(**BID SET**)

HILLSBOROUGH COUNTY
AVIATION AUTHORITY

PROJECT MANUAL

(Containing Bidding and Contract Requirements, and Specifications)

FOR

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT

AUTHORITY PROJECT NUMBER 6930 22

TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

Prepared By: Procurement Department

POST DATE: MARCH 11, 2022

DIVISION 0

BIDDING AND CONTRACT REQUIREMENTS

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HILLSBOROUGH COUNTY AVIATION AUTHORITY

INVITATION TO BID

Sealed bids will be received no later than **2:00 p.m., April 20, 2022** via the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport. The Owner's e-Procurement Portal Clock is the official clock for determination of all deadline dates and times. Without exception, Bids will not be accepted after the submission deadline regardless of any technical difficulties such as poor internet connections. The Owner strongly recommends completing and submitting Bids well ahead of the deadline. All bids received will be publicly opened and read aloud thereafter at 2:00 p.m. in the Authority Boardroom, Main Terminal Building, Third Level, Blue Side, Tampa International Airport and via Microsoft Teams video and audio. No Bid will be considered unless received on or before the time and at the place designated above.

The Bidder must supply all information required by the Solicitation Documents, to include the Bid Form and required attachments (Contract Documents) through the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport by the Bid Submittal Time and Date.

In addition to providing the a scanned copy of the Bid Bonds, Surety Bond Affidavit, Power of Attorney, and Cashier's Check (if applicable) through the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport by the Bid Submittal Time and Date, Bidders will also submit such documents to the Owner within seven days after the date of the Bid Opening as an original hardcopy with corporate seals for Bidder and Surety.

Bidders are invited to submit bids for the work on the bid forms provided in the Contract Documents. Other bid forms will not be accepted.

Scheduled Item	Significant Dates
Contract Documents posted on Owner's e-Procurement Portal:	March 11, 2022 after 1:30 p.m.
Mandatory Pre-Bid Conference	March 22, 2022 at 10:00 a.m.
Request for Clarification Deadline	April 6, 2022 by 2:00 p.m.
Addendum posted on Owner's e-Procurement Portal website	April 13, 2022 by 5:00 p.m.
Bid Submittal Time and Date	April 20, 2022 by 2:00 p.m.
Award by Authority's Board	June 2, 2022 at 9:00 a.m.

The Bidder must be a Mechanical Contractor or a General Contractor licensed in the State of Florida, and the Mechanical Contractor or the General Contractor's Mechanical Contractor must have completed two HVAC mechanical retrofit projects, each equal to or in excess of $200,000 in construction value, as a prime contractor since January 1, 2012. Bidder will use SECTION 00315 – LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT PROJECT EXPERIENCE FORM to meet this minimum qualification.

A **MANDATORY** Pre-Bid Conference for all Bidders will be held in the Authority Boardroom, Main Terminal Building, Third Level, Blue Side, Tampa International Airport on **March 22, 2022 at 10:00 a.m.** Questions relating to the Contract and Contract Documents will be answered at that time. Attendance by all prospective Bidders is mandatory. Bids submitted by Bidders not in attendance at this scheduled MANDATORY Pre-Bid Conference will be rejected. **Attendance may be in person or via Microsoft Teams.** To be considered as attending in person, Bidder must have signed in on one of the sign-in sheets. Attendees are warned that the sign-in sheets will be collected once the Pre-Bid Conference begins. Any Attendees arriving late after the sign-in sheets are collected will not be considered to have attended the Pre-Bid Conference as required. **Contact the Procurement Agent listed below (Page 00020-3) via email to register as an on-line attendee by Microsoft Teams. To be considered as attending via Microsoft Teams, the attendee must be identified by the Procurement Agent at the start of the Pre-Bid Conference and must stay on-line through the end of the Pre-Bid Conference. The on-line attendance registration deadline is listed above. Pre-registration is not required for in person attendees.**

A **MANDATORY** site inspection of the Project areas at Tampa International Airport will occur as a part of the scheduled Pre-Bid Conference. Details will be announced during the Pre-Bid Conference. Attendance by all prospective Bidders at this scheduled site inspection is mandatory.

IMPORTANT NOTICE

All Bidders are hereby notified that they must comply with the Woman and Minority Business Enterprise (W/MBE) Program requirements as defined in the Owner's W/MBE Policy.

W/MBE – This Project has no federal funding and has a W/MBE Goal of 13.3%.

Complete examination and understanding of the Contract Documents, including the bidding documents, general conditions of the Contract, specifications, construction drawings and the site of the proposed work, are necessary to properly submit a bid.

A cashier's check on any national or state bank or a bid bond on the form contained in the Contract Documents in an amount not less than 5% of the total amount bid, made payable to the Hillsborough County Aviation Authority, must accompany each bid as a guarantee that the Bidder will not withdraw its bid for a period of 85 calendar days (or 115 calendar days if federal funds are applicable) after opening of the bids, and as a guarantee that, in the event the Contract is awarded to the Bidder, Bidder will, within seven days after the date of award of the Contract, enter into a Contract with the Owner and furnish the required and executed contracts, insurance policy endorsements, certificates of insurance and performance and payment bonds. If Bidder fails to do this, Bidder will forfeit the amount of the cashier's check or bid bond as liquidated damages. By submitting its Bid, the Bidder agrees that these liquidated damages are not a penalty. The bid bond and performance and payment bonds are required to be secured by an agency of the surety, which agency will have an established place of business in the State of Florida and will be duly licensed to conduct business therein.

The Owner reserves the right to waive any formalities, technicalities, or irregularities, and reject any or all bids, re-advertise for bids and avoid or refrain from awarding the contract for the work.

Bidders shall submit all inquiries regarding this bid via the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Please note the deadline for submitting

inquiries. All answers to inquiries will be posted on the Owner's e-Procurement Portal. Bidders may also click "Follow" on this bid to receive an email notification when answers are posted. It is the responsibility of the bidder to check the website for answers to inquiries.

If you have any questions pertaining to this Project, please contact the Procurement Agent, James Hanney, at (813) 870-8779 or email at JHanney@TampaAirport.com.

END OF SECTION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1.01 GENERAL

A. This Contract is to be financed solely by the Hillsborough County Aviation Authority (Owner). Award of Contract is subject to the approval of the Owner.

B. Owner, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises and airport concession disadvantaged business enterprises 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.

C. Non-Discrimination and Segregated Facilities:

1. Each Bidder will complete, sign and include in their Bid the Certification of Non-Segregated Facilities. If not submitted with the Bid, the Bid may be considered irregular and may be rejected. When a determination has been made to award a Contract to a specific Contractor, such Contractor will, prior to award, furnish such other pertinent information regarding compliance with Federal Regulation and Contractor's own employment policies and practices as the Federal Aviation Administration, the Owner, or the Secretary of the Labor Office of Federal Contract Compliance (OFCC) may require. Contractor will require similar compliance with its subcontractors. Where the Contract Price is $10,000.00 or greater, Contractor will comply with Part 152 of the Federal Aviation Regulations as amended and specifically FAR 152.411 (c) and (d), incorporated herein by this reference. All such information required of a subcontractor will be furnished by the Contractor.

2. The Equal Employment Opportunity Report Statement, Certificate of Non-Segregated Facilities, Equal Opportunity Clause, and all other EEO requirements will be included in all non-exempt subcontracts entered into by the Contractor. Subcontracts entered into by Contractor will also include all other applicable labor provisions. No subcontract will be awarded to a non-complying subcontractor.

3. Affirmative Action: If the Contract is an Aviation Related Activity as defined in 14 CFR Part 152, and is a Construction Contract of $10,000.00 or more, Contractor assures that it will undertake an Affirmative Action Program as required by 14 CFR Part 152 Subpart E, to insure that no person will, on the grounds of race, creed, color, national origin, or sex, by excluded from participating in or receiving the services or benefits of any program or activity covered by this Subpart. Contractor assures that it will require that its covered suborganizations provide assurances to the Contractor that they similarly will undertake Affirmative Action Programs and that they will require assurances from their suborganizations, as required by 14 CFR Part 152, Subpart E to the same effect.

4. In addition, the Bidder will also insert in each of Bidder's subcontracts a clause requiring the subcontractor to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

D. Compliance with Governmental Requirements:

1. The Bidder covenants and agrees that Bidder and Bidder's agents and employees will comply fully with all applicable federal, state, county, municipal or other governmental laws, executive orders, wage, hour and labor, equal employment opportunity, Woman and Minority Owned Business Enterprises, pollution control, and environmental regulations, applicable national and local codes, and Hillsborough County Aviation Authority Rules, Regulations and Manuals, and that Bidder will obtain all necessary permits, pay all required fees and taxes, and otherwise perform these services in a legal manner. To the maximum extent permitted by applicable law, the Bidder will indemnify and hold harmless the Owner, its Board members, officers, employees, agents, and volunteers from any fees, damages, fines or costs of any kind arising out of Bidder's or any of the Bidder's consultants, subcontractors, suppliers or agents of any tier or their respective employees' failure to comply with such governmental regulations. This obligation to indemnify and hold harmless will be construed separately and independently. If this clause is found to be in conflict with applicable law, the clause will be considered modified by such laws to the extent necessary to remedy the conflict.

2. Bidder certifies that all materials, equipment, etc., contained in their Bid meets all OSHA requirements.

3. Bidders must comply with the Fair Labor Standards Act.

4. It is the Authority's policy to promptly take any measures necessary to ensure that no person in the United States shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in any activity conducted with, or benefiting from, funds received from this Procurement. Bidder agrees to abide by this Policy.

   a. Using the definitions of activity, facility and program as found and defined in §§21.23(b) and 21.23(e) of 49 CFR §21, the Authority and Bidder will facilitate all programs, operate all facilities, or conduct all programs in compliance with all non- discrimination requirements imposed by, or pursuant to FAA Grant Assurance 30.

E. Procurement Protest Policy:

1. Failure to follow the procurement protest policy set out in the Owner's policies constitutes a waiver of Bidder's protest and resulting claims. A copy of the procurement protest policy may be obtained by contacting the Owner via

telephone at 813-870-8700 or via mail to Hillsborough County Aviation Authority, Post Office Box 22287, Tampa, Florida 33622. The policy is also available on the Owner's website: www.TampaAirport.com > Learn about TPA > Airport Business > Procurement > Procurement Protest Policy. The Authority will post on its website, and make available for public access, any and all formal protest documents received on this solicitation.

F. Restricted Vendor Lists:

1. By submitting a Bid, Bidder represents that it is not precluded from submitting a Bid under Section 287.133 (2)(a), Florida Statutes, which provides as follows: a person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

2. A person or affiliate who has been placed on the discriminatory vendor list kept by the Florida Department of Management Services may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or consultant under a contract with any public entity and may not transact business with any public entity as provided in Section 287.134 of the Florida Statutes.
3. An entity or affiliate who has had its Certificate of Qualification suspended, revoked, denied, or have further been determined by FDOT to be a non-responsible contractor, may not perform work under this Contract.

G. General Bond Requirements:

1. The bid security will be as specified; only the Bid Bond and Surety's Bond Affidavit as bound within these documents or a Cashier's Check is acceptable. Each separate Bid will be accompanied by a Cashier's Check or Bid Bond on the form provided herein in an amount of not less than 5% of the total amount bid, made payable to the Hillsborough County Aviation Authority. If a Bid Bond is provided in lieu of a Cashier's Check, it must be accompanied by a valid Power of Attorney indicating that the person signing the Bond on behalf of the Surety has full legal authority to do so. Failure to provide the Bid Bond or Cashier's check will result in your bid being found as non-responsive. If the Power of Attorney is not provided with the Bid Bond, the Bid may be considered irregular and may be rejected.

2. The amount of such Bid Bond or the Cashier's Check of the Bidder whose Bid is

accepted will be forfeited and paid to the Owner as liquidated damages if said Bidder fails to enter into a Contract with the Owner and fails to furnish the required and executed contracts, certificates of insurance and performance and payment bonds within seven days after the date of the award of the Contract. The Bidder agrees that the liquidated damages are not a penalty and 5% of the total bid amount is reasonable.

3. Contract Payment and Performance Bonds will be as specified; only the Payment and Performance Bonds and Surety's Bond Affidavits as bound within these Contract Documents are acceptable.

4. The Surety of the Bond will be a corporate Surety authorized under the laws of Florida to do business in Florida, and authorized to write that type of bond through a licensed agent of the Surety located in Florida. The agent authorized to represent the Surety on the Bid Bond must be listed on the State website: www.myfloridacfo.com. If the agent is not listed on the State website as an authorized representative of the Surety, the Bid may be considered irregular and may be rejected.

5. PERFORMANCE BOND AND PAYMENT BOND

   a. The Contractor will furnish a Statutory Payment Bond and a Common Law Performance Bond (Bonds) for the full and faithful performance of the Work, meeting the standards specified herein, on the bond forms attached to this Contract as Sections 00610 and 00620, with a certified Power of Attorney Affidavit attached, each in the full amount of the Contract Sum.

   b. All Bonds required under this Contract will be written through a reputable and responsible surety bond agent, licensed to do business in the State of Florida and with an acceptable Surety company which holds a Certificate of Authority authorizing it to write surety bonds in Florida. Bonds will be furnished to the Owner not later than seven days after Notice of Award. Prior to the commencement of any of the Work, but not later than 30 days from the date of Notice of Award, the Contractor will record the Bonds in the public records of Hillsborough County, Florida.

   c. An acceptable Surety company must meet all of the following requirements:

      i. Hold a Certificate of Authority authorizing it to write surety bonds in Florida.

      ii. Have been in business and have a record of successful continuous operations for the last five years.

      iii. Be listed and maintain a current Certificate of Authority as acceptable surety on federal bonds and as acceptable reinsuring companies in accordance with U.S. Department of Treasury

Circular 570, current revision. The amount of Bonds issued pursuant to this Contract will not exceed the underlying limitation in the Federal Register for that Surety.

iv. Have a current rating by A.M. Best Company of "A-" or higher.

v. Be a responsible Surety company at the time of the Bond execution.

d. Should the Surety lose its Certificate of Authority according to the current Federal Register published by the U.S. Department of the Treasury, and/or should its Best rating be reduced below the rating required in Paragraph c. iv the Owner will have the right to require Contractor to change the Surety to an acceptable Surety company, all at Contractor's expense without reimbursement from Owner.

e. The Surety company will have a Florida licensed agent who is authorized to execute bonds for the Surety company and whose name is listed in the prescribed space on the bond forms and affidavit for all Bonds required by the Owner.

f. Upon the request of any person or entity appearing to be a potential beneficiary of the Bonds covering payment of obligations arising under this Contract, the Contractor will promptly furnish a copy of the Bonds or will permit a copy to be made.

g. If the Surety on any Bond furnished by the Contractor under this Contract is declared bankrupt, becomes insolvent, has its right to do business in the State of Florida terminated, ceases to be licensed to conduct business in the State of Florida, if the Owner deems the Surety upon any Bond to be unsatisfactory, or if for any reason such Bond ceases to be adequate, the Contractor will, at its expense, within five days after such occurrence, furnish additional or replacement Bond or Bonds in such form, amount, and with such Surety or Sureties as will be acceptable to the Owner. In such event, no further payment to the Contractor will be deemed to be due under this Contract until such new or additional security for the faithful performance of the Work is furnished in a manner and form acceptable to the Owner.

h. In the event the Bonds required in this Article are not provided, the Owner will have the right to terminate this Contract for cause.

i. Bond coverage shall be adjusted during the term of this Contract to reflect additions or deductions made by Change Orders or Work Orders.

j. The Owner is entitled to receive any refunded bond premiums resulting from Bond coverage adjustments.

H. Insurance Requirements:

Insurance requirements will be as specified herein in Section 00650 - INSURANCE REQUIREMENTS.

1.02 EXAMINATION OF CONDITIONS AFFECTING WORK

A. Prior to submitting a Bid, each Bidder will examine and thoroughly familiarize itself with all existing conditions, including all applicable laws, codes, ordinances, rules and regulations that will affect their Work. Bidders will visit the Project Site, examine the grounds and all existing buildings, utilities, pavements and systems and will ascertain all conditions that will in any manner affect Work. Bidders will make a request to the Owner, in writing, for any additional information deemed necessary for Bidder to be fully informed as to exactly what is to be expected prior to submitting a Bid.

B. The Owner will make available during normal business hours, at its offices, Record Documents and Drawings pertaining to the existing Site and Facilities at the Airport listed on Section 00020 - INVITATION TO BID, Page 00020-1. These Record Documents and Drawings will not be considered a part of the Contract Documents but are provided by the Owner for information only to assist Bidders in ascertaining conditions that may affect the Work. Record Documents and Drawings have been maintained by the Owner solely for the Owner's own benefit, and do not necessarily indicate all existing conditions fully or accurately. Bidders will be solely responsible for all assumptions made in reliance upon Record Documents and Drawings.

C. The Contract Documents describe the Work to be performed under this Contract and include, but are not limited to, the Bidding Documents, Bonds, Affidavits, Compliance Forms, Statements, Insurance Requirements and Documents, the Contract between Owner and Contractor (herein referred to as the Contract), Conditions of the Contract (General Conditions), General Requirements and other Requirements, Reports, and Specifications.

D. The Bidders shall be responsible for obtaining any and all information that they consider necessary for the purpose of preparing and submitting their Bid.

E. By submitting a Bid, Bidder certifies that it has investigated and is fully informed of the conditions to be encountered, of the character, quality and quantities of Work to be performed and materials to be furnished, and it has included in its Bid all items and costs necessary for the proper execution and completion of the Work.

1.03 CONE OF SILENCE AND INTERPRETATIONS

The Owner has established a cone of silence applicable to all competitive procurement processes, including this Bid. The cone of silence will be imposed on this Bid beginning on the date the Bid documents are posted on the Owner website and ending with the Board’s selection.

A. The cone of silence prohibits any communications regarding this Invitation to Bid between:

1. A potential respondent (which includes vendors, service providers, bidders, proposers, lobbyists and consultants) and their representative(s) and Owner’s

staff, or Owner consultants engaged to assist the Owner on a specific Invitation to Bid, except for communications with the Owner's procurement agent or other supporting procurement staff responsible for administering the procurement, provided the communication is strictly limited to procedural matters; and

2. A potential respondent and their representative(s) and a Board member.

B. Unless specifically provided otherwise, in addition to the exceptions set forth above, the cone of silence does not apply to:

1. Communications with the Owner's Legal Affairs Department; and

2. Oral communications at the Pre-Bid Conference; and

3. Oral communications during any duly noticed Board meeting; and

4. Communications relating to protests made in accordance with the Owner's Procurement Protest Policy.

C. Any communications regarding matters of process or procedure from a potential Bidder must be referred to the Procurement Agent listed in the Contact Section on the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Please refer to the Owner's e-Procurement Portal for updated information pertaining to any addenda or revisions to the Bid schedule.

D. No oral interpretation or clarification of the Contract Documents will be made to any Bidder. If Bidder requires clarification or finds any ambiguities, discrepancies in, or omissions or there is doubt as to the true meaning of any part of the Contract Documents, Bidder shall submit all inquiries regarding this bid via the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Please note the deadline for submitting inquiries. All answers to inquiries will be posted on the Owner's e-Procurement Portal.

E. All such interpretations and any supplemental instructions will be in the form of a written addendum posted on the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. It is the responsibility of the Bidder to verify the Owner received their request by contacting the Procurement Agent listed as the contact listed in Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Failure of any Bidder to review any addendum will not relieve them from any obligation contained therein.

