fiber reinforced plastic panels.
   B. Accessories and trim.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
   C. Samples: Submit two samples 4 by 4 inch in size illustrating material and surface design of panels.

1.04 QUALITY ASSURANCE
   A. Basis of Design: Specifications are based on panel types by specified basis of design manufacturer and product(s). Panel types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, weight, and profile are minor, and do not detract substantially from the indicated design intent.
      1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.
   B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 PROJECT CONDITIONS
   A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Basis of Design Manufacturer - Panels:
   B. Other Acceptable Manufacturers - Panels:
      3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS
   A. Wall Panels:
1. Panel Size: As indicated on Drawings.
2. Panel Thickness: 0.100 (2.5 mm).
4. Color: As selected.
5. Attachment Method: Adhesive only, with trim and sealant in joints.

203 MATERIALS
A. Panels: Glass fiber reinforced plastic (FRP), complying with ASTM D5319.
   1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Scratch Resistance: Barcol hardness score greater than 35, when tested in accordance with ASTM D2583.
   4. Impact Strength: Greater than 6 ft lb force per inch, when tested in accordance with ASTM D256.
B. Trim: Vinyl; color coordinating with panel.
C. Adhesive: Type recommended by panel manufacturer.
D. Sealant: Silicone; color matching panel.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify existing conditions and substrate flatness before starting work.
B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS
A. Install panels in accordance with manufacturer's instructions.
B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
C. Pre-drill fastener holes in panels, 1/8 inch greater in diameter than fastener, spaced as indicated by panel manufacturer.
D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
F. Install panels with manufacturer's recommended gap for panel field and corner joints.
G. Drive fasteners to provide snug fit, and do not over-tighten.
H. Place trim on panel before fastening edges, as required.
I. Fill channels in trim with sealant before attaching to panel.
J. Install trim with adhesive and screws or nails, as required.
K. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
L. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION
PART 1   GENERAL

1.01 SECTION INCLUDES
   A. Acoustical wall panels.
   B. Acoustical ceiling baffles.
   C. Ceiling sound diffusers.

1.02 REFERENCE STANDARDS

1.03 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.
      4. Independent testing agency test reports.
   C. Selection Samples: For each product specified, two complete sets of color samples representing manufacturer's full range of available colors and patterns.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Minimum 10 years of experience in producing acoustical products of the types specified in this Section.
   B. Installer Qualifications: Acceptable to the manufacturer of the acoustical products being installed.
   C. Basis of Design: Specifications are based on acoustical accessory types by specified basis of design manufacturer. Acoustical accessory types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, weight, profile, and performance are minor, and do not detract substantially from the indicated design intent.
      1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Protect acoustical products from moisture during shipment, storage, and handling.
   B. Store products in manufacturer's unopened packaging until ready for installation.
      1. Store materials flat, in dry, well-ventilated space.
      2. Do not stand panels on end.
      3. Protect edges from damage.
   C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS
   A. Do not begin installation of acoustical products until building has been enclosed and environmental conditions approximate those that will prevail when building is occupied.
   B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Manufacturer:
   2. Products: Specified by model number in the Section.

B. Other Acceptable Manufacturers:
   2. Decoustics: www.decoustics.com
   4. Substitutions: See Section 01 6000 - Product Requirements.

C. Provide all acoustical products specified herein by a single manufacturer.

2.02 ACOUSTICAL ACCESSORIES - GENERAL

A. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E84, unless otherwise specified.

2.03 ACOUSTICAL WALL PANELS

A. Wrapped Fiberglass Panels: Acousti-panels AP; core of 6 to 7 pcf single fiberglass with chemically hardened edges, seamless finish material wrapped and bonded to back side of panels.
   1. Thickness: 2 inch; NRC 1.05.
   2. Size: As indicated.
   4. Color: As selected from manufacturer's standards.
   5. Edges: Square.
   8. Acceptable Products:
      b. Wenger Corp.: Wall Absorber, with fabric.

2.04 CEILING SOUND DIFFUSERS

A. Ceiling Mounted Diffusers: Asymmetric pyramidal units with properties as follows:
   1. CDL - Sound-Reflective: Glass fiber mat core lined with resin hardener; NRC 0.05.
   2. Size: 2 by 4 ft.
   3. Finish: Textured gelcoat in white.
   4. Mounting: Lay-in ceiling grid system as specified in Section 09 5100.
   5. Acceptable Products:
      a. Owens Corning Conwed Designscape | Wall Technology: Respond Pyramidal.

2.05 SUSPENDED ACOUSTICAL BAFFLES

A. Wrapped Fiberglass Baffles: Core of 6 to 7 pcf single fiberglass with chemically hardened edges.
   1. Thickness: 2 inch; NRC 1.05.
   2. Size: As indicated.
   4. Color: As selected from manufacturer's standards.
   5. Edges: Square.
   8. Acceptable Products:
2.06 ACCESSORIES
   A. Mounting Adhesive: Water-based, zero VOC content, heavy-bodied adhesive as recommended by manufacturer of acoustical panels.
   B. Two-Part Z-Clips: Manufacturer's standard mounting bar and matching clips for mounting on rear of acoustical panels.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Do not begin installation 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. Clean surfaces thoroughly prior to installation.
   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION
   A. Install acoustical units in accordance with manufacturer's instructions.
   B. Adhesive Mounting: Size back of panels at 18 inch on center in both directions with thin coating of adhesive in 4 inch squares. Center adhesive dabs the size of a large egg on each sized area, and press panel firmly against substrate, flattening adhesive. Block panel for not less than 24 hours until adhesive has set.
   C. Two-Part Clips: Fasten bars to wall at 48 inches on center in both directions. Impale matching mechanical clips into back of panels in matching pattern and drop panel into position so clips fully engage into wall-mounted bars.

3.04 PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 098436
SOUND ABSORBING WALL FINISHES

PART 1 GENERAL

1.01 SUMMARY

A. Provide sound absorbing wall finishes where shown on the Drawings and as specified herein.

B. Reference Standards:

1.02 SUBMITTALS

A. Submit 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.
   4. Submit shop drawings showing layout, edge profiles, accessories, finish colors and textures. Shop drawings shall include plans, elevations, sections, and mounting devices and details. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials. Include details at cutouts and penetrations for other work. Include direction of fabric weave and pattern matching.
   5. Independent testing agency test reports.

B. Selection Samples: Submit selection and verification samples of finishes, colors and textures.

1.03 FIRE AND SMOKE RATINGS

A. Performance Requirements – Surface Burning Characteristics (ASTM E84):
   1. Flame Spread: 25, maximum.
   2. Smoke Developed: 450, maximum.
   3. These ratings apply to all acoustical wall treatment.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Acceptable to the manufacturer of the acoustical products being installed.

B. Basis of Design: Specifications are based on acoustical accessory types by specified basis of design manufacturer. Acoustical accessory types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified
requirements, and provided that deviations in design, weight, profile, and performance are minor, and do not detract substantially from the indicated design intent.

C. Comply with requirements specified in Division 1.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical products from moisture during shipment, storage, and handling. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

### 1.06 FIELD CONDITIONS

A. Do not begin installation of acoustical products until building has been enclosed and environmental conditions approximate those that will prevail when building is occupied.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

### 1.07 EXTRA STOCK

A. Deliver to the Owner matching replacement stock of 2% of installed quantity. Provide materials from same production run as those installed. Provide in colors as directed by the Architect or the Project Manager.

### 1.08 WARRANTY

A. Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within manufacturer’s warranty period. Failures include, but are not limited to, the following:

1. Fabric sagging or distorting.
2. Warping of core.

### PART 2 PRODUCTS

#### 2.01 SUMMARY

A. MANUFACTURERS

1. Armstrong.
2. Conwed Designscape.
3. Decoustics.
4. MBI Products.
6. Equivalent products will be considered, when submitted for approval prior to the bid opening, that meet or exceed the requirements of this specification and provisions of Division 1.

B. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E84, unless otherwise specified.
2.02 SOUND ABSORBING WALL PANELS

A. General
   1. Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.
   2. Regional Materials: Preference shall be given to materials that are manufactured within a 500 mile radius of the project site.

B. Fiberglass Fabric-Wrapped Sound Absorbing Panels
   1. Product: Conwed Designscape Respond A100.
   2. Location: As indicated on the drawings.
   3. Size: As indicated on the drawings (maximum of 4’ x 8’).
   4. Core: 1-inch thick fiberglass (6-7 pcf), as indicated on Drawings.
   5. Edge: As selected by the Architect.
   7. Color: As selected by the Architect and shown on the Drawings.
   8. Noise Reduction Coefficient (NRC): Minimum 0.85 (1-inch thickness).

PART 3 EXECUTION

3.01 MANUFACTURER’S INSTRUCTIONS
   A. Comply with manufacturer’s product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION
   A. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   B. Do not install panels until unsatisfactory conditions are corrected.

3.03 PREPARATION
   A. Clean surfaces thoroughly prior to installation.
   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.04 INSTALLATION
   A. Install acoustical units in accordance with manufacturer’s instructions.
   B. Follow manufacturer’s instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as-new condition.

3.05 PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Surface preparation.
B. Field application of paints.

1.02 DEFINITIONS
A. Conform to ASTM D16 for interpretation of terms used in this Section.
B. Gloss Ratings: ASTM D523; on 85 and 60 degree gloss meters:
   1. Flat: 0 to 15 (85 degree gloss meter).
   2. Eggshell: 5 to 20 (60 degree gloss meter).
   3. Satin: 15 to 35 (60 degree gloss meter).
   4. Semi-Gloss: 30 to 65 (60 degree gloss meter).
   5. Gloss (High): 65 and Greater (60 degree gloss meter).

1.03 REFERENCE STANDARDS
B. SSPC-SP 1 - Solvent Cleaning; 2015.
D. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of 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. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   3. Manufacturer's installation instructions.
C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches 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.
   3. Allow 14 for approval process, after receipt of complete samples by Architect.
D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
E. 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 Finish Materials: 1 gallon of each color; from the same product run, store where directed. Provide new unopened containers.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.
C. Basis of Design: Specifications are based on paint types and systems by specified basis of design manufacturer. Paint types and systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in formulation, compatibility, and performance are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.
1.06 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 and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer’s instructions.

1.07 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 paint and finishes 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: 50 degrees F for exterior; unless required otherwise by manufacturer’s instructions.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
B. Acceptable Manufacturers:
   6. Substitutions: See Section 01 6000 - Product Requirements.
C. Acceptable Manufacturers - Primers and Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL
A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project’s work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer’s product instructions.
B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer’s full line.
C. Colors: To be selected from manufacturer’s full range of available colors.
   1. Selection to be made by Architect after award of contract.
   2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
   3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS
   1. Two top coats and one coat primer.
   2. Top Coat(s): Exterior Ferrous Metals, Primed, Latex, 2-coat:
      a. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.

B. Fiber Cement Siding, Opaque, Alkyd, 2 Coat:

C. Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
   a. Top Coat(s): Sherwin-Williams DTM Acrylic.

D. Galvanized Metals, Latex, 3 Coat:
1. One coat galvanize primer.

E. Aluminum, Unprimed, Water-Based, 3 Coat:
1. One coat etching primer.
   a. Sherwin-Williams DTM Wash Primer, B71 Series.
2. Gloss: Two coats of alkyd enamel.

2.04 ACCESSORY MATERIALS
A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION
3.01 EXAMINATION
A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Fiber Cement Siding: 12 percent.
   2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION
A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP1.
   2. Prepare surface according to SSPC-SP 2.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP1.
EXTERIOR PAINTING


3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 PAINTING AND COATING - GENERAL

A. Scope: Finish 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. Items specifically indicated on Drawings to receive paint finish.
   3. Mechanical and Electrical:
      a. On the roof and outdoors, paint equipment that is exposed to weather or to view, including factory-finished materials.

B. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise 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. Non-metallic roofing and flashing.
   7. Marble, granite, slate, and other natural stones.
   8. Floors, unless specifically indicated.
   10. Glass.