F. Bidders are required to register for an account via the Owner's e-Procurement Portal hosted by ProcureNow. Once bidder has completed registration, you will receive addenda notifications to your email by clicking "Follow" on this project. Ultimately, it is sole responsibility of each bidder to periodically check the site for any addenda at https://secure.procurenow.com/portal/tampaairport.

G. Any violation of the cone of silence will render voidable the bid, as well as the awarded Contract.

1.04 SUBSTITUTIONS

A. The materials, products and equipment described in the Contract Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. The Contractor is responsible for assuring that all suppliers, subcontractors and vendors conform to the Contract requirements.

B. No substitution will be considered prior to the specified Bid submittal time and date unless written request for approval has been submitted via Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. The burden of proof on the merit for the proposed substitution is upon the Bidder. The Owner's decision to approve or disapprove a proposed substitution is final.

1. In making requests for substitutions, the Bidder will list the particular system, product, or material Bidder wishes to substitute, and the justification for the substitution. Requests submitted will include any and all adjustments of that and any other Work affected thereby.

C. If the Owner approves a proposed substitution prior to the specified Bid submittal time and date, such approval will be set forth in an Addenda. Bidders will not rely on approvals made in any other manner.

D. No substitutions will be considered after the Bid submittal time and date except as specifically provided for in the Contract Documents.

1.05 ADDENDA

A. Any Addenda issued by the Owner prior to the Bid submittal time and date for the purpose of changing the intent of the Contract Documents or clarifying the meaning of same, will be binding in the same way as if written in the Contract Documents. Since all Addenda are available to Bidders on the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport, it is sole responsibility of each bidder to periodically check the site for any addenda at https://secure.procurenow.com/portal/tampaairport before submitting Bids. It is the usual practice for the Owner to e-mail Addenda to known Bidders, but it cannot be guaranteed that all Bidders will receive Addenda in this manner. Each Bidder will acknowledge receipt of each and every Addendum directly in the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. If acknowledgment is not given, the Bid may be considered irregular and may be rejected.

B. Bidders shall submit all inquiries regarding this bid via the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Please note the deadline for submitting inquiries. All answers to inquiries will be posted on the Owner's e-Procurement Portal. Bidders may also click "Follow" on this bid to receive an email notification when answers are posted. It is the responsibility of the bidder to check the website for answers to inquiries.

C. Any issue that may affect Bidder's ability to bid or to construct the Project may be submitted to the Procurement Agent after the Request for Clarification Deadline. The

Owner will determine if the issue affects the Bidder's ability to bid or construct the Project and, if it substantially does so, will issue an Addendum addressing the issue.

1.06 CONTRACT DOCUMENTS

A. Complete sets of the Contract Documents are available on the Owner's e-Procurement portal located at https://secure.procurenow.com/portal/tampaairport.

B. Bidders are expected to use complete sets of Contract Documents in preparing Bids. Bidder shall be solely responsible and liable for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

C. If Bidder has any questions or finds ambiguities, discrepancies in, or omissions from the Contract Documents, the Bidder shall submit all inquiries regarding this bid via the Owner's e-Procurement Portal, located at https://secure.procurenow.com/portal/tampaairport. Please note the deadline for submitting inquiries. All answers to inquiries will be posted on the Owner's e-Procurement Portal..

D. By submitting a Bid, the Bidder certifies that it has thoroughly and fully examined the Contract Documents and that it has informed the Owner of any questions, ambiguities, discrepancies in, or omissions from the Contract Documents.

1.07 RESPONSIBILITY OF BIDDERS

A. The Owner reserves the right to investigate and determine the responsibility of the Bidders before and after Bids are received. Owner will not award the Contract to any Bidder determined by Owner to be non-responsible. Among the criteria which Owner may use in making such determination are the following:

1. Failure to comply with any minimum qualification requirements of the Owner, as specified for this Project on the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport.

2. Failure to supply such accurate information as the Owner may require in evaluating the responsibility of Bidders or failure to supply the Owner with such documents or information as the Owner may request to assist the Owner in evaluating the responsibility of prospective Bidders.

3. Failure of the Bidder to obtain proper license (if any is required) prior to bidding, i.e. if Bidder is not certified and licensed in accordance with the appropriate State of Florida Statutes and appropriate State of Florida construction or professional licensing boards, including but not limited to the requirements of Chapters 255 and 287 of the Florida Statutes. In addition, applicable license(s) must be current and active throughout the life of the project.

4. Past performance of the Bidder, one or more of the listed Subcontractors or any affiliated or related entity.

5. Failure of Bidder or any affiliated related entity to pay or satisfactorily settle all bills for labor and materials on any former contract with Owner.

6. The outstanding obligations of the Bidder, whether previously assumed or to be assumed in the future.

7. Unsatisfactory, defective, or non-conforming work on any previous contract with the Owner by the Bidder, one or more of the listed subcontractors, or any affiliated or related entity.

8. The present relationship between the Owner and the Bidder (or any affiliated or related entity), including the existence of any unresolved disputes arising out of past projects.

9. The financial condition of the Bidder. Such evidence of financial responsibility will 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 will be certified by a public accountant. At the time of submitting such financial statements or reports, the Bidder will 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 will 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.

10. Experience of the Bidder and/or its listed subcontractors in performing Work of this nature.

11. Submission of appropriate Women and Minority Owned Business Enterprise (W/MBE) information.

12. Past compliance with the Owner's W/MBE Policy and Program on Owner projects only.

13. Submission, upon request, of the Bid Documents.

14. Lack of Competency of Bidder. The Contract will be awarded only to a Bidder considered to be capable of performing the Work as required by the Contract Documents. Owner may declare any Bidder ineligible at any time during the process of receiving bids or awarding the Contract where developments arise which, in the opinion of the Owner, adversely affect the Bidder’s competency to perform the Work and to discharge its responsibilities under the Contract.

1.09 PREPARATION AND SUBMISSION OF BID

A. Sealed Bids for the construction of the Work generally described will be received until the time and date stated in the Section 00020 - INVITATION TO BID.

B. Bids received without Section 00300 – BID FORM will be found non-responsive.

C. Bids received without completion of the Bid Schedule found in the Owner's e-Procurement Portal will be found non-responsive.

Due to the allocation of funds, successful Bidders will be required to provide a Schedule of Values in a manner acceptable to the Design Professional and Owner, and in accordance with the Contract Documents.

D. Each Bid and any attachments submitted will be submitted through the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport.

No Bid will be considered unless received through the Owner's e-Procurement Portal located at https://secure.procurenow.com/portal/tampaairport before the Bid submittal time and date specified for opening all Bids. Bids will not be accepted after the specified Bid submittal time and date. The Bid will contain the following documents.

Bidder will submit the following as a response to this Invitation to Bid:

T All required documents as specified for this project in the Owner's e-Procurement Portal.

File Uploads: All electronic files submitted must be in a common format accessible by software programs the Owner uses. Such common formats are generally described as Microsoft® Word (.doc or .docx), Microsoft® Excel (.xls or .xlsx), JPEG), or Adobe Portable Document Format (.pdf).

Bidder will not secure, password protect or lock uploaded files. The Owner must be able to open and view the contents of uploaded files. Bidder will not disable or restrict the ability of the Owner to print the contents of an uploaded file.

Scanned documents or images must be of sufficient quality, no less than 150 dpi, to allow for reading and interpreting the words, drawings, images or sketches.

It is the Bidder's responsibility to ensure the files uploaded to the Owner's software programs are not corrupt.

E. The Bidder will have downloaded Contract Documents from the Owner and must submit their Bid on the forms furnished by the Owner in the Owner's e-Procurement Portal. Bids submitted by Bidders who have not downloaded Contract Documents from the Owner's e-Procurement Portal may be rejected.

F. Bids will be submitted as indicated in the Bid Schedule located in the Owner's e-Procurement Portal. If the Bid Schedule located in the Owner's e-Procurement Portal is not submitted with the Bid, the Bid will be found non-responsive.

G. Bids containing reservations, conditions, omissions, unexplained erasures or alterations, items not required in the Bid or irregularities of any kind may be rejected by the Owner.

H. Each Bid will indicate the full business name and address of the Bidder and will be signed by Bidder with Bidder's usual signature.

I. A Bid submitted by a partnership will list the names of all partners and will be signed in the partnership name by one of the members of the partnership.

J. A Bid submitted by a corporation will be executed in the legal name of the corporation. If the Bid Affidavit is signed by a person other than the President or Vice President of the corporation, such person must furnish a corporate resolution showing their authority to bind the corporation. The name of each person signing the Bid will be typed or printed below the signature.

K. When requested by the Owner, a Power of Attorney or other satisfactory evidence of the authority of the officer signing in behalf of the corporation will be furnished for the Owner's records.

L. The Bid will be accompanied by a Bid Bond and Surety's Bond Affidavit executed on the forms provided or a Cashier's Check payable to the Owner, in an amount not less than 5% of the bid amount. If a Bidder withdraws its Bid within 85 calendar days (or 115 calendar days if federal funds are applicable) from the date on which Bids are opened, or if a Bidder is awarded the Contract but fails, refuses or neglects to execute and return the Contract or to furnish acceptable Insurance Documents and the required Certificates of Insurance, Payment and Performance Bonds within seven calendar days after the date of award of the Contract, then the amount of the Bond or cashier’s check will be paid to, or retained by, the Owner as liquidated damages. The Bidder agrees that the Liquidated Damages are not a penalty and 5% of the total bid amount is reasonable.

M. The Bidder will supply all information required by the Bid Form and Contract Documents.

1.10 MODIFICATIONS OR WITHDRAWAL OF BIDS

A. A Bidder may withdraw and resubmit a Bid, provided that Bidder's request for withdrawal is received by the Owner in writing before the time specified for submittal of Bids. Revised Bids must be received at the place specified in the Contract Documents before the time and date specified for submittal of Bids. Modifications will not reveal original amount of bids. Bid Bonds must reflect modifications.

B. Negligence on the part of the Bidder in the preparation of their Bid will not be grounds for modification or withdrawal of the Bid after the Bid Submittal time and date.

1.11 PUBLIC OPENING OF BIDS

A. Bids will be opened and read publicly at the time and place specified in the Contract Documents. Bidders, their authorized agents, and other interested persons are invited to attend.

B. Owner reserves the right to correct, in all Bids, obvious mathematical or transposition errors within the Bid Prices or Total Bid Price, as long as the intent of the Bidder is reasonably clear from the Bid.

C. All Bids and other materials or documents submitted by a Bidder for this Project will become property of the Owner. The Owner is subject to the public records

requirements of Florida State Statute Chapter 119, and as such, all materials submitted by the Bidder to the Owner are subject to public disclosure. The Bidder specifically waives any claims against the Owner related to the disclosure of any materials if made under a public records request.

1.12 REJECTION OF BIDS

A. Bids containing any omission, alterations of form, additions or conditions not called for, conditional or alternate bids unless called for, incomplete bids, or Bids otherwise regular which are not accompanied by a Cashier's Check or Bid Bond may be considered irregular and may be rejected.

B. The Owner reserves the right, in Owner’s judgment and sole discretion, to reject any or all Bids, to waive any formalities, technicalities or irregularities therein, to avoid or refrain from awarding a contract for Work, and to re-advertise for Bids.

C. Bids may be considered irregular for the following reasons:

1. If the Bid is on a form other than that furnished by the Owner, or if the Owner's form is altered.

2. If there are unauthorized additions, conditional or alternative pay items, or irregularities of any kind which made the Bid incomplete, indefinite or otherwise ambiguous.

3. Not Used.

4. Submitting more than one Bid from the same partnership, firm or corporation under the same or different name.

5. Evidence of collusion among Bidders. Bidders participating or previously participating in such collusion will be disqualified as Bidders for this and any future work of the Owner until any such participating Bidder has been reinstated by Owner as a qualified Bidder.

6. Evidence that Bidder has a financial interest in the firm of another Bidder for the same Work.

7. If the Bidder, employee or agent of the Bidder has a Conflict of Interest as determined by the Director of Procurement.

8. If Bidder is considered to be "non-responsible" for any reason specified in Item 1.08-RESPONSIBILITY OF BIDDERS of this Section.

D. Bids will be considered non-responsive for the following reasons:

1. If the bid is not accompanied by Section 00340-BID SCHEDULE or Section 00400-1-BID BOND.

2. Bids received that do not meet the requirements specified in Section 1.14 -

WOMAN AND MINORITY OWNED BUSINESS ENTERPRISE (W/MBE) POLICY AND PROGRAM.

3. If Bidder cannot demonstrate ability to obtain Contract required insurance specified in Section 00650 – INSURANCE REQUIREMENTS.

E. The Owner reserves the right to reject any and all Bids for any reason including but not limited to that the Bid is higher than the Owner approved budget or estimated project cost.

1.13 ESCROW OF BID DOCUMENTS

A. Each Bidder agrees that all documents relied upon in making or supporting their Bid will be retained in escrow, in a manner satisfactory to the Owner, prior to the date the Contract is awarded and preserved and maintained during the course of the Work until Final Payment is made. The Owner will have the right to inspect any and all such Bid Documents and to verify that such Bid Documents are properly escrowed prior to the time of the Award of the Contract, or at any time thereafter during the course of the Work.

1.14 WOMAN AND MINORITY OWNED BUSINESS ENTERPRISE (W/MBE) POLICY AND PROGRAM

A. Policy: It is the policy of the Owner that W/MBE as defined herein will have full and fair opportunities to compete for and participate in the performance of all non-federally funded contracts or in the purchase of goods and services procured by the Owner and the Bidder will take all necessary and reasonable steps to ensure that W/MBEs have full and fair opportunities to compete for and perform subcontracts. Bidders will demonstrate that they will subcontract with certified W/MBEs, or clearly demonstrate in a manner acceptable to the Owner its good faith efforts to obtain W/MBE subcontractors. The successful bidder's W/MBE commitment as stated on their Letter(s) of Intent will be enforceable under the terms of the Contract.

A business certified as a W/MBE by Hillsborough County, City of Tampa, State of Florida Office of Supplier Diversity (OSD) or as a DBE certified under the FLUCP program, will be eligible to participate on Owner funded contracts as a W/MBE firm pursuant to the Owner's W/MBE Policy and Program.

Bidders are encouraged to refer to the Owner's W/MBE Policy and Program which is posted on the Owner's website: www.TampaAirport.com. Links to the various websites that have directories of certified W/MBE firms are also available on the Owner's website.

B. W/MBE Obligation: Each contract the Owner executes with the Bidder and each subcontract the Bidder executes with a subcontractor, must include the following clause:

"The bidder/proposer, contractor, supplier/vendor and subcontractor will not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The bidder/proposer, contractor, supplier/vendor or subcontractor will carry out applicable requirements in the Owner's W/MBE policies and programs in the award

and administration of Owner contracts. Failure of bidder/proposer, contractor, supplier/vendor or subcontractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the Owner deems appropriate which may include, but not limited to:

(1) Withholding monthly progress payments;
(2) Assessing sanctions;
(3) Assessing liquidated damages; and/or
(4) Disqualifying the bidder/proposer, contractor, supplier/vendor or subcontractor from future bidding as non-responsible."

C. Certification of Eligible W/MBEs: To ensure the eligibility of W/MBEs proposed to participate on the Contract, all W/MBEs must be certified by the FLUCP, City of Tampa, Hillsborough County or the State of Florida Office OSD. ***W/MBEs must be certified with the appropriate agencies at the time bids are received and Letters of Certification must be included in the sealed bid envelope when submitted to the Owner.***

D. W/MBE Goals: W/MBE Goals may be established for contracts with subcontracting opportunities. The Bidder will subcontract with certified W/MBEs at least 13.3% of the dollar value of the Contract. Only certified W/MBEs will count toward the Contract Goal.

The Bidder will be required to submit a W/MBE Assurance and Participation Form and Letter of Intent for each W/MBE that Bidder proposes to participate in this Contract at the time the Bid is submitted to the Owner. If Bidder is a W/MBE, Bidder must submit a Letter of Intent for work the Bidder proposes to self-perform and count toward the Goal. Failure of the Bidder to submit the required W/MBE information in the Bid may render the Bid non-responsive. If the Bidder fails to achieve the Goal stated herein, the Bidder will be required to provide documentation demonstrating that the Bidder made "Good Faith Efforts" in attempting to do so.

E. Bidder Efforts to Meet W/MBE Subcontract Goals:

1. The Bidder will satisfy the Owner that it has made "Good Faith Efforts" to utilize W/MBEs in meeting the established Goal. "Good Faith Efforts" are those efforts that could reasonably be expected to result in W/MBE Goal attainment by a Bidder who aggressively and actively seeks to obtain W/MBE participation. Efforts that are merely "Pro Forma" are not "Good Faith Efforts" to meet W/MBE Goals. In determining whether or not the apparent successful Bidder has made such "Good Faith Efforts" to meet the Goal, some of the factors the Owner will consider are the following:

   a. Whether the Bidder advertised in newspapers of general circulation, websites, trade association, and minority-focus media concerning the subcontracting opportunities prior to bid opening;

   b. Whether the Bidder provided written notice by certified mail, facsimile or electronic mail prior to the bid submission date to a reasonable number of W/MBEs that their interest in the Contract was being solicited and giving W/MBE sufficient time to prepare a response to the request;

c. Whether the Bidder followed up initial solicitations of interest by contacting W/MBEs to determine with certainty whether the W/MBEs were interested;

d. Whether the Bidder selected portions of the Work to be performed by W/MBEs in order to increase the likelihood of meeting the W/MBE Goals including, where appropriate, breaking down contracts into economically feasible units to facilitate W/MBE participation;

e. Whether the Bidder provided interested W/MBEs with adequate information about the Drawings, Specifications or requirements of the Contract;

f. Whether the Bidder negotiated in good faith with interested W/MBEs, not rejecting W/MBEs as unqualified without sound reasons based on a thorough investigation of their capabilities;

g. Whether the Bidder made efforts to assist interested W/MBEs in obtaining bonding, lines of credit, or insurance required by the Owner or Contractor;

h. Whether the Bidder effectively used the services of available minority community organizations, minority trade or business groups, local, state and federal minority business assistance offices, and other organizations that provide assistance in the recruitment and placement of W/MBEs;

i. Whether the Scope of Work submitted by the Bidder to any W/MBE contractor, W/MBE subcontractor, W/MBE sub-subcontractor, W/MBE supplier, W/MBE sub-supplier or W/MBE sub-sub-supplier, and so on, either directly or in-directly, was intended to achieve, in whole or in part, the specified W/MBE participation;

j. Whether the replies or quotes from W/MBEs in response to Scopes of Work provided to them by contractors, either directly or indirectly, were fair and responsive;

k. Whether the Bidder fairly represented W/MBE quotations in the formulation of the Bidder's bid as shown on the Contractor's bid tabulation or other work documents supporting the Bidder's bid; and

l. Whether all other bidders met the W/MBE Goal but the apparent low bidder or most qualified bidder did not.

2. Bidders who do not meet the W/MBE Goal may satisfy the Good Faith Efforts requirement by documenting their efforts to do so. If the Owner subsequently determines that the Bidder did not satisfy the Good Faith Efforts, the Bidder is entitled, at their option, to the administrative reconsideration process as outlined in the Owner’s W/MBE policy.

3. Any Bidder who meets the W/MBE Goal will be deemed to have made the necessary "Good Faith Efforts" without the need for further proof. Failure to meet the Goal or satisfy the Good Faith Efforts requirements, may cause the Bid to be determined to be non-responsive.

4. The Owner reserves the right to require such additional and supplemental information solely for the purpose of clarifying the W/MBE information submitted by the Bidder. The determination of whether Bidder's efforts were made in "good faith" will be made by Owner.