3.04 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 written 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. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

F. Sand metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Surface preparation.
   B. Field application of paints.

1.02 DEFINITIONS
   A. Conform to ASTM D16 for interpretation of terms used in this Section.
   B. Gloss Ratings: ASTM D523; on 85 and 60 degree gloss meters:
      1. Flat: 0 to 15 (85 degree gloss meter).
      2. Eggshell: 5 to 20 (60 degree gloss meter).
      3. Satin: 15 to 35 (60 degree gloss meter).
      4. Semi-Gloss: 30 to 65 (60 degree gloss meter).
      5. Gloss (High): 65 and Greater (60 degree gloss meter).

1.03 REFERENCE STANDARDS
   C. SSPC-SP 1 - Solvent Cleaning; 2015.
   E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide complete list of 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. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
      3. Manufacturer's installation instructions.
   C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches 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, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
      3. Allow 14 days for approval process, after receipt of complete samples by Architect.
   D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
   E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
   F. 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 Finish Materials: Provide the left over paint only; from the same product run, store where directed. Provide in unopened containers.
      3. Label each container with color in addition to the manufacturer's label.
      4. Verify the colors with the finish plans in the construction documents. The colors are:
         • PT-1, Sherwin Williams SW 6183, Conservative Gray, Eggshell and Semi-gloss
         • PT-2, Sherwin Williams SW 7021, Simple white, Eggshell and Semi-gloss
         • PT-3, Sherwin Williams SW 6186, Dried Thyme, Eggshell and Semi-gloss
1.05 QUALITY ASSURANCE
   A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years’ experience.
   B. Basis of Design: Specifications are based on paint types and systems by specified basis of design manufacturer. Paint types and systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in formulation, compatibility, and performance are minor, and do not detract substantially from the indicated design intent.
      1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.06 MOCK-UP
   A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
   B. Mock-up: Provide panel, 10 feet long by 10 feet wide, illustrating each paint color, texture, and finish.
      1. Locate where directed by Architect.
      2. Mock-up may remain as part of the 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. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

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 materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
   D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
   B. Acceptable Manufacturers:
      6. Substitutions: See Section 01 6000 - Product Requirements.
202 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly
dispersed to a homogeneous coating, with good flow and brushing properties, and capable of
drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under
conditions of service and application, as demonstrated by manufacturer based on testing and
field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single
production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is
specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the
following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for
Architectural Coatings.
      b. Architectural coatings VOC limits of Colorado.
   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.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by
Architect from the manufacturer's full line.

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. Allow for minimum of three colors for each system, unless otherwise indicated, without additional
cost to Owner.
   3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
   4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling
they are mounted on/under.
   5. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to
the same color as the walls/ceilings they are mounted on/under.

203 PAINT SYSTEMS

A. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete masonry
units, and uncoated steel.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Institutional Low Odor/VOC Interior Latex.
      a. Acceptable Products:
         1) Sherwin-Williams 100% Acrylic Interior Latex, Semi-Gloss.
   3. Primer: As recommended by top coat manufacturer for specific substrate.

B. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
   1. Medium duty applications include metal doors, door frames, railings, handrails, guardrails, and
balustrades.
   2. Two top coats and one coat primer.
   3. Top Coat(s): Interior Alkyd, Water Based.
      a. Acceptable Products:

C. Medium Duty Vertical: Including gypsum board and concrete masonry units.
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex.
      a. Acceptable Products:
         1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss.

D. Dry Fall: Metals; exposed structure and overhead-mounted services, including shop primed steel
deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
1. Shop primer.
2. Two top coats.
3. Top Coat: Latex Dry Fall.
   a. Acceptable Products:
      1) PPG Paints Speedhide Super Tech Water Based Interior Dry-Fog, 6-724XI, Semi-Gloss.

E. Transparent Finish on Concrete Floors.
1. 2 coats sealer.
2. Stain: Semi-Transparent Stain for Concrete Floors.
   a. Acceptable Products:
      1) Behr Premium Semi-Transparent Concrete Stain [No. 850]. (MPI #58)
      2) PPG Paints Porter Color Seal Acrylic Waterproofing Sealer, PP3249 Series. (MPI #58)
3. Sealer: Water Based for Concrete Floors.
   a. Acceptable Products:
      1) Behr Premium Wet-Look Sealer High Gloss [No. 985]. (MPI #99)
      2) Substitutions: Section 01 6000 - Product Requirements.

F. Concrete/Masonry, Opaque, Latex, 3 Coat:
1. One coat of block filler.
2. Semi-gloss: Two coats of latex enamel.

G. Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
2. Semi-gloss: Two coats of latex enamel.

H. Ferrous Metals, Primed, Latex, 2 Coat:
1. Touch-up with latex primer.
2. Semi-gloss: Two coats of latex enamel.

I. Galvanized Metals, Latex, 3 Coat:
1. One coat galvanize primer.
2. Semi-gloss: Two coats of latex enamel.

J. Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
1. One coat of alkyd primer sealer.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.
B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
E. Test shop-applied primer for compatibility with subsequent cover materials.
F. 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 Masonry Units: 12 percent.
   3. Concrete Floors and Traffic Surfaces: 8 percent.
3.02 PREPARATION
A. Clean surfaces thoroughly and correct defects prior to 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. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.
F. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.
I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 PAINTING AND COATING - GENERAL
A. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
B. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise 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, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   7. Glass.
   8. Concrete masonry units in utility, mechanical, and electrical spaces.
   9. Acoustical materials, unless specifically indicated.
   10. Concealed pipes, ducts, and conduits.

3.04 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 written 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 in thicknesses specified by manufacturer.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

F. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION
SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Room signs.
B. Interior directional and informational signs.
C. Signs required for Building Code compliance and building occupancy.

1.02 REFERENCE STANDARDS

1.03 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years of documented experience.
B. Basis of Design: Specifications are based on sign types by specified basis of design manufacturer. Sign types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements; and provided that deviations in design, profile, and finishes are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.04 DELIVERY, STORAGE, AND HANDLING
A. Package signs as required to prevent damage before installation.
B. Package room and door signs in sequential order of installation, labeled by floor or building.
C. Store tape adhesive at normal room temperature.

1.05 FIELD CONDITIONS
A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Manufacturers:
   8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS
A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
B. Room Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Raised numbers, letters, pictograms, and Braille shall be precision Routed Time-Bond System utilizing manufacturer's standard solid color material, surface painted not allowed. Changeable message signs shall have acrylic backplate mounted on clear plexiglas cover plate over changeable message slots. Changeable message slots shall be formed by solid color spacers on backplate. Exposed surfaces of all sign types shall have solid color as selected by Architect. Text
and background shall be contrasting colors, matte finish with 70% contrast between letters and background color.

2. Generally 7” wide x 7” high with beveled edges, depending on text information, but not to exceed 9” wide x 7” high.
   a. Room number information will be printed in 1 ½” Helvetica Medium. All letters with room text will be upper case only. Raised Tactile and Braille room numbers, in Photopolymer layout and Braille size is Grade II. Raised lettering shall be one piece integral with the back panel of the sign.
   b. Room title will be printed in 1” Helvetica Medium.

3. Restroom Signs - Generally 7” wide x 9” high.
   a. Tactile Number and Braille Number and 4” Boys/Girls raised symbol Plates. Text will be in 1” Helvetica medium, upper case, with 5” pictorials.
   b. All raised lettering shall be integral with the back panel of the sign.

4. Room Signs: (See Schedule for Rooms and Permanent Message.)

C. Interior Directional and Informational Signs:
   1. Sign Type: Same as room and door signs.
   2. Sizes: As indicated on the Drawings.

D. Code-Required Door and Room Signs: Provide all signs required by Authority Having Jurisdiction (AHJ) for building occupancy; determine requirements and report to Owner and Architect prior to making specified submittals. Include cost of these signs in Contract Sum.

2.03 SIGN TYPES

A. Room Signs: (See Schedule for Rooms and Permanent Message.)
   1. Generally 7” wide x 7” high with beveled edges, depending on text information, but not to exceed 9” wide x 7” high.
      a. Room number information will be printed in 1 ½” Helvetica Medium. All letters with room text will be upper case only. Raised Tactile and Braille room numbers, in Photopolymer layout and Braille size is Grade II. Raised lettering shall be one piece integral with the back panel of the sign.
      b. Room title will be printed in 1” Helvetica Medium.
   2. Braille: USA Braille AK Rev. A, incised or raster.

B. Restroom Signs - Generally 7” wide x 9” high.
   1. Tactile Number and Braille Number and 4” Boys/Girls raised symbol Plates. Text will be in 1” Helvetica medium, upper case, with 5” pictorials.
   2. All raised lettering shall be integral with the back panel of the sign.

C. Changeable Message Signs: (See Schedule for Rooms, Symbols and Text.)
   1. Size: 7” high x 7” wide.
   2. Text Size: 1/32” raised, 1 1/2 " high numbers and 1" letters, Helvetica Medium, upper case.
   4. Provide two 1" high message windows.
   5. Changeable Message Strip: Two strips as scheduled, 5/8” high letters.

D. Room Occupancy Limit Signs: (See Schedule for Rooms and Permanent Message.)
   1. Size: Room signs with number and text shall be 7” high x 7” wide, maximum.
   2. Text Size: 1/32” raised, 11/2" high numbers and 1" letters, Helvetica Medium, upper case, left center copy.

2.04 LIFE SAFETY SIGNS

A. Provide laminated acrylic signs as required by applicable Building Code and Fire Department regulations for life safety, including stair, and exit doors.

B. Floor plan and similar diagrams may be photographically screened on opaque solid background sheet and covered with 0.25 inch thick clear acrylic sheet.

2.05 ACCESSORIES

A. Mounting Devices: Except as specified for each sign type, provide mounting devices specifically recommended by manufacturer for indicated application; concealed upon finished installation.
B. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
C. Tape Adhesive: Double sided tape, permanent adhesive.
D. Provide matching color backup plates for locations on glazing.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Install neatly, with horizontal edges level.
   C. Locate signs where indicated:
      1. Room Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
      2. If no location is indicated obtain Owner's instructions.
   D. Protect from damage until Substantial Completion; repair or replace damage items.

END OF SECTION
SECTION 10 2113.19
SOLID PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Solid plastic toilet compartments.
B. Urinal screens.

1.02 REFERENCE STANDARDS
A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
C. Product Data: Provide data on panel construction, hardware, and accessories.
D. Samples: Submit manufacturer's full range of available colors, for selection.
E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Acceptable Manufacturers:
   1. Scranton Products: www.scrantonproducts.com. only
   2. No Substitutions allowed as Owner requires to match product installed at recent US Customs Renovation

2.02 SOLID PLASTIC TOILET COMPARTMENTS
A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286, floor-mounted unbraced.
   1. Comply with ASTM E84, Class B, for finish surfaces of partition systems.
   2. Color: As selected by Architect from manufacturer's full line.

B. Doors:
   1. Thickness: 1 inch.
   2. Width: 24 inch.
   4. Height: 55 inch.

C. Panels:
   1. Thickness: 1 inch.
   2. Height: 55 inch.
SOLID PLASTIC TOILET COMPARTMENTS

3. Depth: As indicated on Drawings.

D. Pilasters:
   1. Thickness: 1 inch.
   2. Width: As required to fit space; minimum 3 inch.

E. Screens: Without doors; to match compartments; mounted to wall with continuous panel brackets.
   1. Urinal Screens - Minimum Size: 24 inches wide x 48 inches high, bottom edge positioned 12 inches above floor surface. Wall mounted with two panel brackets, and floor-to-ceiling vertical upright consisting of pilaster anchored to floor and ceiling.

203 ACCESSORIES

A. Pilaster Shoes: Formed ASTM A666, Type 304 stainless steel with No. 4 finish, 3 in high, concealing floor and ceiling fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
   2. Provide ceiling attachment using two adjustable hanging studs, attached to above-ceiling framing.