1.15 SUSTAINABLE PROCUREMENT

When deeemed appropriate by the Bidder and not in conflict with the Contract Documents, Bidders are encouraged to reduce use of products and materials that negatively impact human health and/or the environment.

END OF SECTION

SECTION 00300 - BID FORM

TO:

HILLSBOROUGH COUNTY AVIATION AUTHORITY
OWNER
Tampa International Airport
Post Office Box 22287
Tampa, Florida 33622

FROM:

BIDDER NAME Gibson Air Conditioning and Refrigeration, LLC

STREET ADDRESS 316 Commerce Court

CITY, STATE, ZIP Winter Haven, Florida 33880

DATE 04/20/2022 PHONE (863) 679-8256

E-MAIL gibsonaircondition@aol.com
(Person to receive recommendation of award notification)

1.01 The undersigned Bidder hereby certifies the following: (1) it has accurately identified all persons required by the applicable signature block; (2) the Bid Prices are fair, in all respects, and made in good faith, without collusion or fraud; (3) no officer, employee or agent of the Owner and no spouse or child of an officer, employee, or agent of the Owner, has, or will have during the performance of the Contract, any material interest in the business of the Bidder, and (4) Bidder has no knowledge of any potential conflict of interest.

The Bidder further represents that it has carefully examined the site of the Work, the Contract Documents, the Addenda furnished prior to the opening of the Bids and existing Owner records for the Work contemplated during the Bid submittal period. By submitting a Bid, the Bidder represents to the Owner that the Bid and the Contract are inclusive of sufficient compensation for performing adequate investigations of existing site conditions, the Contract Documents, and existing records to sufficiently support the design. The Bidder further acknowledges that any information provided by the Owner was to assist the Bidder in completing adequate investigations. In addition, the Bidder represents that it has investigated and is fully informed of the conditions to be encountered, of the character, quality and quantities of Work to be performed and materials to be furnished and has included in the Bid and Contract all items necessary for the proper execution and completion of the Work in accordance with the requisite time frame, applicable laws, statutes, building codes, regulations, or as otherwise required by the Contract Documents.

The undersigned, as Bidder, does hereby declare that, having familiarized itself with the local conditions affecting the cost of the Work, Owner's policies, procedures, rules, regulations and manuals affecting the cost of the Work, Contract Documents including the Project Manual (consisting of Bidding and Contract Requirements, and the Specifications), Drawings, and other related Contract Documents prepared by the Owner and titled: LTPG Elevator Room Air Conditioning Replacement.

Airport Name:	Tampa International Airport
Authority Project No.:	6930 22
Project Title:	LTPG Elevator Room Air Conditioning Replacement
Dated:	March 11, 2022

together with all Addenda to such Contract Documents as acknowledged in the Authority's e-Procurement Portal, it proposes to furnish all materials and labor specified and perform all Work required in strict accordance with the provisions of Contract Documents noted above for the consideration of the prices quoted in Bid Pricing Form in the Authority's e-Procurement Portal, titled the same as written above, attached hereto and incorporated by reference.

1.02 The undersigned affirms that in making such Bid, neither Bidder nor any company that Bidder may represent, nor anyone on behalf of Bidder or Bidder's company, directly or indirectly, has entered into any combination, collusion, undertaking or agreement with any other Bidder or Bidders to control the prices of said Work, or any compact to prevent any other Bidder or Bidders from bidding on said Contract or Work, and further affirms that such Bid is made without regard or reference to any other Bidder or Bid and without any agreement or understanding or combination, either directly or indirectly, with any other person or persons with reference to such bidding in any way or manner whatsoever. The undersigned acknowledges that the Owner is relying on the statements made herein.

1.03 Each Bidder agrees that all documents relied upon in making or supporting their Bid will be retained in escrow prior to the date the Contract is awarded and will be preserved and maintained during the course of the Work until Final Payment is made. The Owner will have the right to inspect any and all such Bid Documents and to verify that such Bid Documents are properly escrowed, in a manner satisfactory to the Owner, prior to the time of the award of the Contract, or at any time thereafter during the course of the Work.

1.04 The undersigned, when notified of the acceptance of this Bid, does hereby agree to enter into a Contract and return such signed (executed) Contract to the Owner along with the fully executed Performance Bond and Payment Bond with good and sufficient Surety and furnish the required Certificates of Insurance and Insurance Policy endorsements, within seven days after the date of award of the Contract.

A preliminary Construction Schedule (based on major items) as required by Section 01315 - SCHEDULES, PHASING will be provided to the Owner by the undersigned within 15 days from the date of the award of the Contract, and will be in accordance with the provisions of the Contract Documents.

The undersigned further agrees that if awarded the Contract, Bidder will commence the Work within ten days after the date of Notice to Proceed and that Bidder will achieve Substantial Completion within 147 days after Notice to Proceed.

The Owner may issue a Notice to Proceed seven days after the date of award of the Contract. However, the Contractor will not use or occupy Owner's premises in connection with the Contract until all documentation required by the Contract Documents has been submitted,

accepted and executed by the Owner. Refer to Section 00500 - AWARD OF CONTRACT AND EXECUTION OF CONTRACT BONDS and Section 00650 – INSURANCE REQUIREMENTS.

Should the undersigned fail to achieve Substantial Completion within the time(s) specified in the Contract and the Contract Documents, the Owner may retain the sum specified in the Contract for each day that the Work remains incomplete beyond the time limit(s), which sum will represent not a penalty but liquidation of a reasonable portion of the damages that will be incurred by the Owner by failure of the undersigned to complete the Work within the days stipulated. The undersigned agrees that the assessment of actual damages at the time the Contract is entered into is uncertain. By bidding on the project, the undersigned signifies that it agrees that the sum specified in the Contract for the Liquidated Damages is reasonable. The undersigned agrees that the Liquidated Damages in the Contract are solely for delay and loss of use.

1.05 In submitting this Bid, it is understood that the right is reserved by the Owner to waive formalities, technicalities and irregularities and to reject all Bids. It is agreed that this Bid may not be withdrawn for a period of 85 calendar days (or 115 calendar days if federal funds are applicable) after the opening thereof.

1.06 The Bidder attaches hereto a Cashier's Check or Bid Bond payable to the Hillsborough County Aviation Authority, as required under Section 00020 – INVITATION TO BID, and the Bidder agrees that in case Bidder fails to fulfill obligations under the Bid, the Owner, may, at its option, determine that the Bidder has abandoned Bidder's rights and interest in such Bid and that the Cashier's Check or Bid Bond accompanying their Bid has been forfeited to the Owner as liquidated damages. Otherwise, the Cashier's Check or Bid Bond will be returned to the Bidder upon the execution and return of the Contract and the acceptance of the Bonds and Insurance, or upon rejection of the Bid. The Bidder agrees that the Liquidated Damages are not a penality and 5% of the total bid amount is reasonable.

1.07 The undersigned affirms that Bidder has completed, signed and included in its Bid submission all documents as required in the Minimum Qualifications section of the Authority's e-Procurement Portal.

When a determination has been made to award a Contract to a specific Bidder, such Bidder will, prior to award, furnish such other pertinent information and assurances regarding Bidder's proposed subcontractors, as the Owner, the FAA, the Secretary of Labor, FDOT, and/or the Office of Federal Contract Compliance (OFCC) may require. The Bidder will furnish similar statements executed by each of Bidder's first-tier and second-tier subcontractors whose Contracts equal $10,000 or more and will obtain similar compliance by such subcontractors before awarding such subcontracts. No subcontract will be awarded to any non-complying Subcontractor.

It is understood and agreed that all workmanship and materials under all items of work are guaranteed for one year from the date of substantial completion, unless otherwise specified within the Contract Documents.

1.09 The legal status of the undersigned is: (The Bidder will complete A. and the appropriate portion of B. or C. and strike out the other one.)

A. Federal Employer Identification (FEI) number: 20-3163192

B. Corporation: N/A

1. A corporation, duly organized and doing business under the laws of the State of _____, for whom, bearing official title of _____ _____, whose signature is affixed to this bid, is duly authorized to execute contracts.

Date of Incorporation:_____

Name and address of Florida registered agent for service of process:

_____
_____
_____

2. If Foreign Corporation (non-Florida):
Date of Certificate of Authority to transact business in Florida: _____

Name and address of Florida registered agent for service of process:

_____
_____
_____

C. Partnership: N/A

A partnership, all of the members of which, with addresses are: (Designate general partners as such).

_____ _____ _____

_____ _____ _____

_____ _____ _____

continue if required . . .

If all partners are non-residents of Florida: Designate name and address of Florida registered agent required for service of process.

Name and address of Florida registered agent for service of process:

_____
_____
_____

D. Other Entity

Sole Proprietorship (LLC)
A _____, duly organized and duly doing business under the laws of the State of

Florida, for whom, bearing the title of Owner / President, whose signature is affixed to this bid, is duly authorized to execute contracts.

Name and address of Florida registered agent for service of process:

Michael G. Windham, Jr.
316 Commerce Court
Winter Haven, Florida 33880

ALL BIDDERS MUST SIGN AND EXECUTE THE FOLLOWING:

Dated and signed at 316 Commerce Court Winter Haven, Florida 33880

on this 20th day of April, 2022.

NAME OF BIDDER ~~Gibson~~ Air Conditioning and Refrigeration, LLC

By: _____
(Signature)

TITLE Owner / President

BUSINESS ADDRESS 316 Commerce Court
Winter Haven, Florida 33880

WITNESSES:

By: _____
(Signature)

By: _____
(Signature)

END OF SECTION

SECTION 00315 – LTPG ELEVATOR AIR CONDITIONING REPLACEMENT PROJECT EXPERIENCE FORM

The Bidder must be a Mechanical Contractor or a General Contractor licensed in the State of Florida, and the Mechanical Contractor or the General Contractor's Mechanical Contractor must have completed two HVAC mechanical retrofit projects, each equal to or in excess of $200,000 in construction value, as a prime contractor since January 1, 2012. Bidder will use this SECTION 00315 – LTPG ELEVATOR AIR CONDITIONING REPLACEMENT PROJECT EXPERIENCE FORM to meet this minimum qualification.

Project No. 1

Name of Mechanical Contractor: Gibson Air Conditioning and Refrigeration, LLC

Project Name: Project ID 6930 22 LTPG Elevator Room Air Conditioning Replacement

Name of Project and Location:	Addition of a Chiller and Cooling Tower at Osceola Heritage Park
Year Project was Completed:	2018
Contract Amount:	$776,947.00
Reference Name:	Michael Renaud
Reference Phone:	(321) 281-7523
Reference Email:	michael.renaud@osceola.org
Detailed Project Description:	Purchase and Installation of a 4th Chiller and Cooling Tower. Installed Concrete, Structual Steel, Piping and Pumps.

Project No. 2

Name of Mechanical Contractor: Gibson Air Conditioning and Refrigeration, LLC

Project Name: Project ID 6930 22 LTPG Elevator Room Air Conditioning Replacement

Name of Project and Location:	Chiller Plant Upgrades at Celebration K-8 School
Year Project was Completed:	2017
Contract Amount:	$680,000.00
Reference Name:	Gammy Diaz
Reference Phone:	(321) 402-8347
Reference Email:	gammy.diaz@osceolaschools.net
Detailed Project Description:	Demolition of (3) Chillers, (2) Cooling Towers, and Underground Piping.Purchase, and Installation of (2) Cooling Towers, ODP Chiller, Underground Piping, VFD's, Pumps, Associated Work, and Specialties

Gibson Air Conditioning and Refrigeration, LLC
(Name of Bidder)

By: _____
(Signature*)

Title: Owner / President

Date: 04/20/2022

* Must be same signature on Bid Form.

SECTION 00350 - BID AFFIDAVIT

The following affidavit will be executed in order that your Bid may be considered:

STATE OF Florida

COUNTY OF Polk

Michael G. Windham, Jr., of lawful age, being first duly sworn, deposes and says: That it executed the accompanying Bid on behalf of the Contractor named herein, and that it had lawful authority so to do, and said Contractor has not directly or indirectly entered into any agreement, express or implied, with any contractor or contractors, having for its object the controlling of the price or amount of such Bid or any Bids, the limiting of the Bid of contractors, the parceling or farming out to any contractor or contractors or to other persons of any part of the Contract or any of the subject matter of the Bids, or of the profits thereof, and that it has not and will not divulge the sealed Bid to any person whomsoever, except those having a partnership or other financial interest with them in said Bid or Bids, until after the sealed Bid or Bids are opened.

Signed By: _____

Subscribed and sworn to before me this 20th day of April, 20 22.

Notary Public State of Florida
Heather Shearer
My Commission
HH 205634
Exp. 3/14/2026

My Commission Expires:

03/14/2026

By: _____
Notary Public (Signature)

[Affix Corporate Resolution if not signed by the President or Vice President of the Company]

END OF SECTION

BOND NO. n/a Bid

(NOT TO BE FILLED OUT IF A CASHIER'S CHECK IS SUBMITTED)

KNOW ALL MEN BY THESE PRESENTS: That the undersigned Gibson Air Conditioning & Refrigeration, LLC _____, as Principal, and Liberty Mutual Insurance Company _____, as **Surety**, are held and firmly bound unto the **Hillsborough County Aviation Authority** in the sum of 5% of the bid amount shown on the Bid Schedule for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THIS OBLIGATION is such that if Principal:

1. Does not withdraw the attached Bid Amount shown on the Bid Schedule for the Authority **Project No. 6930 22 entitled LTPG Elevator Room Air Conditioning Replacement at Tampa International Airport** for a period of 85 calendar days (or 115 calendar days if federal funds are applicable) after the date on which the Bids are opened; and

2. Enters into a written Contract and furnishes the required Insurance, Certificates of Insurance and Payment and Performance Bonds with surety or sureties acceptable to the **Hillsborough County Aviation Authority** within seven days after the date of award of the Contract, then this obligation will be void; Otherwise the same will be in full force and the full amount of this Bid Bond will be paid to the **Hillsborough County Aviation Authority** as stipulated herein.

Signed this 20th day of April, 2022.

CONTRACTOR MUST INDICATE WHETHER CORPORATION, PARTNERSHIP, COMPANY, (OR INDIVIDUAL). THE PERSON SIGNING FOR THE CONTRACTOR WILL SIGN HIS/HER OWN NAME AND SIGN CORPORATE TITLE. WHEN THE PERSON SIGNING FOR A CORPORATION IS OTHER THAN THE PRESIDENT OR VICE PRESIDENT, HE/SHE MUST FURNISH A CORPORATE RESOLUTION SHOWING HIS/HER AUTHORITY TO BIND THE CORPORATION

(Affix Contractor's Corporate Seal)

Gibson Air Conditioning & Refrigeration, LLC
Name of Contractor

By: _____
(Signature)

Type Name and Title Below:
Michael G. Windham, Jr.
Owner/President

Address: 316 Commerce Ct.
Winter Haven FL 33880

863-679-8256
Telephone Number Fax Number

(Affix Surety's Corporate Seal)

Liberty Mutual Insurance Company
Name of Surety

By: _____
Attorney in Fact for Surety (Signature)
and Florida Licensed Resident Agent

Type name of Attorney in Fact: Kevin Wojtowicz

Attorney in Fact Address: Nielson Wojtowicz Neu & Associates
1000 Central Ave #200, St. Petersburg FL 33705

727-209-1803 727-209-1335
Telephone Number Fax Number

By: n/a
Florida Licensed Agent (Signature)

Type name of Fla. Licensed Agent: Kevin Wojtowicz
License Number: A289006
Agent Address: _____

_____
Telephone Number Fax Number

SECTION 00400 2-SURETY BOND AFFIDAVIT

STATE OF Florida
COUNTY OF Pinellas

BEFORE ME, THE UNDERSIGNED AUTHORITY, PERSONALLY APPEARED Kevin R. Wojtowicz, WHO, BEING DULY SWORN, DEPOSES AND SAYS THAT THEY ARE A DULY AUTHORIZED FLORIDA LICENSED INSURANCE AGENT, PROPERLY LICENSED UNDER THE LAWS OF THE STATE OF Florida, TO REPRESENT Liberty Mutual Insurance Company OF Massachusetts, A COMPANY AUTHORIZED TO MAKE CORPORATE SURETY BONDS UNDER THE LAWS OF THE STATE OF Florida (THE "SURETY").

SAID Kevin Wojtowicz FURTHER CERTIFIES THAT AS AGENT FOR THE SAID Liberty Mutual Insurance Company,
THEY HAVE SIGNED THE ATTACHED BOND AS A LICENSED AGENT, IN THE SUM OF 5% OF THE BID AMOUNT SHOWN ON 00340-BID SCHEDULE, ON BEHALF OF Gibson Air Conditioning & Refrigeration, LLC,
TO THE **HILLSBOROUGH COUNTY AVIATION AUTHORITY COVERING PROJECT NO. 6930 22, LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT at TAMPA INTERNATIONAL AIRPORT, TAMPA, FLORIDA.**

SIGNED:
By: N/A
Florida Licensed Insurance Agent (Signature)

1000 Central Ave #200, St. Petersburg FL 33705
Address Of Agent

727-209-1803
Phone Number
727-209-1335
Fax Number

175 Berkley St., Boston MA 02116
Address Of Bond Company

617-357-9500
Phone Number

Identification
Fax Number

SURETY:
By: K O
Attorney-In-Fact (Signature)
and Florida Licensed Resident Agent, Kevin Wojtowicz

Acknowledgment For
Attorney-In-Fact

The foregoing instrument was acknowledged before me by means of ☑ physical presence or ☐ online notarization this 20th day of April, 2022, by Kevin Wojtowicz
(name of person)
as Attorney-In-Fact

By: C Heard
(Signature of Notary Public)

By:
(Signature of Notary Public)

Notary Public State of Florida
Eileen C. Heard
My Commission GG 257187
Expires 10/22/2022

Print, Type, or Stamp Commissioned Name of Notary

Personally Known ~~OR xxxx Produced~~

Type of Identification Produced KNOWN

END OF SECTION

Liberty Mutual SURETY

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: **8198058-964008**

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Laura D. Mosholder; Brett Rosenhaus; Tracey Boone-Brown; Emily Golecki; John R. Neu; Daniel F. Oaks; Becky Stanton; Kevin Wojtowicz

all of the city of Saint Petersburg state of FL each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 29th day of November , 2018 .

LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS
THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE
WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 29th day of November , 2018 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

TERESA PASTELLA COMMONWEALTH OF PENNSYLVANIA NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12. Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 20th day of April , 2022

LIBERTY MUTUAL INSURANCE COMPANY INCORPORATED 1912 MASSACHUSETTS
THE OHIO CASUALTY INSURANCE COMPANY INCORPORATED 1919 NEW HAMPSHIRE
WEST AMERICAN INSURANCE COMPANY INCORPORATED 1991 INDIANA

By: _____
Renee C. Llewellyn, Assistant Secretary

LMS-12873 LMIC OCIC WAIC Multi Co_062018

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

SECTION 00417 - WOMAN AND MINORITY OWNED BUSINESS ENTERPRISE (W/MBE) ASSURANCE AND PARTICIPATION

LTPG ELEVATOR AIR ROOM CONDITIONING REPLACEMENT
AUTHORITY PROJECT NO. 6930 22
TAMPA INTERNATIONAL AIRPORT

Select one of the responses below. Failure to complete this section may be grounds for rejection of the Bid.

☒ **Yes - Bidder Assures Prescribed W/MBE Goal.**

The Bidder assures that it will meet the W/MBE requirements stated in this Solicitation and the Hillsborough County Aviation Authority's W/MBE Policy and Program, and will subcontract with W/MBE firms certified as a woman-owned or minority-owned business by the City of Tampa, Hillsborough County, State of Florida Department of Management Services, Office of Supplier Diversity (OSD), or as a Disadvantaged Business Enterprise (DBE) under the Florida Unified Certification Program (FLUCP), in an amount equal to at least 13.3% of the total dollar amount of the awarded Contract. The W/MBE Goal stated above is the minimum prescribed Goal; however, additional W/MBE participation is encouraged. The Bidder is required to submit a Letter of Intent for each W/MBE that will participate in the awarded Contract at the time the Bid is submitted to the Owner. The actual W/MBE contractual commitment will be the total amount of participation shown on the validated Letter(s) of Intent submitted by the Bidder. It is understood that the amounts shown on the Letter(s) of Intent are estimates and that actual amounts paid to W/MBE subcontractors may vary depending on the final adjustments of the estimated quantities; however, the Bidder's W/MBE contractual commitment can only be modified by an amendment or change order.

OR

☐ **No - Bidder Does NOT Assure Prescribed W/MBE Goal.**

The Bidder is unable to assure W/MBE participation of the prescribed Goal of 13.3%, but will subcontract with W/MBE firms in an amount equal to at least ____% of the total dollar amount of the awarded Contract. The Bidder must submit with its Bid a completed W/MBE Good Faith Effort Worksheet documenting Bidder's good faith efforts to meet the prescribed Goal. In determining whether or not the Bidder made sufficient good faith efforts to meet the Goal, the Owner will consider the factors listed in the W/MBE Policy and Program. The Bidder is required to submit a Letter of Intent for each W/MBE that will participate in the awarded Contract at the time the Bid is submitted to the Owner. The actual W/MBE contractual commitment will be the total amount of participation shown on the validated Letter(s) of Intent submitted by the Bidder. It is understood that the amounts shown on the Letter(s) of Intent are estimates and that actual amounts paid to W/MBE subcontractors may vary depending on the final adjustments of the estimated quantities; however, the Bidder's W/MBE contractual commitment can only be modified by an amendment or change order.

By: Name of Bidder: Gibson Air Conditioning and Refrigeration, LLC Date: 04/20/2022

Bidder Representative's Name:
Michael G. Windham, Jr. Title: Owner / President

(Bidder Representative's Signature)

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT
AUTHORITY PROJECT NO. 6930 22
TAMPA INTERNATIONAL AIRPORT

Letter of Intent

NOTE: Failure to complete this statement may be grounds for rejection of the Bid.

Name of Bidder's firm: Gibson Air Conditioning and Refrigeration, LLC
Address: 316 Commerce Court
City: Winter Haven State: Florida Zip Code: 33880
Phone: (863) 679-8256 Fax number: (863) 299-9600
E-mail: gibsonaircondition@aol.com

Name of W/MBE firm: AEC Development Partners, LLC
Address: 1228 E 7th Ave Suite 200
City: Tampa State: Florida Zip Code: 33605
Phone: (813) 358-6646 Fax number:
E-mail: dperdomo@aecdevelopmentpartners.com

Description of work to be performed by W/MBE firm: Concrete

Amount of the W/MBE firm's subcontract $18,745.00

Commitment

The Bidder is committed to utilizing the above-named W/MBE firm for the work described above.

By: Name of Bidder: Gibson Air Conditioning and Refrigeration, LLC Date: 04/20/2022

Bidder Representative's Name:
Michael G. Windham, Jr. Title: Owner/President

Michael G. Windham Jr.
(Bidder Representative's Signature)

Affirmation

By: Name of W/MBE Firm: AEC Development Partners, LLC Date: 04/20/2022

W/MBE Representative's Name:
Daniel Perdomo Title: Principal

(W/MBE Representative's Signature)

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT
AUTHORITY PROJECT NO. 6930 22
TAMPA INTERNATIONAL AIRPORT

Letter of Intent

NOTE: Failure to complete this statement may be grounds for rejection of the Bid.

Name of Bidder's firm: Gibson Air Conditioning and Refrigeration, LLC
Address: 316 Commerce Court
City: Winter Haven State: Florida Zip Code: 33880
Phone: (863) 679-8256 Fax number: (863) 299-9600
E-mail: gibsonaircondition@aol.com

Name of W/MBE firm: Florida Air Care, LLC
Address: 6625 35th St. N #3
City: Pinellas Park State: Florida Zip Code: 33781
Phone: (727) 623-4605 Fax number:
E-mail: flaircare@yahoo.com

Description of work to be performed by W/MBE firm: HVAC Installation

Amount of the W/MBE firm's subcontract $46,848.00

Commitment

The Bidder is committed to utilizing the above-named W/MBE firm for the work described above.

By: Name of Bidder: Gibson Air Conditioning and Refrigeration, LLC Date: 04/20/2022

Bidder Representative's Name:
Michael G. Windham, Jr. Title: Owner/President

Michael G. Windham Jr.
(Bidder Representative's Signature)

Affirmation

By: Name of W/MBE Firm: Florida Air Care, LLC Date: 04/20/2022

W/MBE Representative's Name:
James L. Blowe, Jr. Title: Service Manager

(W/MBE Representative's Signature)

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT
AUTHORITY PROJECT NO. 6930 22
TAMPA INTERNATIONAL AIRPORT

Letter of Intent

NOTE: Failure to complete this statement may be grounds for rejection of the Bid.

Name of Bidder's firm: Gibson Air Conditioning and Refrigeration, LLC
Address: 316 Commerce Court
City: Winter Haven State: Florida Zip Code: 33880
Phone: (863) 679-8256 Fax number: (863) 299-9600
E-mail: gibsonaircondition@aol.com

Name of W/MBE firm: JDP Electric, Inc.
Address: 6600 N. Florida Ave.
City: Tampa State: Florida Zip Code: 33604
Phone: (813) 234-4004 Fax number:
E-mail: Edward@jdpelectric.com

Description of work to be performed by W/MBE firm: Electrical

Amount of the W/MBE firm's subcontract $29,870.00

Commitment

The Bidder is committed to utilizing the above-named W/MBE firm for the work described above.

By: Name of Bidder: Gibson Air Conditioning and Refrigeration, LLC Date: 04/20/2022

Bidder Representative's Name:
Michael G. Windham, Jr. Title: Owner/President

Michael G. Windham Jr.
(Bidder Representative's Signature)

Affirmation

By: Name of W/MBE Firm: JDP Electric, Inc. Date: 04/20/2022

W/MBE Representative's Name:
Ed Devine Title: Service Manager

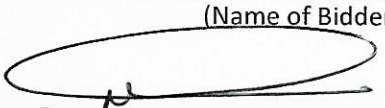
Ed DeVine
(W/MBE Representative's Signature)

SECTION 00418 - CERTIFICATE OF NON-SEGREGATED FACILITIES

CERTIFICATION TO BE SUBMITTED BY CONSTRUCTION CONTRACTORS OF APPLICANTS AND THEIR SUBCONTRACTORS (APPLICABLE TO CONSTRUCTION CONTRACTS AND RELATED SUBCONTRACTS EXCEEDING TEN THOUSAND DOLLARS (US $10,000.00) WHICH ARE NOT EXEMPT FROM THE EQUAL OPPORTUNITY CLAUSE)

The construction Contractor certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that construction Contractor does not permit its employees to perform their services at any location, under construction Contractor's control, where segregated facilities are maintained. The construction Contractor certifies that it will not maintain or provide, for its employees, segregated facilities at any of its establishments and that construction Contractor will not permit its employees to perform their services at any location, under construction Contractor's control, where segregated facilities are maintained. The construction Contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting room, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, and transportation and housing facilities provided for employees which are segregated by explicit directives or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The construction Contractor agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding ten thousand dollars (US $10,000.00) which are not exempt from the provisions of the equal opportunity clause and that construction Contractor will retain such certifications in its files.

Gibson Air Conditioning and Refrigeration, LLC
(Name of Bidder)



By: _____
(Signature*)

Title: Owner / President

Date: 04/20/2022

* Must be same signature on Bid Form.

END OF SECTION

SECTION 00420 - BIDDER'S GENERAL BUSINESS INFORMATION

(Bidders will fully respond to all items)

Each Bidder will furnish with their Bid the following completed and signed statement pertaining to the Bidder's general business information. In addition, the Owner reserves the right to conduct additional investigations into the Bidder's financial viability, work experience and available assets as the Owner may deem necessary to facilitate administration of the Contract in accordance with the Contract Documents. Each Bidder will fully cooperate with all such investigations.

FIRM: Gibson Air Conditioning and Refrigeration, LLC

ADDRESS: 316 Commerce Court
Winter Haven, Florida 33880

PHONE: (863) 679-8256

Contact in your firm for inquiries: Michael G. Windham, Jr.

Years in business under present name: 17 Years

Date of Incorporation: 07/19/2005

Place of Incorporation: Polk County, Florida

Contracting specialties: HVAC / Mechanical / General Contractors

Years performing work specialties: 17 Years

Geographic areas of business operation: Office - Polk County, Winter Haven
Work Performed - Hillsborough, Orange, Osceola, Pinellas, Polk Counties

List all Projects presently under contract:

Discovery Intermediate School Pump and Piping Replacement

(Attach additional sheet(s) if necessary)

Work performed in last two years:

*** See Attached List of Completed Projects for Completed Contracts and Descriptions.

(Attach additional sheet(s) if necessary)

Contract value of work presently under construction: $ 522,143.10

Average annual contract value of construction work last three years: $ 1,000,000.00

Total bonding capacity: $ 2,000,000.00

Value of work presently bonded: $ 522,143.10

Bonding Company: Nielson, Wojtowicz, Neu and Associates
Address: 100 Central Avenue, Suite 2000
St. Petersburg, Florida 33705

Insurance Agent: Ewing, Blackwelder and Deuce
Address: 1330 Havendale Blvd. Winter Haven, FL 33881
Phone: (863) 293-2838

What types of work are generally performed by your own forces?

HVAC/Mechanical Equipment Installation, Maintenance and Service
Project Management
Welding

(Attach additional sheet(s) if necessary)

What work will be performed by your own forces on this Project?

Project Management

(Attach additional sheet(s) if necessary)

Total employees employed by firm: 11

Engineers & Design Professionals	N/A	Estimators	1
CPM Schedulers	1	Tradesmen	6
Project Managers	1	Purchasing Agents	1
Superintendents	1	Other(Describe)	

In-House Engineering or fabrication capability: Mechanical Duct Systems
Mechanical Piping Systems
Structual Steel

Fabricating floor area (square feet): 6000 sq. ft.

Value of capital equipment owned by firm: $ 632,305.00

Bank references and addresses:

MidFlorida Credit Union
P.O. Box 8008
Lakeland, Florida 33802

Does the firm have experience with projects of a similar nature and scope within the past ten years? If yes, describe:

Project and Location	Design Professional	Contract with (Firm, Address, Person, Phone)	Amount	Date Completed
*** See Attached List of Completed Projects for Additional Contracts and Descriptions.				

(Attach additional sheet(s) if necessary)

Has the firm failed to complete a contract within the past ten years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Has the firm been debarred, suspended or prohibited from contracting or bidding with a Federal, State or local Government entity during the past ten years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Has the firm been involved in a bankruptcy or reorganization within the past ten years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Does the firm have any pending claims or suits by others against firm? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Does the firm have any pending claims or suits against others? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Has the firm filed written claims or suits against others within the past two years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Has the firm been assessed liquidated damages within the past five years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Has the firm been refused a bond within the past five years? If yes, describe:

No

(Attach additional sheet(s) if necessary)

Is the firm in compliance with all EEO requirements? Yes

List three most significant projects presently under construction:

Project and Location	Design Professional	Contract with (Firm, Address, Person, Phone)	Amount	Date Completed
Discovery Intermediate School Pump and Piping Replacement 5350 San Miguel Road Kissimmee, FL 34758	TLC Engineering Solutions	The School District of Osceola County, Florida 817 Bill Beck Blvd. Kissimmee, FL 34744 Gammy Diaz (321) 402-8347	$522,143.10	04/2022

(Attach additional sheet(s) if necessary)

Name of individual with direct managerial responsibility for this entire Project:

Michael G. Windham, Jr.

List the name, title, experience, and area of responsibility of each Project Manager and Field Supervisor, which Bidder will use on this Project:

Name	Title	Experience in this type of work (years)	Area of Responsibility
Michael G. Windham, Jr.	Owner / President	25 Years	Field Supervisor
Darrell Caulder	Project Manager	10+ Years	Project Manager

(Attach additional sheet(s) if necessary)

ENCLOSE A COPY OF LATEST FINANCIAL STATEMENT.

This form will be signed by an Officer of the firm or an individual so authorized by an Officer of the firm.

Type of firm:

Corporation: _____
Partnership: _____
Sole Proprietorship: Yes (LLC)

Name: Michael G. Windham, Jr.

Signature _____

Title: Owner / President

Date: 04/20/2022

END OF SECTION

Ron DeSantis, Governor

Halsey Beshears, Secretary

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD

THE CLASS A AIR CONDITIONING CONTRACTOR HEREIN IS CERTIFIED UNDER THE PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

WINDHAM, MICHAEL GIBSON JR

GIBSON AIR CONDITIONING & REFRIGERATION LLC
316 COMMERCE COURT
WINTER HAVEN FL 33880

LICENSE NUMBER: CAC1814712

EXPIRATION DATE: AUGUST 31, 2022

Always verify licenses online at MyFloridaLicense.com

Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.

Ron DeSantis, Governor

Julie I. Brown, Secretary

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD

THE GENERAL CONTRACTOR HEREIN IS CERTIFIED UNDER THE
PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

WINDHAM, MICHAEL GIBSON JR

GIBSON AIR CONDITIONING & REFRIGERATION LLC
316 COMMERCE COURT
WINTER HAVEN FL 33880

LICENSE NUMBER: CGC1530635

EXPIRATION DATE: AUGUST 31, 2022

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Ron DeSantis, Governor

Halsey Beshears, Secretary

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD

THE MECHANICAL CONTRACTOR HEREIN IS CERTIFIED UNDER THE
PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

WINDHAM, MICHAEL GIBSON JR

GIBSON AIR CONDITIONING & REFRIGERATION LLC
316 COMMERCE COURT
WINTER HAVEN FL 33880

LICENSE NUMBER: CMC1250395

EXPIRATION DATE: AUGUST 31, 2022

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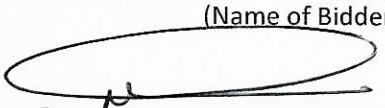
SECTION 00418 - CERTIFICATE OF NON-SEGREGATED FACILITIES

CERTIFICATION TO BE SUBMITTED BY CONSTRUCTION CONTRACTORS OF APPLICANTS AND THEIR SUBCONTRACTORS (APPLICABLE TO CONSTRUCTION CONTRACTS AND RELATED SUBCONTRACTS EXCEEDING TEN THOUSAND DOLLARS (US $10,000.00) WHICH ARE NOT EXEMPT FROM THE EQUAL OPPORTUNITY CLAUSE)

The construction Contractor certifies that it does not maintain or provide, for its employees, any segregated facilities at any of its establishments and that construction Contractor does not permit its employees to perform their services at any location, under construction Contractor's control, where segregated facilities are maintained. The construction Contractor certifies that it will not maintain or provide, for its employees, segregated facilities at any of its establishments and that construction Contractor will not permit its employees to perform their services at any location, under construction Contractor's control, where segregated facilities are maintained. The construction Contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting room, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, and transportation and housing facilities provided for employees which are segregated by explicit directives or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The construction Contractor agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding ten thousand dollars (US $10,000.00) which are not exempt from the provisions of the equal opportunity clause and that construction Contractor will retain such certifications in its files.

Gibson Air Conditioning and Refrigeration, LLC
(Name of Bidder)



By: _____
(Signature*)

Title: Owner / President

Date: 04/20/2022

* Must be same signature on Bid Form.

END OF SECTION

SECTION 00421 - SCRUTINIZED COMPANY CERTIFICATION

This certification is required pursuant to Florida Statute Section 287.135.

As of July 1, 2018, a company that, at the time of bidding or submitting a bid/response for a new contract/agreement or when entering into or renewing a contract/agreement for goods or services, is on the Scrutinized Companies that Boycott Israel List, created pursuant to Florida Statute Section 215.4725, or is engaged in a boycott of Israel, is ineligible for, and may not bid on, submit a proposal/response for, or enter into or renew a contract/agreement with an agency or local governmental entity for goods or services of any amount.

Additionally, as of July 1, 2018, a company that, at the time of bidding or submitting a bid/response for a new contract/agreement or when entering into or renewing a contract/agreement for goods or services, is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Florida Statute Section 215.473, or has been engaged in business operations in Cuba or Syria, is ineligible for, and may not bid on, submit a proposal/response for, or enter into or renew a contract/agreement with an agency or local governmental entity for goods or services of $1 million or more.

Each Bidder and any subcontractor(s) it proposes for contracts/agreements of $1 million or more, or for any amount if on the Scrutinized Companies that Boycott Israel List or if engaged in a boycott of Israel, must submit a fully executed copy of this form. If the Bidder is found to have submitted a false certification, been placed on the Scrutinized Companies that Boycott Israel List, is engaged in a boycott of Israel, or for any contract for goods or services of $1 million or more, has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or is found to have been engaged in business operations in Cuba or Syria, the Owner may terminate any resulting contract.

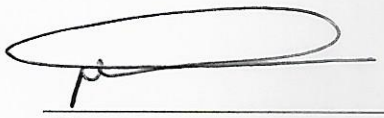
Company: Gibson Air Conditioning and Refrigeration, LLC FID or EIN No.: 20-3163192

Address: 316 Commerce Court City/State/Zip: Winter Haven, Florida 33880

I, Michael G. Windham, Jr., as a representative of Gibson Air Conditioning and Refrigeration, LLC

certify and affirm that this company, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, is not on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, and is not engaged in business operations in Cuba or Syria if the resulting contract/agreement is for goods or services of $1 million or more, and certify and affirm that this company, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, is not on the Scrutinized Companies that Boycott Israel List and is not engaged in a boycott of Israel if the resulting contract/agreement is for goods or services of any amount.

I understand and agree that the Owner may immediately terminate any contract resulting from this solicitation upon written notice if the undersigned entity (or any of those related entities as set out above) are found to have submitted a false certification or any of the following occur with respect to the company or a related entity: (i) it has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel, or (ii) for any contract for goods or services of $1 million or more, it has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or it is found to have been engaged in business operations in Cuba or Syria.



Signature

Owner / President
Title

Michael G. Windham, Jr.
Printed Name

04/20/2022
Date

END OF SECTION

SECTION 00422 - E-VERIFY CERTIFICATION

This certification is required in accordance with the State of Florida, Office of the Governor, Executive Order Number 11-116 (Verification of Employment Status) and Fla. Stat. Section 448.095.

The State of Florida, Office of the Governor, Executive Order Number 11-116 (Verification of Employment Status), and any projects with Florida Department of Transportation (FDOT) funding as part of a Joint Participation Agreement between FDOT and the Authority, require, as a condition of all contracts for the provision of goods or services, an express requirement that contractors utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the contractor during the term of the contract, and an express requirement that contractors include in subcontracts the requirement that subcontractors performing work or providing services pursuant to the contract utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term.