B. Head Rails: Hollow anodized aluminum, 1 by 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.

C. Wall and Pilaster Brackets: Polished stainless steel.

D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

E. Hardware: Satin stainless steel: 1092 heavy duty hardware.
   1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
   2. Heavy duty hinges, gravity type, adjustable for door close positioning; two per door. Provide hinges that are continuous, integral, or wrap around - through bolted onto partition.
   3. Thumb turn door latch with exterior emergency access feature.
   4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
   5. Coat hook with rubber bumper; one per compartment, mounted on door.
   6. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on Drawings.
B. Verify correct spacing of and between plumbing fixtures.
C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
C. Attach panel brackets securely to walls using anchor devices.
D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.
B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
C. Adjust adjacent components for consistency of line or plane.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Corner guards.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.
C. Submit locations of all corner guards for approval prior to ordering product.
D. Samples: Submit two sections of corner guard, 24 inch long, illustrating component design, configuration, color and finish.

1.04 QUALITY ASSURANCE
A. Provide each type of wall and corner guard accessory by same manufacturer.
B. Basis of Design: Specifications are based on product types and model numbers by the specified basis of design manufacturer. Product types manufactured by other acceptable manufacturers are permitted, subject to compliance with all specified requirements; and provided that deviations in dimensions, sizes, style, and finish are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Basis of Design Manufacturer:
   1. Items specified in this Section are as manufactured by InPro: www.inprocorp.com.
B. Other Acceptable Manufacturers:
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS
A. Corner Guards - Surface Mounted: Recycled polyethylene with extruded aluminum full height retainer and integral impact absorbing device.
   1. Location: All exposed corners at Stage/Platform.
   2. Width of Wings: 3 inches.
   3. Corner: Square.
   5. Length: One piece, 6'.
B. Corner Guards - Surface Mounted: Stainless Steel
   1. Material: Type 430 stainless steel, No. 4 finish, 16 gage, 3 1/2 x 3 1/2 inch. Type 304 stainless steel at Kitchen corners.
   2. Style: Stainless Steel
      a. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
      b. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
      c. Size: 3 inches.
      d. Corner: Square.
      e. Length: One piece, 6 feet minimum height.
      f. Acceptable Products:
         1) InPro: Stainless Steel.
2) Substitutions: See Section 01 6000 - Product Requirements.

2.03 FABRICATION
   A. Fabricate components with tight joints, corners and seams.
   B. Pre-drill holes for attachment.
   C. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
   B. Verify that field measurements are as indicated on Drawings.

3.02 INSTALLATION
   A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
   B. Position corner guards from 4 inches above finished floor to 76 inches above finished floor.
   C. Position corner guards 4 inches above finished floor to 76 inches high.

3.03 TOLERANCES
   A. Maximum Variation From Required Height: 1/4 inch.
   B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 SCHEDULE
   A. All outside corners: Corridors, break out spaces, toilet room entries, public spaces.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Accessories for toilet rooms and utility rooms.
B. Grab bars.

1.02 REFERENCE STANDARDS
C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate locations of accessories with other work to avoid interference, and to assure proper operation and servicing of accessory units.
   2. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.05 QUALITY ASSURANCE
A. Provide accessories by the same manufacturer for each type of accessory unit, and for units exposed in the same areas, to ensure matching of finishes.
B. Comply with ASTM F446 for grab bars and accessories, anchorage, test methods, and performance.
C. Basis of Design: Specifications and Drawings are based on accessory types and model numbers by the specified basis of design manufacturer. Accessory types manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in dimensions and profile are minor, and do not detract substantially from the indicated design intent.
   1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
B. Pack accessories individually in a manner to protect accessory and its finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Basis of Design Manufacturer:
1. Products scheduled on Drawings are manufactured by Bobrick Washroom Equipment, Inc. (www.bobrick.com) and Koala Kare (www.koalabear.com), except as otherwise indicated.

B. Other Acceptable Manufacturers:
   3. ASI Group Watrous: www.asigroupwatrous.ca
   5. GO-JO (Soap Dispenser Only): www.gojo.com
   7. Technical Concepts (Soap Dispenser only): www.technicalconceptsforless.com
   8. Substitutions: Section 01 6000 - Product Requirements.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide two keys for each accessory to Owner.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Type 304 or 316.

E. Mirror Glass: Tempered safety glass according to ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

F. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: No. 4 Brushed finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET AND UTILITY ROOM ACCESSORIES

A. Accessories for toilet and utility rooms are scheduled on Drawings

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

D. Verify that field measurements are as indicated on Drawings.

E. See Section 06 1000 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

C. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of units.

D. Verify with Architect exact locations of accessories.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
B. Install plumb and level, securely and rigidly anchored to substrate.
C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated on Drawings.
D. Use concealed fasteners wherever possible.
E. Where exposed mounting devices and fasteners are necessary, provide such devices finished to match accessory; use security type fasteners for all exposed accessory mountings.
F. Unless otherwise indicated, align accessory units with adjacent fixtures and other elements within the same area. Conform to ANSI/ICC A117.1 for positions and mounting heights.

3.04 PROTECTION
A. Protect installed accessories from damage due to subsequent construction operations.
B. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.
C. Protect exposed accessory finishes from damage until final acceptance of the Work.

3.05 CLEANING AND ADJUSTMENT
A. Clean and polish all exposed surfaces after installation, and after removal of labels and protective coatings or coverings.
B. Test and adjust accessories for proper and smooth operation.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Fire extinguishers
   B. Fire extinguisher cabinets.
   C. Automatic external defibrillators (AED).
   D. Accessories.

1.02 REFERENCE STANDARDS
   B. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
   C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
   D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
   E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.04 QUALITY ASSURANCE
   A. Basis of Design: Specifications are based on specialty types and model numbers by the specified basis of design manufacturer. Specialty types manufactured by other acceptable manufacturers are permitted, subject to compliance with all specified requirements, and provided that deviations in dimensions and profile are minor, and do not detract substantially from the indicated design intent.
      1. Comply with requirements specified in Section 01 4000 and Section 016000.

1.05 FIELD CONDITIONS
   A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Basis of Design Manufacturer:
         a. Fire Extinguishers: Manufacturer's model numbers for sizes and types specified.
   B. Other Acceptable Manufacturers:
      3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS (TO BE PROVIDED BY OWNER)
2.03 CABINETS
   A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.
   B. Cabinet Configuration: Semi-recessed type, unless otherwise indicated or specified.
      1. Sized to accommodate scheduled items and accessories.
      2. Trim: Returned to wall surface, with 3 1/2 inch projection.
      3. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
   C. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with two butt hinge. Provide nylon catch.
   D. Door Glazing: Plastic, clear, 1/8 inch thick acrylic. Set in resilient channel gasket glazing.
   E. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
   F. Weld, fill, and grind components smooth.
   G. Finish of Cabinet Exterior Trim and Door: Primed for field paint finish.
   H. Finish of Cabinet Interior: White enamel.

2.04 DEFIBRILLATORS
   A. General: Automated external defibrillator (AED) unit and cabinet; complete assembly for wall mounting.
   B. Acceptable Manufacturer:
         a. Defibrillator: Philips Heartstart FRX AED; Model 861304.
         b. Cabinet: Philips Basic Alarmed AED Cabinet; Model 9898031365321.
      2. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES
   A. Fire Blanket: Fire retardant treated wool; red, 62 by 84 inch size.
   B. Extinguisher Brackets: Formed steel, chrome-plated.
   C. Graphic Identification: "FIRE EXTINGUISHER".

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION
   A. Install in accordance with manufacturer’s instructions.
   B. Fire Extinguisher/Valve Cabinets: Install cabinets plumb and level in wall openings, maximum 30 inches from finished floor to inside bottom of cabinet.
   C. AED Cabinets: Install cabinets plumb and level on wall surfaces, maximum 48 inches from finished floor to top of cabinet.
   D. Secure rigidly in place.
   E. Place extinguishers in cabinets.

3.03 SCHEDULE - EXTINGUISHER AND CABINET ASSEMBLIES
   A. Wet Chemical Type Extinguisher Assembly:
      1. Locations: Food Service Kitchen.
      2. Assembly: Wet chemical type, Class K, stainless steel tank.
   B. Dry Chemical Type Cabinet Assembly:
1. Locations: All other locations as indicated on Drawings.
2. Contents: One Dry Chemical Type extinguisher 4A-60B:C extinguisher, placed in semi-recessed cabinet.

END OF SECTION
SECTION 12 3201
MANUFACTURED PLASTIC LAMINATE-FACED CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Production manufactured plastic laminate-faced casework units, including hardware.
B. Countertops are specified in Section 12 3600.

1.02 REFERENCE STANDARDS
B. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers
   Association; 2010 (ANSI/BHMA A156.9).
C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association;
   2005.

1.03 DEFINITIONS
A. Exposed Portions: Include all surfaces including edges visible when doors and drawers are closed.
   Also included are visible surfaces and edges of shelves in open cabinets, or behind glass doors, and
   underside of bottoms of cabinets over 4 feet above floor.
B. Semi-Exposed Portions: Include surfaces behind opaque doors and drawer fronts including shelves,
   dividers, interior faces of cabinet ends, backs, tops and bottoms, drawer sides, backs and bottoms,
   and back face of doors. Also included are underside of bottom of cabinets between 2 feet and 4 feet
   from floor, and flat tops 9 inches or more above floor.
C. Concealed Portions: Include sleepers, web frames, dust panels, and other surfaces not normally
   visible after installation, including underside of bottoms of cabinets less than 2 feet above floor.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination: Coordinate the work with plumbing rough-in, electrical rough-in, and installation of
   associated and adjacent components.
B. Sequencing: Sequence installation to ensure utility connections are achieved in an orderly and
   expeditious manner.

1.05 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Include components dimensions, layout in relation to surrounding wall surfaces,
   profiles, finishes, and hardware.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this
   Section, with not less than five years of documented experience.
B. Installer Qualifications: Company specializing in performing the work of this Section with minimum five
   years of documented experience.
C. System Standard: Specifications and Drawings are based on specific casework types by the specified
   system standard manufacturer. Casework systems manufactured by other acceptable manufacturers
   are permitted, subject to compliance with specified requirements, and provided that deviations in
   dimensions, configurations, and profile are minor, and do not detract substantially from the indicated
   design intent.
   1. Comply with requirements specified in Section 01 4000.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Store materials in ventilated, interior locations under constant minimum temperatures of 60 degrees F
   and maximum relative humidity of 55 percent.
B. Do not deliver cabinets until painting, wet work, grinding, and similar operations are completed in
   installation areas. Store cabinets in installation areas, or in areas with similar ambient conditions.
C. Protect work from moisture damage.
1.08 FIELD CONDITIONS
   A. Comply with cabinet manufacturer’s recommendations for temperature and humidity requirements in cabinet installation areas. Do not install cabinets until required conditions have been stabilized and will be maintained in the installation areas.
   B. Verify field dimensions will allow installation of specified casework units. Verify sizes and shapes of countertops prior to fabrication, and after base cabinets are installed, to assure proper fit and cutout locations.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. System Standard Manufacturer:
         a. Product: TMI Trimline 7000.
         b. Casework unit designations and accessory components as indicated on Drawings.
   B. Other Acceptable Manufacturers:
      6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WOOD CORE MATERIALS
   A. Particleboard: ANSI A208.1; composed of wood chips, sawdust, or flakes; minimum 47 lb. density; grade to suit application; sanded faces.
      1. Provide moisture-resistant type within 48 inches of sink locations.