Company: Gibson Air Conditioning and Refrigeration, LLC FID or EIN No.: 20-3163192

Address: 316 Commerce Court City/State/Zip: Winter Haven, Florida 33880

I, Michael G. Windham, Jr., as a representative of Gibson Air Conditioning and Refrigeration, LLC certify and affirm that this company will comply with the E-Verification requirements of Executive Order Number ~~11-116 and~~ Fla. Stat. Section 448.095.

Signature

Owner / President
Title

Michael G. Windham, Jr.
Printed Name

04/20/2022
Date

[Affix Corporate Resolution if not signed by the President or Vice President of the Company]

END OF SECTION

SECTION 00423 - NON-COLLUSION CERTIFICATION

The essence of competitive bidding is that the Owner shall receive bona fide competitive Bids from all those bidding. In recognition of this principle, the undersigned certifies that this is a bona fide Bid, intended to be competitive, and that Bidder has not fixed or adjusted the amount of the Bid price by, or under, or in accordance with any agreement or arrangement with any other person or entity. The undersigned, who has Authority to make the following representation on behalf of the Bidder, also certifies that Bidder has not done and will not do at any time before the hour and date specified for the submission of the Bid any of the following acts:

(a) communicate to a person other than the person soliciting for these Bids the amount or approximate amount of the Bid price, except where the disclosure, in confidence, of the approximate amount of the Bid price is necessary to obtain insurance premium and/or bond quotations required for the preparation of the Bid;

(b) enter into any agreement or arrangement with any other person or entity that such person or entity shall refrain from bidding or as to the amount of any Bid price to be submitted;

(c) offer, pay, give or agree to pay, offer or give any sum of money or valuable consideration directly or indirectly to any person or entity for doing or having done or having caused to be done in relation to any other Bid or Bid price for the said work, act or thing of the sort described above.

In this certificate, the word "person" includes any persons or any body or association, corporate or unincorporated; and any agreement or arrangement includes any such transaction, formal or informal and whether ~~legally binding~~ or not.

Signed: _____ Witnessed By: Matthew Shearer

Name: Michael G. Windham, Jr.

Date: 04/20/2022

For and on behalf of : Gibson Air Conditioning and Refrigeration, LLC
[*Bidder's Name*]

END OF SECTION

SECTION 00430 - SUBCONTRACTORS LIST

THIS SUBCONTRACTORS LIST IS REQUIRED FOR SUBMISSION WITH BID DOCUMENTS.

This list is attached to and is made an integral part of Bid submitted by: (Bidder to insert full name and address)

Gibson Air Conditioning and Refrigeration, LLC
316 Commerce Court
Winter Haven, Florida 33880

For the construction of:

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT
AUTHORITY NO. 6930 22

TAMPA INTERNATIONAL AIRPORT
Tampa, Florida

The undersigned, hereinafter called "Bidder", lists below the names of the subcontractors who will perform the portions of the Work indicated. If Bidder, instead of a subcontractor, will perform the portions of the Work indicated, Bidder will insert its own name on the appropriate lines. All blank lines will be filled in with the name of the Bidder or a subcontractor. Subcontractor will meet the experience requirements of the appropriate specification section.

SUBCONTRACT	NAME, ADDRESS AND PHONE NUMBER OF SUBCONTRACTOR
Mechanical / HVAC	Florida Air Care, LLC (727) 623-4605 6625 35th St. N #3 Pinellas Park, FL 33781
Electrical	JDP Electric, Inc. (813) 234-4004 6600 N. Florida Ave. Tampa, Florida 33604
Concrete	AEC Development Partners, LLC (813) 358-6646 1228 E 7th Ave Suite 200 Tampa, Florida 33605

SUBCONTRACT	NAME, ADDRESS AND PHONE NUMBER OF SUBCONTRACTOR

(Insert Trades)

OTHERS

The Bidder declares that it has fully investigated each subcontractor listed, has received and has in it's files evidence that each subcontractor maintains a fully equipped organization capable, technically and financially, of performing the pertinent Work, and that Bidder has performed similar installations in a satisfactory manner. The Bidder further declares that it will not change any of these designated subcontractors for Work under this Contract without Owner's written permission.

Gibson Air Conditioning and Refrigeration, LLC
Name of Bidder

By: _____
(Signature*)

Title: Owner / President

* Must be same signature on Bid Form.

END OF SECTION

SECTION 00440 - BIDDER'S SELECTION OF PAYMENT METHOD

The Authority offers suppliers the option of receiving payments via ePayables **or** via Automated Clearing House (ACH).

A. Bidder has the option to receive payments utilizing an ePayables solution during the entire term of this Contract either by utilizing ePayables with Authority's Reverse Discount or ePayables under the Large Ticket Vendor Program. Payment will be processed by Accounts Payable using the ePayable system upon Account Payable's receipt of a Pay Application. After the payment is processed, the Pay Application will be reviewed and verified by the Authority Project Manager. Bidder retains the right to request a review of the rejected or corrected Pay Application. Any further adjustment to the Pay Application resulting from the review will be made in the next billing period. Merchant services fees will apply and are determined by Bidder's agreement with its bank or financial institution that processes credit or debit card payments on behalf of Bidder (Merchant Acquirer). The Authority is not responsible for any agreed upon terms between Bidder and Bidder's Merchant Acquirer. Bidder will receive a reverse discount of 75 basis points from Authority if Bidder does not utilize the Large Ticket Vendor program with its Merchant Acquirer. The Authority's reverse discount is whereby the Authority will give back to the Bidder .75% of the Merchant services fees to the Bidder for not utilizing the Large Ticket Vendor Program. The Authority reserves the right to suspend or discontinue the reverse discount in the event Bidder consistently overcharges Authority.

OR

B. Bidder also has the option to receive payments via Automated Clearing House (ACH). Payment will be issued within 20 days after Authority's verification and approval of a Pay Application. Authority may reject a Pay Application or correct the Pay Application when errors are found. Bidder retains the right to request a review of the rejected or corrected Pay Application. Any further adjustment to the Pay Application resulting from the review will be made in the next billing period.

Bidder may at any time during the term of this Contract elect to change its payment method to ePayables upon written notice to the Vice President of Planning and Development and the completion of Authority's ePayables application process. If the payment method is changed to ePayables, the information and process described above in Paragraph A, ePayables, will apply.

Please select one of the following electronic payment methods based on the information provided above:

1. ePayables: (Choose only one on this category)

☐ ePayables with Authority Reverse Discount.

☐ ePayables under the Large Ticket Vendor Program.

OR

2. ACH:

☒ Bidder would like to receive payments via ACH.

Please provide name and contact information for Bidder's Accounts Receivable Representative that will be responsible for invoicing the Authority during the term of this Contract.

Name: Heather Shearer

Title: Business Manager

Office Mailing Address: 316 Commerce Court

City: Winter Haven **State:** FL **Zip Code:** 33880

Phone: (863) 679-8256 **Ext:** _____ **Fax:** (863) 299-9600

Email: gibsonaircondition@aol.com

Signature

Owner / President
Title

Michael G. Windham, Jr.
Printed Name

04/20/2022
Date

END OF SECTION

SECTION 00500 - AWARD OF CONTRACT AND EXECUTION OF CONTRACT BONDS

1.01 CONSIDERATION OF BIDS

A. After the Bids are publicly opened and read, they will be compared on the basis of the Contract Lump Sum Bid Amounts contained therein.

B. Until the award of a Contract is made, the Owner reserves the right to reject a Bidder's Bid if the Bid is irregular as specified in Subsection 1.12 entitled REJECTION OF BIDS of Section 00100.

C. In addition, until the award of Contract is made, the Owner reserves the right to reject any or all Bids including but not limited to any and all Bids that are higher than the Owner approved budget or estimated project cost, 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 Bids, or proceed with the Work otherwise. All such actions will promote the Owner's best interests.

1.02 AWARD OF CONTRACT

A. The award of the Contract, if it is awarded, will be to the lowest responsible Bidder whose qualifications indicate the award will be in the best interest of the Owner and whose Bid complies with all the prescribed requirements. No award will be made until the Owner has concluded such investigations as it deems necessary to establish the responsibility, qualifications and financial ability of the Bidder to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed. The Owner reserves the right to reject the Bid of any Bidder who does not pass such investigation to the Owner's satisfaction. If the Contract is awarded, the Owner will give the successful Bidder written notice of the award within 85 calendar days (or 115 calendar days if federal funds are applicable) after the opening of the Bids. Until the final award of the Contract, the Owner reserves the right to reject any or all Bids, to waive technicalities and to advertise for new Bids, or to proceed to do the Work otherwise when the best interests of the Owner will be promoted thereby.

B. The date of the award of the Contract will be the date that the Contract is awarded by the Owner.

1.03 CANCELLATION OF AWARD

Owner reserves the right to cancel the award without liability to the Bidder, except return of Bid security, at any time before a Contract has been fully executed by all parties and is approved by the Owner in accordance with Subsection 1.07 entitled APPROVAL OF CONTRACT of this Section 00500.

1.04 RETURN OF BID SECURITY

As soon as the Bids have been compared, the Owner may, at its discretion, return the Cashier's Checks or other collateral accompanying those Bids which, in its judgment, would not be

considered in making the award. When award is made, the successful Bidder's security and that of the next low Bidder will be retained until the Contract and Bonds have been executed, after which it will be returned to the Bidders. Should the award be delayed more than 85 calendar days (or 115 calendar days if federal funds are applicable) after opening of Bids, all Bidders' security will be returned, unless such delay is from causes beyond the control of the Owner.

1.05 REQUIREMENTS OF CONTRACT BONDS

A. A good and sufficient Common Law Performance Bond and Statutory Payment Bond in the form contained herein, each in the sum of not less than 100% of the Contract Sum, with a surety company satisfactory to the Owner and licensed to conduct business in the State of Florida, will be required of the Contractor, guaranteeing that the Contract, including the various guarantee periods thereunder, will be faithfully performed and that no later than 10 calendar days from receipt of each payment the Contractor receives from the Owner, the Contractor will make payment to and release retainage to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Contractor with labor, materials, or supplies, used directly or indirectly by the Contractor in the prosecution of the Work provided for in the Contract.

B. The Bonds, along with appropriate Power of Attorney, will be executed and delivered to Owner, not later than seven days from the date of award of the Contract. Prior to commencing any Work under the Contract, the Contractor will record the Payment and Performance Bonds in the public records of Hillsborough County, Florida. If, at any time after the execution of the Contract and the Contract Bonds as required, Owner reasonably deems the surety or sureties of such Bond or Bonds to be unsatisfactory, or if, for any reasons, such Bond or Bonds cease to be adequate to cover the performance of the Work or prompt payment as above specified, Contractor will, at its own expense and within five days after written notice from the Owner to do so, furnish additional Bond or Bonds in such form and amount and with such surety or sureties as will be satisfactory to the Owner. In such event, no further payment to the Contractor will be deemed due under the Contract until such new or additional Bond or Bonds are furnished in a manner and form satisfactory to the Owner.

1.06 EXECUTION OF CONTRACT

The successful Bidder will sign (execute) the necessary agreements for entering into the Contract and return such signed Contract to the Owner, along with the fully executed Surety Bond or Bonds specified and along with required Insurance Certificates and Endorsements, within seven days after the date of award of the Contract. If the Contract is mailed, special handling is recommended.

1.07 APPROVAL OF CONTRACT

The Owner will review, accept and complete the execution of the Contract in accordance with local laws or ordinances, and will return the fully executed Contract to the Contractor. No Contract is binding upon the Owner until it has been executed by the Owner and delivered to the Contractor.

1.08 FAILURE TO EXECUTE CONTRACT

Failure of the successful Bidder to execute the Contract and furnish acceptable Insurance Certificates, and Endorsements, and Surety Bond or Bonds within seven days after the date of award of the Contract will be just cause for cancellation of the Contract and forfeiture of the Bid guaranty, not as a penalty, but as liquidation of damages to the Owner. The Bidder agrees that the Liquidated Damages are not a penalty and 5% of the total bid amount is reasonable. Award of the Contract may then be made to the next best responsive and responsible Bidder, or the Work re-advertised, or handled as the Owner may elect.

END OF SECTION

SECTION 00510 - CONTRACT

This **CONTRACT** is made and entered into this 2nd day of June, 2022, by and between Gibson Air Conditioning & Refrigeration, LLC, hereinafter designated as the **Contractor**, and the **Hillsborough County Aviation Authority**, Tampa, Florida, hereinafter referred to as the **Owner**.

WITNESSETH:

CONTRACTOR, agrees with the Owner to the following:

1. THAT THE CONTRACTOR will provide the materials and labor specified and perform, in a first class manner, all Work in connection with the **LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT, at TAMPA INTERNATIONAL AIRPORT**, in the manner and form as provided by the following Contract Documents, which are incorporated by reference and made a part hereof, as if fully contained herein:

PROJECT MANUAL entitled, **LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT** and dated **MARCH 11, 2022.**

DRAWINGS entitled **TPA LTPG ELEVATOR AC REPLACEMENT** and dated **MAY 6, 2022.**

2. THAT THE CONTRACTOR will commence the Work within ten days of the date set by the Owner in a written Notice to Proceed and will achieve Substantial Completion of all Work under this Contract within **147** days after issuance of the Notice to Proceed.

3. The Owner hereby enters into this Contract with the Contractor in the Contract Sum amount of Two Hundred Thirty Thousand Seven Hundred Fifty-Five and No One Hundredth Dollars (U. S.) ($230,755) for the Work in accordance with the Contractor's listed lump sums specified for the item(s) in the bid tabulation, acknowledged by the Contractor, and included as Attachment 1. Payments will be made for work actually performed upon presentation of the proper certificates to the Owner and upon terms set forth in the Contract Documents.

4. It is mutually agreed between the parties hereto that time is of the essence of this Contract, and in the event the Work has not achieved Substantial Completion by the completion date(s) or within the days herein specified, it is agreed that from any money due or to become due the Contractor or it's surety, the Owner may retain the sum of Five Hundred and No One Hundredth Dollars ($500) per day, for each day thereafter, Sundays and holidays included, that the Work remains incomplete, not as a penalty but as liquidation of a reasonable portion of damages that will be incurred by the Owner by failure of the Contractor to complete the Work within the time(s) stipulated. The Parties agree that assessment of actual damages at the time this Contract is made is uncertain. The parties agree that the sum of $500 per day is reasonable. The parties agree that the liquidated damages described in this paragraph are solely for delay and loss of use.

5. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Contract (including the various guarantee periods thereunder) and the Bonds hereto attached, the Owner will reasonably deem the surety or sureties of such Bond or Bonds to be unsatisfactory, or if, for any reason, such Bond or Bonds cease to be adequate to cover the performance of the work or the prompt payment for said labor, materials, supplies and services, the Contractor will, at its own expense within five days from the date of written notice from the Owner to do so, furnish additional Bond or Bonds in such form and amount, and with such surety or sureties, as will be satisfactory to the Owner. In such event, no further payment to the Contractor will be deemed due under this Contract until such

new or additional Bond or Bonds are furnished in a manner and form satisfactory to the Owner.

6. Preference to Florida State Residents: Contractor will give preference to the employment of state residents in the performance of the Work on this Project if state residents have substantially equal qualifications to those of non-residents. The term "substantially equal qualifications" means the qualifications of two or more persons among whom the Contractor cannot make a reasonable determination that the qualifications held by one person are better suited for the position than the qualifications held by the other person or persons. If required to employ state residents, Contractor must contact the Agency for Workforce Innovation to post the Contractor's employment needs in the state's job bank system.

7. A. To the maximum extent permitted by Florida law, in addition to Contractor's obligation to provide pay for and maintain insurance as set forth elsewhere in this Contract, Contractor will indemnify and hold harmless the Owner, its members, officers, agents, employees, and volunteers from any and all liabilities, suits, claims, procedures, liens, expenses, losses, costs, royalties, fines and damages (including but not limited to claims for attorney's fees and court costs) caused in whole or in part by the:

1. presence on, use or occupancy of Owner property;

2. acts, omissions, negligence (including professional negligence and malpractice), errors, recklessness, intentional wrongful conduct, activities, or operations;

3. any breach of the terms of this Contract;

4. performance, non-performance or purported performance of this Contract;

5. violation of any law, regulation, rule, order, decree, Advisory Circular or ordinance;

6. infringement of any patent, copyright, trademark, trade dress or trade secret rights; and/or

7. contamination of the soil, groundwater, surface water, storm water, air or the environment by fuel, gas, chemicals or any other substance deemed by the Environmental Protection Agency or other regulatory agency to be an environmental contaminant

by the Contractor or the Contractor's officers, employees, agents, volunteers, subcontractors, invitees, or any other person directly or indirectly employed or utilized by the Contractor, regardless of whether the liability, suit, claim, lien, expense, loss, cost, fine or damages is caused in part by the Owner, its members, officers, agents, employees or volunteers or any other indemnified party. This indemnity obligation expressly applies, and shall be construed to include, any and all claim(s) caused in part by the negligence, acts of omissions of the Owner, its members, officers, agents, employees, and volunteers.

B. In addition to the duty to indemnify and hold harmless, Contractor will have the separate and independent duty to defend the Owner, its members, officers, agents, employees, and volunteers from all suits, claims, proceedings or actions of any nature seeking damages, equitable or injunctive relief, liens, expenses, losses, costs, royalties, fines, attorney's fees or any other relief in the event the suit, claim, or action of any nature arises in whole or in part from:

1. the presence on, use or occupancy of Owner property;

2. acts, omissions, negligence (including professional negligence and malpractice), errors, recklessness, intentional wrongful conduct, activities, or operations;

3. any breach of the terms of this Contract;

4. performance, non-performance or purported performance of this Contract;

5. violation of any law, regulation, rule, order, decree, Advisory Circular or ordinance;

6. infringement of any patent, copyright, trademark, trade dress or trade secret rights; and/or

7. contamination of the soil, groundwater, surface water, storm water, air or the environment by fuel, gas, chemicals or any other substance deemed by the Environmental Protection Agency or other regulatory agency to be an environmental contaminant

by the Contractor or the Contractor's officers, employees, agents, volunteers, subcontractors, invitees, or any other person directly or indirectly employed or utilized by the Contractor regardless of whether it is caused in part by the Owner, its members, officers, agents, employees, or volunteers or any other indemnified party. This duty to defend exists immediately upon presentation of written notice of a suit, claim or action of any nature to the Contractor by a party entitled to a defense hereunder. This defense obligation expressly applies, and shall be construed to include, any and all claim(s) caused in part by the negligence, acts or omissions of the Owner, its members, officers, agents, employees, and volunteers.

C. If the above indemnity or defense provisions or any part of the above indemnity or defense provisions are limited by Fla. Stat. § 725.06(2)-(3) or Fla. Stat. § 725.08, then with respect to the part so limited, Contractor agrees to the following: To the maximum extent permitted by Florida law, Contractor will indemnify and hold harmless the Owner, its members, officers, agents, employees, and volunteers from any and all liabilities, damages, losses, and costs, including, but not limited to, reasonable attorneys' fee, to the extent caused by the negligence, recklessness, or intentional wrongful conduct of the Contractor and persons employed or utilized by the Contractor in the performance of this Contract.

D. If the above indemnity or defense provisions or any part of the above indemnity or defense provisions are limited by Florida Statute § 725.06 (1), or any other applicable law, then with respect to the part so limited, the monetary limitation on the extent of the indemnification shall be the greater of the (i) monetary value of this Contract, (ii) coverage amount of Commercial General Liability Insurance required under the Contract or (iii) $1,000,000.00. Otherwise, the obligations of this Article will not be limited by the amount of any insurance required to be obtained or maintained under this Contract.

E. In addition to the requirements stated above, to the extent required by FDOT Public Transportation Grant Agreement and to the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the State of Florida, FDOT, including the FDOT's officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness or intentional wrongful misconduct of the Contractor and persons employed or utilized by the Contractor in the performance of this Contract. This indemnification in this paragraph shall survive the termination of this Contract. Nothing contained in this paragraph is intended to nor shall it constitute a waiver of the State of Florida's and FDOT's sovereign immunity.

F. Contractor's obligations to defend and indemnify as described in this Contract will survive the

expiration or earlier termination of this Contract until it is determined by final judgment that any suit, claim or other action against the Owner, its members, officers, agents, employees, and volunteers if fully and finally barred by the applicable statute of limitations or repose.

G. Nothing in this Contract will be construed as a waiver of any immunity from or limitation of liability the Owner, or its members, officers, agents, employees, and volunteers may have under the doctrine of sovereign immunity under common law or statute.

H. The Owner and its members, officers, agents, employees, and volunteers reserve the right, at their option, to participate in the defense of any suit, without relieving Contractor of any of its obligations under this Article.

I. If Paragraphs 7A-7H or any part of Paragraphs 7A-7H is deemed to conflict in any way with any law, the Paragraph or part of the Paragraph will be considered modified by such law to remedy the conflict.

8. 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 in the public or any member thereof any rights as 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.

9. This Contract will be terminated in accordance with Florida Statute Section 287.135 if it is found that the Contractor submitted a false Scrutinized Company Certification as provided in Florida Statute Section 287.135(5) or has been placed on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the Scrutinized Companies that Boycott Israel List, is engaged in a boycott of Israel, or is engaged in business operations in Cuba or Syria. The termination will be subject to the dollar amount limitations included in the respective Florida Statute.

10. CHAPTER 119, FLA. STATUTE REQUIREMENTS

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:
(813) 870-8721, ADMCENTRALRECORDS@TAMPAAIRPORT.COM,
HILLSBOROUGH COUNTY AVIATION AUTHORITY, P.O. BOX 22287, TAMPA FL 33622.

Contractor agrees in accordance with Florida Statute Section 119.0701 to comply with public records laws including the following:

a. Keep and maintain public records required by the Owner in order to perform the Work contemplated by this Contract.

b. Upon request from the Owner's custodian of public records, provide the Owner with a copy of the requested records or allow the records to be inspected or copied within a reasonable time

at a cost that does not exceed the cost provided in Chapter 119, Fla. Stat. or as otherwise provided by law.

c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the Contract Term and following completion of the Contract.

d. Upon completion of this Contract, keep and maintain public records required by the Owner to perform the Work. Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the Owner, upon request from the Owner's custodian of public records, in a format that is compatible with the information technology systems of the Owner.

The Owner maintains its records in electronic form in accordance with the State of Florida records retention schedules. As a result, the paper original version of this document (to the extent it exists) will be scanned and stored electronically as the authoritative record copy as part of the Owner's record management process. Once that occurs, the paper original version of this document will be destroyed. Notwithstanding the foregoing, to the extent the contract documents include any bonds or other security, those bonds or other security will be maintained in their original form and not destroyed.

11. Press releases or other specialized publicity documents, including the Contractor's advertising news bulletins, which are related to this Contract and are intended by the Contractor for the press, broadcasting, or television, will be drawn up in consultation with the Owner. Except as otherwise required by law or regulation, the Contractor will not release or distribute any materials or information relating to this Contract or containing the name of the Owner or any of its employees or Board Members without prior written approval by an authorized representative of the Owner. Contractor shall require all consultants, subcontractors and suppliers of any tier to comply with this paragraph.

12. Prohibited Interest

The Contractor represents that, in connection with this Contract or any property included or planned to be included in this Contract, it has not entered into a contract or arrangement with any officer, director or employee of the Owner, or any business entity of which the officer, director or employee of the officer's, director's or employee's spouse or child is an officer, partner, director, or proprietor or in which such officer, director or employee or the officer's, director's or employee's spouse or child, or any combination of them, has a material interest.

"Material Interest" means direct or indirect ownership of more than 5 percent of the total assets or capital stock of any business entity.

The Contractor represents that, in connection with this Contract or any property included or planned to be included in this Contract, it has not entered into a contract or arrangement with any person or entity who at any time during the immediately preceding two years was an officer, director or employee of the Owner.

The provisions of this subsection shall not be applicable to any agreement between the Owner and its fiscal depositories, any agreements for utility services the rates for which are fixed or controlled by the government, or any agreement between the Owner and an agency of state government.

The following provision is made a part of this Contract and will be inserted in each of the

Contractor's subcontracts:

"No member, officer, or employee of the Hillsborough County Aviation Authority during their tenure or for two years thereafter will have any interest, direct or indirect, in this Contract or the proceeds thereof."

13. Nondiscrimination

A. Compliance with Nondiscrimination Requirements

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

2. 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 Acts and the Regulations, including employment practices when the Contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

3. 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 Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

4. 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 Owner or the Federal Aviation Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Owner or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of Contractor's noncompliance with the Nondiscrimination provisions of this Contract, the Owner will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

a. Withholding payments to the Contractor under the Contract until

the Contractor complies; and/or

b. Cancelling, terminating, or suspending the contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through five 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 Owner 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 Owner to enter into any litigation to protect the interests of the Owner. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

B. Title VI List of Pertinent Nondiscrimination Authorities During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

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

2. 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);

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

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

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

6. 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);

7. 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);

8. 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 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;

9. The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

10. 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;

11. 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, Contractor must take reasonable steps to ensure that LEP persons have meaningful access to Contractor's programs (70 Fed. Reg. at 74087 to 74100); and

12. Title IX of the Education Amendments of 1972, as amended, which prohibits Contractor from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

C. Duration: Contractor must comply with this section during the period during which Federal financial assistance is extended to Owner, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property, or interest therein, or structures or improvements thereon, in which case this provision obligates the Contractor for the longer of the following periods:

1. So long as the airport is used as an airport, or for another purpose involving the provision of similar services or benefits; or

2. So long as the Owner retains ownership or possession of the property.

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IN WITNESS WHEREOF, the parties hereto have set their hands and corporate seals by their proper officers, duly authorized to do so;

By the Contractor this _____ day of _____, 202__.

ATTEST:

GIBSON AIR CONDITIONING & REFRIGERATION, LLC

_____

By: _____

Title: _____

Print Name

_____

Print Address

_____

_____

Signed, sealed, and delivered
in the presence of:

_____
Witness

_____
Print Name

_____
Witness

_____
Print Name

Notary for Gibson Air Conditioning & Refrigeration, LLC
STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me by means of □ physical presence or □ online notarization, this ____ day of _____, 2022, by _____ as
(Name of person)
_____, for _____ .
(type of authority) (name of party on behalf of whom contract was executed)

_____
Signature of Notary

_____
Print, Type, or Stamp Commissioned Name of Notary

Personally Known OR Produced Identification
Type of Identification Produced

By the Owner this _____ day of _____, 202___.

HILLSBOROUGH COUNTY AVIATION AUTHORITY

(*Affix Corporate Seal*)

By: _____
Gary Harrod, Chairman

ATTEST:

_____
Jane Castor, Secretary

Signed, sealed, and delivered
in the presence of:

_____
Witness

_____
Print Name

_____
Witness

_____
Print Name

LEGAL FORM APPROVED AS TO FORM FOR LEGAL SUFFICIENCY:

By: _____
Michael T. Kamprath, Assistant General Counsel

Notary for Hillsborough County Aviation Authority

STATE OF FLORIDA
COUNTY OF HILLSBOROUGH

The foregoing instrument was acknowledged before me by means of □ physical presence or □ online authorization, this ____ day of _____, 2022, by Gary Harrod, in the capacity of Chairman, and by Jane Castor in the capacity of Secretary, for Hillsborough County Aviation Authority, a public body corporate under the laws of the State of Florida, on its behalf.

_____
Signature of Notary

_____
Print, Type, or Stamp Commissioned Name of Notary

Personally Known OR Produced Identification
Type of Identification Produced

END OF SECTION

ATTACHMENT 1, BID TABULATION

Authority Project No. 6930 22

LTPG Elevator Room Air Conditioning Replacement

Tampa International Airport

Tampa, Florida

Bid Item Number	Item Description and Bid Price Per Unit (In Words)				Bid Price Per Unit	Est Qnty	Unit	Total Amount Per Item
A-101-1	LTPG Elevator Room Air Condtioning Replacements							
	Two Hundred Six Thousand Seven Hundred Fifty Five	*Dollars*	Zero	*Cents*	$ 206,755.00	1	LS	$ 206,755.00
	Bid Price Per Unit In Words				*In Numbers*			

NOTE: Basis of payment will be in accordance with the technical specifications applicable to each Bid Item

Sub-total for all Bid Items not including Owner's Allowance

Two Hundred Six Thousand Seven Hundred Fifty Five	*Dollars*	Zero	*Cents*	$	206,755.00
Bid Price Per Unit In Words					

Owner's Allowance

Twenty Four Thousand	*Dollars*	Zero	*Cents*	$	24,000.00	1	Allow	$ 24,000.00
Bid Price Per Unit In Words					*In Numbers*			

Bid Tabulation Amount $ 230,755.00

W/MBE Participation Commitment	A	B
Total W/MBE Commitment Amount from Validated Letter of Intent	$95,463.00	
Total Bid Amount		$230,755.00
W/MBE Commitment Percentage (equals A/B)	41.4%	

Name of Contractor: _____

Signature of Contractor: _____

Title: _____

Date: _____

NOTE:

The W/MBE Commitment percentage is established in accordance with the Owner's W/MBE Policy as stated in Section 00100 INSTRUCTIONS TO BIDDERS and supported by the Letter(s) of Intent submitted by the Contractor with the bid. The Total W/MBE Commitment Percentage may only be modified by Change Order.

SECTION 00610
COMMON LAW PERFORMANCE BOND

Hillsborough County Official Use Only

BOND NO. _____

STATE OF _____

COUNTY OF _____

BY THIS BOND, Gibson Air Conditioning & Refrigeration, LLC, whose principal business address is 316 Commerce Court Winter Haven, FL 33880, business phone number is (863) 679-8256 as Principal, hereinafter "Contractor", and_____, whose principal business address is _____, business phone number is _____as Surety, hereinafter "Surety", are held and firmly bound to the Hillsborough County Aviation Authority, whose principal address is P.O. Box 22287, Tampa, Florida 33622, business phone number is (813) 870-8700, as Obligee, hereinafter "Owner", in the amount of Two Hundred Thirty Thousand Seven Hundred Fifty-Five and No One Hundredth Dollars (U.S.) ($230,755) for the payment of which Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, as provided herein.

WHEREAS, Contractor has by written Contract dated June 2, 2022 entered into an agreement with Owner for **AUTHORITY PROJECT NUMBER 6930 22, LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT at TAMPA INTERNATIONAL AIRPORT** to perform in accordance with the Contract, and the Contract Documents incorporated by reference in the Contract or otherwise. The Contract is incorporated by reference into this Performance Bond, hereinafter "Bond".

It is the condition of this Bond that if the Contractor performs its Contract obligations (the "Work"), then the Surety's obligations under this Bond are null and void; otherwise the Surety's obligations will remain in full force and effect.

The Contractor will perform, carry out and abide by all the terms, conditions and provisions of the Contract and complete the Work in accordance with its terms. If the Contractor fails to perform its Contract obligations, it will be the duty of the Surety to promptly assume responsibility for performance of the Contract including but not limited to completion of the Work. The Surety must and does hereby agree to indemnify the Owner and hold it harmless of, from and against any and all liability, loss, cost, damage, expense, attorney fees, including appellate proceedings, engineering and architectural fees or other professional services which the Owner may incur or which may accrue or be imposed upon the Owner by reason of any negligence, default, breach or misconduct on the part of the Contractor, Contractor's agents, servants, subcontractors or employees, in, about, or on account of the Work or performance of the Contract. Surety will be required to repay and reimburse the Owner, promptly upon demand, all sums of money including, but not limited to, attorney, architect, engineer and any other professional fees reasonably paid out or expended by the Owner on account of the failure or refusal of the Contractor to carry out, perform, or comply with any of the terms, conditions or provisions of the Contract including, but not limited to, the guarantee of the Work and materials furnished under the Contract for the time specified in the Contract.

Hillsborough County Official Use Only

The Surety hereby stipulates and agrees that any modification, omission, or addition, in or to the terms of the Contract, including the Contract Documents, will not affect the obligation of the Surety under this Bond.

Signed and sealed this _____ day of _____, 20___.

CONTRACTOR MUST INDICATE WHETHER CORPORATION, PARTNERSHIP, COMPANY, (OR INDIVIDUAL). THE PERSON SIGNING FOR THE CONTRACTOR WILL SIGN HIS/HER OWN NAME AND SIGN CORPORATE TITLE. WHEN THE PERSON SIGNING FOR A CORPORATION IS OTHER THAN THE PRESIDENT OR VICE PRESIDENT, HE/SHE MUST FURNISH A CORPORATE RESOLUTION SHOWING HIS/HER AUTHORITY TO BIND THE CORPORATION.

(Affix Contractor's Corporate Seal)

_____ By: _____

Name of Contractor (Signature)

Type Name and Title Below: Address:_____

_____ _____

Telephone Number Fax Number

(Affix Surety's Corporate Seal)

_____

Name of Surety

By: _____ By: _____

Attorney in Fact for Surety (Signature) Florida Licensed Agent (Signature)

Type name of Attorney in Fact: _____ Type name of Fla. Licensed Agent: _____

Attorney in Fact Address:_____ License Number_____

Attorney in Fact Address:_____ Agent Address:_____

_____ _____

_____ _____

Telephone Number Fax Number Telephone Number Fax Number

(ATTACH "SURETY'S BOND AFFIDAVIT" ON COPY OF FORM BOUND IN THESE SPECIFICATIONS).
(ATTACH "POWER OF ATTORNEY" FOR SURETY COMPANY REPRESENTATIVE).

Hillsborough County Aviation Authority

THE FOREGOING BOND IS HEREBY APPROVED FOR LEGAL SUFFICIENCY:

By:_____ By:_____

Michael Kamprath, Assistant General Counsel

THIS BOND MUST BE RECORDED IN THE PUBLIC RECORDS OF HILLSBOROUGH COUNTY FLORIDA PRIOR TO COMMENCING ANY WORK UNDER THE CONTRACT.

Hillsborough County Official Use Only

SECTION 00620
STATUTORY PAYMENT BOND

BOND NO. _____

STATE OF _____

COUNTY OF _____

BY THIS BOND, Gibson Air Conditioning & Refrigeration, LLC, whose principal business address is 316 Commerce Court Winter Haven, FL 33880, business phone number is (863) 679-8256 as Principal, hereinafter "Contractor", and_____, whose principal business address is _____

_____, business phone number is _____ as Surety, hereinafter "Surety", are held and firmly bound to the Hillsborough County Aviation Authority, whose principal business address is P.O. Box 22287, Tampa, Florida 33622, business phone number is (813) 870-8700, as Obligee, hereinafter "Owner", in the amount of Two Hundred Thirty Thousand Seven Hundred Fifty-Five and No One Hundredth Dollars (U.S.) ($230,755) the payment of which Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, as provided herein.

THE CONDITION OF THIS BOND is that if Contractor:

1. Performs the Contract dated June 2, 2022, between Contractor and Owner for **AUTHORITY PROJECT NUMBER 6930 22, LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT at TAMPA INTERNATIONAL AIRPORT,** the Contract being made a part of this Bond by reference, at the times and in the manner prescribed in the Contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Contractor with labor, materials, or supplies, used directly or indirectly by Contractor in the prosecution of the work provided for in the Contract; and

3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Contractor under the Contract; and

4. Performs the guarantee of all work and materials furnished under the Contract for the time specified in the Contract, then this Bond is void; otherwise it remains in full force.

Any action instituted by claimant under this Bond for payment must be in accordance with the notice and time limitation provisions in Sections 255.05(2) and (10), Florida Statutes.

Hillsborough County Official Use Only

SECTION 00620
STATUTORY PAYMENT BOND

Any changes in or under the Contract Documents and compliance or non-compliance with any formalities connected with the Contract or the changes does not affect Surety's obligation under this Bond.

Signed and sealed this _____ day of _____, 201___.

CONTRACTOR MUST INDICATE WHETHER CORPORATION, PARTNERSHIP, COMPANY, (OR INDIVIDUAL). THE PERSON SIGNING FOR THE CONTRACTOR WILL SIGN HIS/HER OWN NAME AND SIGN CORPORATE TITLE. WHEN THE PERSON SIGNING FOR A CORPORATION IS OTHER THAN THE PRESIDENT OR VICE PRESIDENT, HE/SHE MUST FURNISH A CORPORATE RESOLUTION SHOWING HIS/HER AUTHORITY TO BIND THE CORPORATION.

(Affix Contractor's Corporate Seal)

_____ By: _____
Name of Contractor (Signature)

Type Name and Title Below: Address:_____

_____ _____
Telephone Number Fax Number

(Affix Surety's Corporate Seal)

_____
Name of Surety

By: _____ By: _____
Attorney in Fact for Surety (Signature) Florida Licensed Agent (Signature)

Type name of Attorney in Fact:_____ Type name of Fla. Licensed Agent:_____
License Number:_____

Attorney in Fact Address:_____ Agent Address:_____

_____ _____

_____
Telephone Number Fax Number Telephone Number Fax Number

(ATTACH "SURETY'S BOND AFFIDAVIT" ON COPY OF FORM BOUND IN THESE SPECIFICATIONS).
(ATTACH "POWER OF ATTORNEY" FOR SURETY COMPANY REPRESENTATIVE).

Hillsborough County Aviation Authority

By:_____

THE FOREGOING BOND IS HEREBY APPROVED FOR LEGAL SUFFICIENCY:

By:_____
Michael Kamprath, Assistant General Counsel

THIS BOND MUST BE RECORDED IN THE PUBLIC RECORDS OF HILLSBOROUGH COUNTY FLORIDA PRIOR TO COMMENCING ANY WORK UNDER THE CONTRACT.

Hillsborough County Official Use Only

SECTION 00620
STATUTORY PAYMENT BOND

STATE OF _____
COUNTY OF _____

BEFORE ME, the undersigned authority, personally appeared _____, who being duly sworn, deposes and says that they are a duly authorized Florida agent, properly licensed under the laws of the State of Florida, to represent _____, a company authorized to make corporate surety bonds under the laws of the State of Florida (the "Surety").

Said _____ further certifies that as agent for the said Surety, they have countersigned the attached Bond as the Florida Licensed Agent in the sum of Two Hundred Thirty Thousand Seven Hundred Fifty-Five and No One Hundredth Dollars (U.S.) ($230,755) on behalf of _____ to the **HILLSBOROUGH COUNTY AVIATION AUTHORITY** covering **the PROJECT NUMBER 6930 22, LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENT at TAMPA INTERNATIONAL AIRPORT**.

Said _____ further certifies that the premium on the said Bonds is _____, which will be paid in full directly to them as agent and included in their regular accounts to the said Surety, and that they will receive their regular commission as agent for the execution of said Bond and that their commission will not be divided with anyone except to _____, who is a duly authorized insurance agent properly licensed under the laws of the State of Florida.

SIGNED:

By: _____
Florida Licensed Insurance Agent (Signature)

Type Name or Agent Below:

_____

Address of Agent: _____

_____

Telephone Number: _____

FAX Number: _____

Florida License Number: _____

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me by means of □ physical presence or □ online notarization, this ____ day of _____, 2022, by _____ as
(Name of person)
_____, for _____ .
(type of authority) (name of party on behalf of whom contract was executed)

_____
Signature of Notary

_____
Print, Type, or Stamp Commissioned Name of Notary

Personally Known OR Produced Identification
Type of Identification Produced

SECTION 00650 - INSURANCE REQUIREMENTS

PART 1 - GENERAL CONDITIONS

1.01 INSURANCE COVERAGE AND LIMITS

A. Contractor agrees to provide its full limits for every policy specified herein, without restriction or reduction, and to the extent required by Florida Department of Transportation Public Transportation Grant Agreement, shall require the same of all of its contractors, subcontractors, suppliers, consultants, and subconsultants at each tier. To the extent that there is any exclusion, deficiency, reduction, or gap in a policy, which makes the insurance more restrictive than the coverage required, the Contractor agrees to remain responsible and obligated to make the Owner whole as if the Contractor and all of its contractors, subcontractors, suppliers, consultants, and subconsultants at each tier fully met the insurance requirements of the contract. Every policy shall be maintained without interruption or amendment throughout the life of this Contract, including but not limited to any warranty or limitation periods, and for any period of extension described herein. In the event the Contractor becomes in default of any requirements the Owner reserves the right to take whatever actions deemed necessary to protect its interests. The Contractor shall require every policy, other than Workers' Compensation, Employer's Liability and Professional Liability, to be endorsed to include the Owner, members of the Owner's governing body, and the Owner's officers, volunteers, agents, and its employees as additional insureds. To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, Contractor shall also ensure that the Florida Department of Transportation is added as an additional insured on the Commercial General Liability policy of the Contractor. There shall be no language in any policy, endorsement, or exclusion that reduces or limits recovery to any amount less than the full policy limits. The Contractor will submit evidence that it, and to the extent required by the Florida Department of Transportation Public Grant Agreement, all subcontractors, suppliers, consultants, and subconsultants at each tier has complied with this provision to the Owner before any work or service commences under this contract. Such evidence shall describe the full policy limits along with any deductible, retentions, attachment point, and any deviation from a fully insured program.

1. Workers' Compensation/Employer's Liability:

   The Contractor shall not allow its coverage, or that of any of its contractors, subcontractors, suppliers, consultants, or subconsultants at each tier, to drop below or become encumbered below the following minimum limits of insurance:

Part One:	"Statutory"
Part Two:	
Each Accident	$1,000,000
Disease - Policy Limit	$1,000,000
Disease - Each Employee	$1,000,000

   It is the responsibility of the Contractor to ensure that all entities and person(s) working for or behalf of itself or any contractor, subcontractor, supplier, subconsultant, independent contractor, sole proprietorship, partner, “leased employee”, person obtained through a professional employer organization (“PEO’s”), operator, and any personnel obtained under an agreement, including

equipment rental agreements have Workers' Compensation Insurance in accordance with Florida's Workers' Compensation law.

2. Commercial General Liability:

The Contractor will maintain and ensure that all contractors, subcontractors, suppliers, consultants, and subconsultants at each tier has Commercial General Liability insurance providing continuous coverage for all liability resulting out of, or in connection with, any ongoing operations performed by, including the use or occupancy of Owner premises, or on behalf of the Contractor under this Contract. The insurance required under this contract shall be the full policy limits without reduction or limitation.

The limits of coverage required shall apply fully to the work or operations performed under this Contract and may not be shared with or diminished by claims unrelated to this Contract. The coverage cannot contain any deductible, retention or self-insurance without prior approval of the Owner and must clearly identify any such deductible, retention or other than a fully insured plan. Any deductible, retention, or self-insurance will be the responsibility of and paid by the First Named Insured and not by the Owner. To the extent required by the Florida Department of Transportation Public Transportation Grant Agreement, the Commercial General Liability insurance of Contractor may not contain or be subject to any self-insured retentions.

Such coverage shall be primary as to any other available insurance and shall not be more restrictive than the coverage afforded to the Named Insured. It is to be written on an "occurrence" basis on a form no more restrictive than ISO Form CG 00 01 10 01 and shall include Products/Completed Operations coverage. Additional insured coverage shall be provided on a form no more restrictive than ISO Form CG 20 10 10 01 and CG 20 37 10 01. The policy or policies shall not include a Contractual Liability Limitation (ISO CG 21 39), a Limitation of Coverage to Designated Premises or Project (CG 21 44), or any endorsement that similarly restricts or limits coverage to the Owner. The Contractor shall not allow its coverage to drop below or become encumbered below the following minimum limits of insurance:

	Contract Specific
General Aggregate	$1,000,000
Each Occurrence	$1,000,000
Personal and Advertising Injury Each Occurrence	$1,000,000
Products/Completed Operations Aggregate	$1,000,000

To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, Contractor shall ensure that all of its contractors, subcontractors, suppliers, consultants, or subconsultants at each tier procure and maintain Commercial Liability Insurance with the following minimum limits of insurance:

General Aggregate	$5,000,000

Each Occurrence	$1,000,000

Products and Completed operations coverage will be maintained for a period of three (3) years from the date of termination of this Contract.

3. Business Auto Liability:

The Contractor agrees to provide its full policy limits for commercial auto coverage, without restriction or reduction, on all owned, hired and non-owned vehicles. Coverage shall be provided on a form no more restrictive than ISO Form CA 00 01. The Contractor shall not allow its coverage to drop below or become encumbered below the following minimum limits of insurance:

Each Occurrence – Bodily Injury and Property Damage Combined	$1,000,000

4. Builders Risk Coverage:

Not Used.

5. Environmental Impairment (Pollution) Liability:

Not Used.

Utility and Railroad Protective Liability

When work performed under this Contract is on or in the vicinity of utility-owned property or facilities the utility shall also be listed as an additional insured along with the Owner and State of Florida, Department of Transportation in the manner as described herein.

If the work performed is on or in the vicinity of a railroad right-of-way, including any encroachments thereon from such work or operations, the entities and persons involved shall require, procure, and maintain Railroad Protective Liability Coverage. Such coverage shall be no more restrictive than that provided by the latest occurrence form edition of the Railroad Protective Liability Coverage (ISO Form CG 00 35) as filed for use in the State of Florida.

Contractor agrees to provide its full policy limits for any Utility or Railroad, without restriction or reduction, and shall require the same of all of its contractors, subcontractors, consultants, and subconsultants at each tier. The Contractor shall not allow its coverage or that of any of its contractors, subcontractors, consultants, or subconsultants at each tier required to have this coverage to drop below or become encumbered below $2,000,000 combined single limit for bodily injury and/or property damage for each occurrence or have an annual aggregate of less than a $6,000,000, inclusive of amounts provided by an umbrella or excess policy.

The coverage shall include the railroad and utility along with the Owner and State of Florida, Department of Transportation as additional insureds in the manner as described herein.

CONTRACTUAL INSURANCE TERMS AND CONDITIONS

This Section incorporates the Owner's Standard Procedure S250.06 and establishes the insurance terms and conditions associated with contractual insurance requirements. This Section is applicable to all Contractors with Owner contracts, and to the extent required by the Florida Department of Transportation Public Transportation Grant Agreement, includes every contractor, subcontractor, consultant, and subconsultant at each tier. Unless otherwise provided herein, any exceptions to the following conditions or changes to required coverages or coverage limits must have prior written approval from the Owner.

INSURANCE COVERAGE:

A. Procurement of Coverage:

With respect to each of the required coverages, the Contractor will, at the Contractor's expense, procure, maintain and keep in force the types and amounts of insurance conforming to the minimum requirements set forth in the applicable contract. In addition to the extent required by Florida Department of Transportation Public Transportation Grant Agreement, the Contractor shall further require that all contractors, subcontractors, suppliers, consultants, and sub-consultants at each tier satisfy and meet all the requirements of the applicable Grant Agreement, including the terms and conditions of this Standard Procedure. Coverage will be provided by insurance companies eligible to do business in the State of Florida and having an AM Best rating of A- or better and a financial size category of VII or better. Utilization of non-rated companies, companies with AM Best ratings lower than A-, or companies with a financial size category lower than VII must be submitted by the company to the Owner Director of Risk Management for approval prior to use. The Owner retains the right to approve or disapprove the use of any insurer, policy, risk pooling or self-insurance program.

B. Term of Coverage:

Except as otherwise specified in the contract, the insurance will commence on or prior to the effective date of the contract and will be maintained in force throughout the duration of the contract, including but not limited to any warranty or limitation periods and for any period of extended coverage required in the contract. If a policy is written on a claims-made form, the retroactive date must be shown and this date must be before the earlier of the date of the execution of the contract or the beginning of contract work, and the coverage must respond to all claims reported within three years following the period for which coverage is required unless a longer period of time is otherwise stated in the contract.

C. Reduction of Aggregate Limits:

Each insurance policy will be specifically endorsed to require the insurer to provide written notice to the Owner at least 30 days (or 10 days prior notice for non-payment of premium) prior to any cancellation, non-renewal or adverse change, initiated by the insurer, and applicable to any policy or coverage described in the contract or in this Standard Procedure. The endorsement will specify that such notice will be sent to:

Hillsborough County Aviation Authority
Attn.: Chief Executive Officer

Tampa International Airport
Post Office Box 22287
Tampa, Florida 33622

Additionally, to the extent required by Florida Department of Transportation Public Transportation Grant Agreement, the workers' compensation, commercial general liability and railroad protective insurance of every contractor, subcontractor, consultant, and sub-consultant at each tier shall be specifically endorsed to require the insurer to provide the Florida Department of Transportation notice within 10 days of any cancellation, notice of cancellation, lapse, renewal, or proposed change to any policy or coverage described in the contract or this Standard Procedure.

D. No waiver by approval/disapproval:

The Owner accepts no responsibility for determining whether the company or any contractor, subcontractor, consultant, or sub-consultant at each tier is in full compliance with the insurance coverage required by the contract. The Owner's approval or failure to disapprove any policy, endorsement coverage, or Certificate of Insurance does not relieve or excuse the company of any obligation to procure and maintain the insurance required in the contract or in this Standard Procedure, nor does it serve as a waiver of any rights or defenses the Owner may have.

E. Future Modifications – Changes in Circumstances:

1. Changes in Coverage and Required Limits of Insurance

The coverages and minimum limits of insurance required by the contract are based on circumstances in effect at the inception of the contract. If, in the opinion of the Owner, circumstances merit a change in such coverage or minimum limits of insurance required by the contract, the Owner may change the coverage and the minimum limits of insurance required, and the Contractor will, within 60 days of receipt of written notice of a change in the coverage and/or the minimum limits required, comply with such change and provide evidence of such compliance in the manner required by the contract. Provided, however, that no change in the coverages or minimum limits of insurance required will be made by the Owner until at least two years after inception of the contract. Subsequent changes in the coverage or minimum limits of insurance required will not be made by the Owner until at least two years after any prior change by the Owner unless extreme conditions warrant such change and are agreeable to both parties. To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, any such change or modification in coverage or limits shall also apply to the contractors, subcontractors, suppliers, consultants, and sub-consultants at each tier.

If, in the opinion of the Owner, compliance with the insurance requirements is not commercially practicable for the Contractor, contractors, subcontractors, suppliers, consultants or subconsulants at any tier, at the written request of the Contractor, the Owner may, at its sole discretion and subject to any conditions it deems appropriate, relax or temporarily suspend, in whole or in part, the insurance requirements which would otherwise apply to the Contractor, contractors, subcontractors, suppliers, consultants, and sub-consultants at any tier. Any such modification will be subject to the prior written approval of the Owner's General Counsel and Executive Vice President of Legal Affairs or designee, and subject to the conditions of such approval.

F. Proof of Insurance – Insurance Certificate:

1. Prior to Work, Use or Occupancy of Owner's Premises

The Contractor and, to the extent required by Florida Department of Transportation Public Transportation Grant Agreement, the Contractor's contractors, subcontractors, suppliers, consultants, and sub-consultants at each tier will not commence work, or use or occupy Owner's premises in connection with the contract until the required insurance is in force, preliminary evidence of insurance acceptable to the Owner has been provided to the Owner, and the Owner has granted permission to the company to commence work or use or occupy the premises in connection with the contract.

2. Proof of Insurance Coverage

As preliminary evidence of compliance with the insurance required by the contract, the Contractor will furnish the Owner with an ACORD Certificate of Liability Insurance (Certificate) reflecting the required coverage described in the contract and this Standard Procedure.

The Certificate must:

a. Be signed by an authorized representative of the insurer. Contractor will furnish the Owner with endorsements effecting coverage required by the contract. The endorsements are to be signed by a person authorized by insurer to bind the coverage on the insurer's behalf;
b. State that: "Hillsborough County Aviation Authority, members of the Authority's governing body and the Authority's officers, volunteers, agents, and its employees are additional insureds for all policies described above other than workers' compensation employer's liability and professional liability";
c. To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, state that the Florida Department of Transportation is an additional insured for commercial general liability;
d. The insurers for all policies shown on the Certificate have waived their subrogation rights against the Authority;
e. Indicate that the Certificate has been issued in connection with the contract;
f. Indicate the amount of any deductible or self-insured retention applicable to all coverages;
g. State that the deductible or self-insured retention is the responsibility of the Contractor; and
h. Identify the name and address of the Certificate holder as:

Hillsborough County Aviation Authority
Attn.: Chief Executive Officer
Tampa International Airport
Post Office Box 22287
Tampa, Florida 33622;

If requested by the Owner, the Contractor will, within 15 days after receipt of written request from the Owner, provide the Owner, or make available for review, a certified complete copy of the policies of insurance. The Contractor may redact those portions of the insurance policies that are not relevant to the coverage required by the contract. The Contractor will provide the Owner with renewal or replacement evidence of insurance, acceptable to the Owner, prior to expiration or termination of such insurance.

G. Deductibles, Self-Insurance, Alternative Risk or Insurance Programs:

1. All deductibles, as well as all self-insured retentions and any alternative risk or insurance programs (including, but not limited to, the use of captives, trusts, pooled programs, risk retention groups, or investment-linked insurance products), must be approved by the Owner's General Counsel and Executive Vice President of Legal Affairs or designee. The Contractor agrees to provide all documentation necessary for the Owner to review the deductible, self-insurance or alternative risk or insurance program.

2. The Contractor will pay on behalf of the Owner, members of the Owner's governing body, the Owner's officers, volunteers, agents and its employees and to the extent required by the Florida Department of Transportation Grant Agreement, any deductible, self-insured retention (SIR), or difference from a fully insured program which, with respect to the required insurance, is applicable to any claim by or against the Owner, or any member of the Owner's governing body, or any officer or employee of the Owner.

3. The contract by the Owner to allow the use of a deductible, self-insurance or alternative risk or insurance program will be subject to periodic review by the Director of Risk Management. If, at any time, the Owner deems that the continued use of a deductible, self-insurance, or alternative risk or insurance program by the Contractor should not be permitted, the Owner may, upon 60 days' written notice to the company, require the Contractor to replace or modify the deductible, self-insurance, or alternative risk or insurance program in a manner satisfactory to the Owner.

4. Any deductible amount, self-insurance, or alternative risk or insurance program's retention will be included and clearly described on the Certificate prior to any approval by the Owner. This is to include fully insured programs as to a zero deductible per the policy. Owner reserves the right to deny any Certificate not in compliance with this requirement.

5. To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, the commercial general liability may not be subject to a self-insured retention. Subject to approval by the Owner under sub-paragraphs 1-4 above, the commercial general liability may contain a deductible, provided that such deductible shall be paid by the named insured.

H. Contractor's Insurance Primary:

The insurance required by the contract will apply on a primary and non-contributory basis. Any insurance or self-insurance maintained by the Owner will be excess and will not contribute to the insurance provided by or on behalf of the Contractor.

To the extent required by Florida Department of Transportation Public Transportation Grant Agreement, the coverage afforded to the Florida Department of Transportation as an additional insured under the Commercial General Liability policy shall be primary coverage.

I. Incident Notification:

In accordance with the requirements of Standard Procedure S250.02, the Contractor will promptly notify the Airport Operations Center (AOC) of all incidents involving bodily injury or property damage occurring on Authority-owned property, tenant owned property or third party property.

J. Customer Claims, Issues, or Complaints:

In addition to complying with all terms outlined in Standard Procedure S250.02, all customer claims, issues, or complaints involving property damage or bodily injury related to the Contractor will be promptly handled, addressed and resolved by the Contractor.

The Contractor will track all customer claims, issues, or complaints involving property damage or bodily injury and their status on a Claims Log available for review, as needed, by Risk Management. The Claims Log should include a detailed report of the incident along with the response and/or resolution. Risk Management has the option to monitor all incidents, claims, issues or complaints where the Owner could be held liable for injury or damages.

K. Applicable Law:

With respect to any contract entered into by the Owner with a value exceeding $10,000,000, if any required policy or program is: (i) issued to a policyholder outside of Florida or (ii) contains a "choice of law" or similar provision stating that the law of any state other than Florida shall govern disputes concerning the policy, then such policy or program must be endorsed so that Florida law (including but not limited to Part II of Chapter 627 of the Florida Statutes) will govern any and all disputes concerning the policy or program in connection with claims arising out of work performed pursuant to the Contract. The Contractor will ensure that all contractors, subcontractors, suppliers, consultants, and subconsultants at each tier are contractually bound and remain in compliance with this provision.

L. Waiver of Subrogation:

The Contractor, for itself and on behalf of its insurers, to the fullest extent permitted by law without voiding the insurance required by the Contract, waives all rights against the Owner, members of the Owner's governing body and the Owner's officers, volunteers, agents and its employees, as well as the State of Florida, Department of Transportation, including the Department's officers and its employees for damages or loss to the extent covered and paid for by any insurance maintained by the Contractor. The Contractor shall require all contractors, subcontractors, suppliers, consultants and subconsultants at each tier for themselves and their insurers, to the fullest extent permitted by law without voiding the insurance required by the Contract, to waive all rights against the Owner, members of the Owner's governing body and the Owner's officers, volunteers, agents and its employees, as well as the State of Florida, Department of Transportation, including the Department's officers and its employees for damages or loss to the extent covered and paid for by any insurance maintained by the Contractor to the extent covered and paid for by any insurance maintained by the Contractor's contractors, subcontractors, suppliers, consultants and subconsultants at each tier. The Contractor shall further require that all contractors, subcontractors, suppliers, consultants, and subconsultants at each tier include the following in every contract and on each policy the following:

"Hillsborough County Aviation Authority, members of the Authority's governing body and the Authority's officers, volunteers, agents, and its employees, as well as the State of Florida, Department of Transportation, including the Department's officers and its employees are additional insureds for the coverages required by all policies as described above other than workers compensation and professional liability."

M. Contractor's Failure to Comply with Insurance Requirements:

1. Owner's Right to Procure Replacement Insurance

If, after the inception of this Contract, the Contractor or any of its contractors, subcontractors, suppliers, consultants, or subconsultants fails to fully comply with the insurance requirements of the Contract, in addition to and not in lieu of any other remedy available to the Owner provided by the Contract, the Owner may, at its sole discretion, procure and maintain on behalf of the Contractor, insurance which provides, in whole or in part, the required insurance coverage.

2. Replacement Coverage at Sole Expense of Contractor

The entire cost of any insurance procured by the Owner pursuant to this Attachment will be paid by the Contractor. At the option of the Owner, the Contractor will either directly pay the entire cost of the insurance or immediately reimburse the Owner for any costs incurred by the Owner, including all premiums, fees, taxes, and 15% for the cost of administration.

a. Contractor to Remain Fully Liable

The Contractor agrees to remain fully liable for full compliance with the insurance requirements in the Contract and shall require the same of all of its contractors, subcontractors, suppliers, consultants, and subconsultants at each tier. To the extent that there is any exclusion, deficiency, reduction, or gap in a policy which makes the insurance more restrictive than the coverage required, the Contractor agrees to remain responsible and obligated to make the Owner whole as if the Contractor and all of its contractors, subcontractors, suppliers, consultants, and subconsultants at each tier fully met the insurance requirements of the contract.

b. Owner's Right to Terminate, Modify, or Not Procure

Any insurance procured by the Owner is solely for the Owner's benefit and is not intended to replace or supplement any insurance coverage which otherwise would have been maintained by the Contractor or by any of its contractors, subcontractors, suppliers, consultants, or sub-consultants at each tier. Owner is not obligated to procure any insurance pursuant to these requirements and retains the right, at its sole discretion, to terminate or modify any such insurance which might be procured by the Owner pursuant to this Attachment.

END OF SECTION

SECTION 00700 – GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

PART 1 – GENERAL CONDITIONS

1.01 BASIC DEFINITIONS

A. THE CONTRACT DOCUMENTS

The Contract Documents consist of:

1. The Project Manual containing the Bidding Documents, Bonds, Affidavits, Compliance Forms, Statements, Insurance Requirements and Documents, the Contract between Owner and Contractor (herein referred to as the Contract), Conditions of the Contract (General Conditions), General Requirements and other Requirements, Reports, and Specifications.

2. The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, to the extent approved by Owner, showing the design, location and dimensions of the Work, and generally include plans, elevations, sections, details, models, electronic data, Building Information Modeling (BIM) schedules and diagrams.

3. All Addenda issued prior to, and all Modifications issued after, execution of the Contract.

4. A Modification is a written amendment to the Contract signed by both parties, or a Change Order, work order or written order for a minor change in the Work issued by the Owner.

B. THE CONTRACT

1. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The parties will not be bound by or be liable for any statement, representation, promise, inducement or understanding of any kind or nature not set forth herein.

2. No changes, amendments or modifications of any of the terms or conditions of the Contract will be valid unless reduced to writing and signed by both parties. The Contract may be amended or modified only by a Modification. Except as provided in Paragraph 3.18, nothing contained in the Contract Documents will be construed to create any contractual relationship (1) between the Design Professional and the Contractor, (2) between the Owner or the Design Professional and a Subcontractor or Sub-Subcontractor, (3) between the Owner and the Design Professional, or (4) between any persons or entities other than the Owner and the Contractor. The Contract will be construed in accordance with the laws of the State of Florida. In any action initiated by one party against the other, venue will lie in Hillsborough County, Florida. The Design Professional will, however, be entitled to performance and enforcement or obligations under

the Contract intended to facilitate performance of the Design Professional's duties.

a. The Contractor will not assign, transfer, convey or otherwise dispose of the Contract or its right, title or interest in it without previous consent of the Owner which consent will not be unreasonably withheld. Owner's consent to any assignment will not relieve the Contractor of any of its agreements, responsibilities, or obligations under this Contract, and the Contractor will be and remain as fully responsible and liable for the defaults, acts, and omissions of Contractor's assignees and Subcontractors arising in connection with the performance of this Contract.

b. Subject to the limitations upon assignment and transfer herein contained, this Contract will be binding upon and inure to the benefit of the parties hereto, their respective successors and assigns.

c. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

C. THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

D. THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

E. THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

F. THE PROJECT MANUAL

The Project Manual is the volume(s) usually assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.02 EXECUTION, CORRELATION AND INTENT

A. The Contract Documents must be signed in not less than duplicate by the Owner and Contractor as provided in the Contract Documents.

B. Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be

performed and correlated personal observations with requirements of the Contract Documents.

C. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one will be as binding as if required by all. Performance by the Contractor will be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

D. Organization of the Specifications into divisions, sections and Parts, and arrangement of Drawings, will not control the Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.

1. The Contractor and all Subcontractors will refer to all of the Drawings, including those showing primarily the Work of the mechanical, electrical and other specialized trades, and to all of the Sections of the Specifications, and will perform all Work reasonably inferable therefrom as being necessary to produce the indicated results.

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

F. If Work is required by the Drawings and Specifications in a manner which makes it impossible to produce first class Work, or should discrepancies appear among the Contract Documents, the Contractor will request an interpretation before proceeding with the Work. If the Contractor fails to make such a request, no excuse will thereafter be entertained for failure to carry out the Work in a satisfactory manner. Should conflict occur in or between the Drawings and Specifications, the Contractor is deemed to have estimated the more expensive way of doing the Work unless Contractor will have asked for and obtained a written decision before submission of Contractor's Bid as to which method or materials will be required.

G. All Work mentioned or indicated in the Contract Documents will be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such construction is not in the Contract. In the event of any conflict(s) among the Contract Documents, the precedence in resolving such conflict(s) will be as follows:

1. General Requirements will govern over General Conditions.

2. General Conditions will govern over Technical Specifications.

3. Technical Specifications will govern over Drawings.

4. Schedules will govern over Drawings.

5. Large-scale Drawings will govern over smaller scale Drawings.

6. Greater quantities will govern over lesser.

7. Higher quality, as adjudged by the Owner, will govern over lesser.

(The above precedence are in numerical order and they will be construed to mean the order of precedence.)

H. All indications or notations which apply to one of a number of similar situations, materials or processes will be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

I. Where codes, standards, requirements and publications of public and private bodies are referred to in the Specifications, references will be understood to be the latest edition, including all amendments thereto, in effect on the date of receiving bids, except where otherwise indicated.

J. Where no explicit quality or standards for materials or workmanship are established for Work, such Work is to be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

K. All manufactured articles, materials, and equipment will be applied, installed, connected, erected, started up, tested, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

L. The Mechanical, Electrical and Fire Protection Drawings are diagrammatic only and are not intended to show the alignment, exact physical locations or configurations of such Work. Such Work will be installed, without additional cost to the Owner, to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor will prepare coordination drawings and complete detailed layout drawings showing the exact alignment, physical location and configuration of the mechanical, electrical and fire protection installations and demonstrating to the Owner's satisfaction that the installations will comply with the preceding sentence. Coordination drawings and complete detailed layout drawings will be submitted to the for Owner's review prior to the commencement of the Work.

M. Exact locations of fixtures and outlets will be obtained from the Owner as provided in Subparagraph 3.02 E. before the Work is roughed in. Work installed without such information from the Owner will be relocated at the Contractor's expense.

N. Test boring or soil test information included with the Contract Documents or otherwise made available to the Contractor was obtained by the Owner in the design of the Project or Work. The Owner does not warrant such information to the Contractor as an accurate (an exact) indication but is an approximate indication of subsurface conditions, and no claim for extra cost or extension of time resulting from reliance by the Contractor on such information will be allowed.

O. Where the Work is to fit with existing conditions or construction not included in this Contract, the Contractor will fully and completely join the Work with such conditions or construction, unless otherwise specified.

1.03 OWNERSHIP AND USE OF DESIGN PROFESSIONAL'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

All Drawings, Specifications and other documents furnished by the Design Professional or Owner are and will remain the property of the Owner. The Drawings, Specifications and other documents prepared by the Design Professional or Owner are instruments of the Design Professional's or Owner's service through which the work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-Subcontractor or material or equipment supplier will own or claim a copyright in the Drawings, Specifications and other documents prepared by the Design Professional or Owner, and unless otherwise indicated, the Design Professional or Owner will be deemed the author of them and will retain all common law, statutory, copyright and other reserved rights. All copies of them, except the Contractor's record set, will be returned or suitably accounted for to the Design Professional or Owner, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Design Professional or Owner, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-Subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the work without the specific written consent of the Owner. The Contractor, Subcontractors, Sub-Subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Design Professional or owner appropriate to and for use in the execution of their work under the Contract Documents. All copies made under this license will bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Design Professional or Owner. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Design Professional's or Owner's copyright or other reserved rights.

1.04 CAPITALIZATION

Terms capitalized in these general conditions include those which are (1) specifically defined, (2) the titles of numbered Parts and identified references to paragraphs, subparagraphs and clauses in the document or (3) the titles of other documents published.

1.05 INTERPRETATION

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

PART 2 – OWNER

2.01 DEFINITION

The Owner is the Hillsborough County Aviation Authority (Authority) and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means Authority or the Owner's authorized representative.

2.02 INFORMATION AND SERVICES REQUIRED OF THE OWNER

A. The Owner will make available Record Documents and Drawings pertaining to the existing buildings and/or facilities relative to this Project. The Owner does not warrant the accuracy and completeness of such Record Documents and Drawings and they are not a part of the Contract Documents.

B. Information or services required of the Owner will be furnished by the Owner with reasonable promptness after receipt from the Contractor of a written request for such information or services.

C. The Contractor will be furnished free of charge, one copy of the Drawings and conformed Project Manuals. Additional sets can be made from the CD provided with the conformed set.

D. The foregoing are in addition to other duties and responsibilities of the Owner enumerated in Section 00700 –GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION.

2.03 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 11.02 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner, the Design Professional, or other authorized representatives, by written order signed personally, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work will not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.01 C.

2.04 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written Notice from the Owner to begin and prosecute correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate change order will be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Design Professional's or Owner's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor will pay the difference to the Owner.

2.05 PERSONAL LIABILITY OF PUBLIC OFFICIALS

In carrying out any of the Contract provisions or in exercising any power or authority granted to it by this Contract, there will be no liability upon the Design Professional or Owner, its 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. Contractor agrees to waive any personal claims it may have against Design Professional, its authorized representative or any officials of the Owner including its Board members, officers, employees, agents and volunteers.

PART 3 – CONTRACTOR

3.01 DEFINITION

The Contractor is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

3.02 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

A. Prior to starting the Work, and at frequent intervals during the process thereof, the Contractor will carefully study and compare the Contract Documents with each other and with the information furnished by the Owner pursuant to Paragraph 2.02 B and will at once report to the Owner, any error, inconsistency or omission the Contractor may discover. Any necessary change will be ordered as provided in Part 7, CHANGES IN THE WORK, subject to the requirements of Paragraph 1.02 and other provisions of the Contract Documents.

1. If the Contractor proceeds with the Work without such notice to the Owner, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents, the Contractor could have discovered such, the Contractor will bear all costs arising therefrom.

B. The Contractor will take field measurements and verify field conditions and will carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered will be reported to the Owner at once.

C. The Contractor will perform the work in accordance with the Contract Documents and submittals approved pursuant to Paragraph 3.12.

D. The Contractor will give the Owner timely notice of all additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the progress of the Work.

E. The Contractor will not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but will request additional Drawings or instructions from the Owner as provided in Subparagraph 3.02 D. If the Contractor proceeds with such Work without obtaining further Drawings, Specifications or instructions, the Contractor will correct Work incorrectly done at the Contractor's own expense.

3.03 SUPERVISION AND CONSTRUCTION PROCEDURES

A. The Contractor will supervise and direct the Work, using the Contractor's best skill and attention. The Contractor will be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

B. The Contractor will be responsible to the Owner for the acts and omissions of all entities or persons performing or supplying the Work under the Contract.

C. The Contractor will not be relieved of obligations for performing the Work in accordance with the Contract Documents either by activities or duties of the Owner in the administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

D. The Contractor will be responsible for inspection of portions of Work already performed under the Contract to determine that such portions are in proper condition to receive subsequent work.

E. All Work by the Contractor will be performed in a workmanlike manner, satisfactory to the Owner. The Contractor will provide adequate supervision and inspections to assure competent performance of the Work.

3.04 LABOR AND MATERIALS

A. Unless otherwise provided in the Contract Documents, the Contractor will provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The word “provide” will mean furnish and install complete, including connections, unless otherwise specified.

B. The Contractor will enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Contract. The Contractor will not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.05 WARRANTY

A. The warranty provided in this Paragraph 3.05 will be in addition to and not in limitation of any other warranty provided by the Contract Documents or otherwise prescribed by Law.

B. All defective Work or Work found not to be in compliance with the requirements of the Contract, or applicable law, building codes, rules or regulations, appearing within one year of the date of Substantial Completion of the whole Work will be promptly corrected by the Contractor at the Contractor’s own cost.

C. The Contractor warrants that the materials and equipment furnished under the Contract will be new and of recent manufacture unless otherwise specified, and that all work will be of good quality, free from faults and defects, and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

D. The Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Owner may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, report of studies by qualified experts, or other evidence which in the opinion of the Owner would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents.

1. All such data will be furnished at the Contractor’s expense. This provision will not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor’s expense.

E. In all cases in which a manufacturer’s name, trade name or other proprietary designation is used in connection with materials or articles to be furnished under this Contract, whether or not the phrase “or equal” is used after such name, the Contractor will furnish the product of the named manufacturer(s) without substitution, unless a written request for a substitution has been submitted by the Contractor and approved by the Design Professional as provided in Subparagraph 3.05 D. Refer to Section 01605 – PRODUCTS AND SUBSTITUTIONS for additional requirements.

F. If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the

Contractor will inform the Owner in writing of the nature of such deviation at the time the material is submitted for approval and will request written approval of the deviation from the requirements of the Contract Documents.

G. In requesting approval of deviations or substitutions, the Contractor will provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality or result at least equal to that otherwise attainable. If, in the opinion of the Owner, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Owner may eject such substitution or deviation without further investigation.

H. The Contract Documents are intended to produce a structure of consistent character and quality of design. All components of the structure including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance and function of the Project. The Design Professional or Owner will judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Design Professional or Owner will not approve as equal to the materials specified, proposed substitutes which, in the Design Professional's or Owner's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes, the Contractor will, if required by the Design Professional or Owner, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

I. Any additional cost, or any loss or damage arising from the substitution of any material or any method from those originally specified, will be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Design Professional, unless such substitution was made at the written request or direction of the Owner or the Design Professional.

J. The Contractor will procure and deliver to the Owner, prior to Final Payment, all special warranties required by the Contract Documents. Delivery by the Contractor will constitute the Contractor's guarantee to the Owner that the warranty will be performed in accordance with its terms and conditions. Refer to Sections 01700 – PROJECT CLOSEOUT and 01740 – WARRANTIES for additional requirements.

K. The warranties set out herein are not in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose. The warranties set out herein are not in lieu of any other contractual, legal or equitable remedies available to the Owner. If the Contractor fails to correct any defective Work or Work found not to be in compliance with the requirements of the Contract Documents, or applicable laws, building codes, rules or regulations, within a reasonable time after receipt of written notice from the Owner, the Owner may correct it in accordance with Owner's right to carry out the Work. If such case occurs prior to final payment, an appropriate Change Order shall be issued deducting the cost of correcting such deficiencies from payments then or thereafter due to the Contractor. If payments then or thereafter due Contractor are not sufficient, the Contractor shall pay the difference to the Owner. All claims, costs, losses, and damages arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work by others) will be paid by Contractor.

L. If the Contractor's correction or removal of defective Work causes damage to or destroys other completed or partially completed construction, the Contractor shall be responsible for the cost of correcting the destroyed or damaged construction.

M. Nothing contained in Article 3.05 shall be construed to establish a period of limitations with respect to other obligations the Contractor has under this Contract. Establishment of the one-year period for correction of Work as described in this Article relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than to specifically correct the Work.

N. If after the one year correction period, but before the applicable limitations period, the Owner discovers any defective Work or Work found not to be in compliance with the requirements of the Contract Documents, or applicable laws, building codes, rules or regulations, the Owner shall, unless the defective Work or Work found not to be in compliance with the requirements of the Contract Documents, or applicable laws, building codes, rules or regulations requires emergency correction, notify the Contractor. If the Contractor elects to correct the Work, it shall provide written notice of such intent within fourteen (14) days of its receipt of notice from the Owner. The Contractor shall complete the correction of Work within a mutually agreed time frame. If the Contractor does not elect to correct the Work, the Owner may correct the Work by itself or others and charge the Contractor for the reasonable costs of the correction. Owner shall provide Contractor an accounting of such correction costs incurred.

O. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of the Work that is not in accordance with the Contract Documents or release the Contractor's obligation to perform the Work in accordance with the Contract Documents: (1) observations by the Owner or the Owner's agents; (2) recommendations for payment made to the Owner or payment by the Owner (whether progress or final); (3) issuance of Certificates of Substantial or Final Completion; (4) use or occupancy of the Work or any part thereof by the Owner; (5) any review and approval of a Shop Drawing or sample submittal; (6) any inspection, test or approval by others; or (7) any correction of defective Work by the Owner.

3.06 TAXES

A. The Contractor will pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when Bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

B. Pursuant to Sales and Use Tax Law, Chapter 212, Florida Statutes, the Hillsborough County Aviation Authority is exempt from the payment of sales tax. The Hillsborough County Aviation Authority Certificate Number is 85-8013883484C-4. Unless otherwise indicated in the Contract Documents, all goods and services performed by Subcontractor (Sub-Subcontractors) or by suppliers are not exempt from State Sales Tax. All work performed by subcontractors for the Contractor and all supplies provided to the Subcontractor or Contractor are not exempt from State Sales Tax. All questions

regarding the State of Florida Sales and Use Tax Law should be referred to the State of Florida Department of Revenue, Tallahassee, Florida.

3.07 PERMITS, FEES AND NOTICES

A. The Contractor will secure and pay for all necessary and required permits and licenses including, but not limited to, batch plant permit(s), building permit(s), and all other permits, as well as all other fees, charges, taxes, licenses and inspections necessary for proper execution of the Contract and which are legally required when Bids are received. The Contractor will secure and pay for all Certificates of Inspection and of Occupancy that may be required by authorities having jurisdiction over Work. No extension of time for completion will be granted. All appropriate sites, building and electrical permits, etc. shall be obtained and paid for by the Contractor. In addition, jurisdiction over this Work, and all required Certificates of Inspection and Occupancy, will be obtained from the appropriate jurisdiction as listed below:

Tampa International Airport (TPA)	Hillsborough County Board of County Commissioners (BOCC) and/or City of Tampa
Peter O. Knight Airport (POK)	City of Tampa
Plant City Airport (PCA)	City of Plant City
Tampa Executive Airport (TEA)	BOCC

B. The Contractor will comply fully with all applicable federal, state, county, municipal and other governmental laws, executive orders, wage, hour and labor, equal employment opportunity, disadvantaged business enterprises, pollution control and environmental regulations, applicable national and local codes, Florida Department of Transportation (FDOT) Policies, Guidelines, Standards, Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Commonly referred to as the “Florida Green Book”), Manual on Uniform Traffic Control Devices and requirements, FAA Advisory Circulars, and Owner’s Rules and Regulations. Any projects with FDOT funding require the Contractor to comply with all applicable provisions of the FDOT Public Transportation Grant Agreement. The Contractor will obtain all necessary permits, pay all required charges, fees and taxes and otherwise perform these services in a legal manner. In the event that any construction occurs on FDOT right of way, the Contractor shall comply with all FDOT requirements contained in Exhibit C of the FDOT Public Transportation Grant Agreement. The Contractor will obtain all necessary permits, pay all required fees and taxes, and otherwise perform these services in a legal manner. The Contractor will give all notices necessary and incidental to the due and lawful prosecution of the Work so as not to delay the completion of the Work.

C. If the Contractor observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, and rules and regulations, the Contractor will promptly notify the Owner in writing, and necessary changes will be accomplished by appropriate Modification.

D. If the Contractor performs Work that it knew or should have known to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Owner and Design Professional, the Contractor will assume full responsibility for such Work and will bear the attributable costs.

E. The Contractor will 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. To the maximum extent permitted