2.03 PLASTIC LAMINATE MATERIALS
   A. Plastic Laminate: NEMA LD 3, Type HGS, HGP, and CLS as specified for casework components; color as selected; finish as selected.
   B. Low Pressure Laminate: Melamine; white color, matte surface texture.
   C. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

2.04 ADHESIVES
   A. Adhesives: Type recommended by laminate manufacturer to suit application.

2.05 HARDWARE
   A. Provide manufacturer’s standard hardware units of type, size and finish indicated for cabinet style, complying with ANSI A156.9, epoxy finished units, and as specified below; or if not indicated, as selected from manufacturer’s standards.
   B. Hinges: Institutional grade heavy gage steel, 5-knuckle type, self-closing within 30 degrees of the fully closed position; two hinges for doors up to 35 inches high, 3 hinges for doors exceeding 35 inches high. No European style allowed.
   C. Wire Pulls: Back mounted, solid metal, 4 inches long, satin chrome color. Provide two (2) pulls for drawers over 24” wide.
   D. Magnetic Catches: Magnetic with adjustable stop position. Minimum seven (7) lb. pull. Provide a minimum of two (2) catches for doors over 4’ high. Provide magnetic catch for each door leaf. Magnetic catch shall be constructed of metal.
   E. Chain Bolt: Stanley 1055 steel. For doors over 48" in height, chain bolts shall be 3" long, shall have an 18" pull cord and an angle strike to secure inactive door on cabinets. Provide two (2) chain bolt latches with connecting chain for inactive leaf of all full-height cabinets (over 54" high).
   F. Drawer Guides: Cabinet manufacturer’s standard complying with positive stops requiring manual depression of lever to remove drawer, steel ball bearing suspensions which shall be 4” extension, have a load capacity minimum of 75 lbs. Knee space drawers shall be equipped with full extension-suspensions with a load capacity minimum of at least 50 lbs. and shall have positive stops
MANUFACTURED PLASTIC LAMINATE-FACED CASEWORK

requiring manual depression of lever to remove drawer. Paper storage and file drawers shall be equipped with one (1) pair of full extension steel ball bearing suspensions of similar design with a load capacity minimum of 100 lbs for drawers over 24” wide. Provide a minimum of four mounting screws on each side.

G. Shelf Supports: Fully adjustable in all wall and utility cabinets; predrilled holes in cabinet sides spaced 1.25 inches on center and not more than 1.5 inches from shelf edges; 4 units per shelf, 2-pin self-locking shelf clips rated at minimum 250 lb each.

H. Drawer and Door Locks: Plated-finish disc tumbler, cam type. Only round cylinder to be exposed. Provide locks on all cabinet doors and drawers except for sink base cabinets. Double-door base cabinets shall have cylinder locks on each door leaf. Lock strike plate shall be constructed of metal. All locks shall be keyed alike within each room. Each room shall be keyed differently. Provide two (2) keys for each lock keying. Provide a master key to pass all cabinet locks. Each lock furnished with two (2) keys and master keyed. Locks shall be engraved with corresponding key number.

I. Coat Rods: Manufacturer’s standard 1.25 inch diameter chrome plated or stainless steel tubing.

J. Restraint Chains: Provide cabinet door restraint chain to prevent cabinet door from opening into obstruction; i.e. wall, countertop, etc. (EPCO TC12 or comparable product).

K. Accessories: Provide all miscellaneous plastic laminate items, such as scribes, aprons, skirts, fillers, and closures, as required for a complete installation. Miscellaneous plastic laminate items shall be constructed of materials and by methods as specified for other casework components. All exposed surfaces of miscellaneous items shall be finished the same as door and drawer faces.

L. Plastic Grommets: Round plastic grommets; cable set, two-piece, with break-away tab cover cap. For press-fitting or gluing into 2-3/8 inch (60 mm) diameter holes.
   2. Provide one (1) grommet in each workstation countertop at locations directed by Owner and Architect.

206 FABRICATION - GENERAL

A. Fabricate casework to ensure durable and rigid unit and to permit plumb and level site installation.

B. Align adjoining units for site assembly modules, to achieve tight hairline joints.

C. Prepare units with anchor devices to permit ease of site assembly.

D. Do not juxtapose materials noticeably dissimilar in color.

E. Concealed Members: Particleboard; thickness required by manufacturer’s standards.

F. Face Frame Style: Exposed around door and drawer fronts; not less than 3/4 inch particleboard with glued and screwed or glued mortise and tenon joints.

G. Door and Drawer Style: Flush overlay.

H. Drawer Construction: Not less than 1/2 inch thick plywood subfront, bottom, back, and sides. Provide box type construction with subfront and back rabbeted into sides and secured with glue and mechanical fasteners. Exposed fronts secured to subfront with mounting screws from the interior of the drawer body.

I. Exposed Ends: Not less than 1/2 inch thick particleboard. Connect to face frame with glued tongue and plow joint, and supplemented with concealed mechanical fasteners.

J. Un-Exposed Ends: Not less than 1/2 inch thick particleboard. Connect to face frame with glued tongue and plow joint, and supplemented with concealed mechanical fasteners.

K. Back, Top, and Bottom Rails: Not less than 3/4 inch thick particleboard, machined to interlock with end panels, and rabbeted to receive top and bottom panels; with back rails secured under pressure with glue and mechanical devices.

L. Cabinet Interior Finish: Plastic laminate; color, sheen, and texture as specified.
   1. Shelving: Not less than 3/4 inch thick particleboard with finished top, bottom, and front edge; 1 inch thick if over 36” span.

M. Exposed Edge of Door and Drawer Fronts: Manufacturer’s standard 3 mm PVC, hot melt glue applied.
N. Exposed Edges of Cabinet Box, Front Edge of Shelves and Top of Drawer Boxes: Manufacturer's standard 3 mm PVC, hot melt glue applied.

2.07 FABRICATION - BASE CABINETS
A. Depth: Unless otherwise indicated, nominal 24 inches deep x height required for 36 inch high finished countertop.
B. Bottoms: Not less than 1/2 inch thick particleboard fully secured and rabbeted into end panels, front frame, and back bottom rail.
C. Back Panels: Not less than 1/4 inch thick particleboard fastened to rear edge of end panels, and to top and bottom rails.
D. Toe Boards: Not less than 3/4 inch thick particleboard attached between end panels, and extended from bottom panel to floor.
E. Corner Blocks: Glued and fastened in each of four top corners to maintain cabinet squareness and rigidity.

2.08 FABRICATION - WALL CABINETS
A. Depth: Unless otherwise indicated, nominal 12 inches deep x heights indicated.
B. Tops and Bottoms: Not less than 1/2 inch thick particleboard, fully supported by, and secured in rabbets in end panels, front frame, and back rail.
C. Backs: Not less than 1/4 inch thick particleboard, fastened to rear edge of ends and to top and bottom hanger rails.

2.09 FABRICATION - MUSIC ROOM CABINETS
A. Wire Grill Doors: Vertical 3/16” Diameter Metal Rods with Beveled Ends Welded to 5/16” Diameter Heavy Gauge Rod and Vinyl Coated.

PART 3 EXECUTION
3.01 PREPARATION
A. Verify installation and adequacy of backing and support framing.
B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.02 INSTALLATION
A. Set and secure casework in place rigid, plumb, and level.
B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
C. Use purpose-designed fixture attachments for wall mounted components.
D. Use threaded steel concealed joint fasteners to align and secure adjoining cabinet units.
E. Permanently fix cabinet and counter bases to floor using appropriate angles and anchorages.
F. Complete hardware installation and adjust doors and drawers for proper operation.

3.03 TOLERANCES
A. Maximum Variation from True Position: 1/16 inch.
B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.04 CLEANING
A. Repair, or remove and replace defective work as directed by Architect.

3.05 PROTECTION
A. Maintain proper protection and ambient conditions to ensure that work will be without damage or deterioration at the time of acceptance.

END OF SECTION
SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Countertops for architectural wood casework.
   B. Countertops for manufactured casework.
   C. Wall-hung counters and vanity tops.
   D. Sinks molded into countertops.
   E. Epoxy resin sinks.

1.02 REFERENCE STANDARDS
   B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2014.
   D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
   F. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
   H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
   I. PS 1 - Structural Plywood; 2009.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordination: Coordinate sizing and configuration of countertops with associated casework and adjacent construction.

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. Specimen warranty.
   C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other Sections.
   D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
   E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
   F. Installation Instructions: Manufacturer's installation instructions and recommendations.
   G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE
   A. Fabricator Qualifications: Company specializing in the fabrication of specified countertops with minimum three years of documented experience.
   B. Installer Qualifications: Fabricator.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Store products in manufacturer's unopened packaging until ready for installation.
   B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
1.07 **FIELD CONDITIONS**

A. Prior to installation, allow wood-based items to acclimate for a minimum of one week in the spaces in which they are to be installed.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS**

**201 COUNTERTOP ASSEMBLIES**

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS).

B. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.
   1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
      a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      b. Surface Color and Pattern: As indicated on Drawings.
      c. Finish: Matte or suede, gloss rating of 5 to 20.
      d. Acceptable Manufacturers:
         2) Panolam Industries International, Inc.
         3) Panolam Industries International, Inc.
         5) Substitutions: See Section 01 6000 - Product Requirements.
   2. Exposed Edge Treatment: Molded PVC edge, 3 mm thick, sized to completely cover edge of panel, radiused and buffed.
      a. Color: As selected by Architect from the manufacturer's full line.
   3. Back and End Splashes: Same material, same construction; minimum 4 inches high.

C. Chemical Resistant Plastic Laminate Countertops: Chemical resistant high pressure decorative laminate sheet bonded to substrate.
   1. Laminate Sheet: NEMA LD 3 Grade HGP, 0.039 inch nominal thickness.
      a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      b. Chemical-Resistance: Provide products that resist the following chemicals with not more than Moderate Effect when tested in accordance with NEMA LD 3:
      c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
      d. Finish: Matte or suede, gloss rating of 5 to 20.
      e. Surface Color and Pattern: As scheduled on Drawings.
      f. Acceptable Manufacturers:
         2) Panolam Industries International, Inc.
         3) Panolam Industries International, Inc.
         5) Substitutions: See Section 01 6000 - Product Requirements.
   2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
   3. Back and End Splashes: Same material, same construction; minimum 4 inches high.
   4. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 - Countertops, Custom Grade.

D. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
   1. Manufacturers:
      b. Substitutions: See Section 01 6000 - Product Requirements.
   2. Flat Surface Thickness: 1 inch, nominal.
   3. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.
   5. Color: Black.
7. Back and End Splashes: Same material, same thickness; separate for field attachment.
8. Sinks: Same material, same color; integrally molded with counter; bottom sloped to outlet; molded outlets; drain outlet located in back corner.
   a. Sides and Ends: 1/2 inch minimum thickness.
   b. Bottoms: 5/8 inch minimum thickness.
   c. Interior Corners: 1 inch minimum radius.
   d. Clamping collars for 1-1/2 or 2 inch diameter waste pipe, for sealed but not permanent connection.
   e. Steel channel supports front to back on each side, fastened to underside of top to support twice full sink weight.

E. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 3/4 inch, minimum.
2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
   a. Manufacturers:
      2) Substitutions: See Section 01 6000 - Product Requirements.
   b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with the MIA Dimension Stone Design Manual.
   c. Finish on Exposed Surfaces: Polished.
3. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

202 ACCESSORY MATERIALS
A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
B. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
D. Joint Sealant: Mildew-resistant silicone sealant, as selected by Architect.
E. Countertop Brackets: A&M Hardware Inc.:  
   1. Bracket: A&M Hardware Inc, 1000 pound capacity, Hybrid Bracket No.HYB (1.5) 18 - 18" x 18" for 24" deep counters.
   2. Bracket: A&M Hardware Inc, 1000 pound capacity, Hybrid Bracket No.HYB (1.5) 24 - 24" x 24" for 30" deep counters.

203 FABRICATION
A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1-1/2 inch except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to walls with contact surfaces set in waterproof adhesive.
   2. Height: 4 inches, unless otherwise indicated.
C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on Drawings, finished to match.
PART 3 EXECUTION

3.01 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION
A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
C. Attach epoxy resin countertops using compatible adhesive.
D. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES
A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING
A. Clean countertops surfaces thoroughly.

3.06 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION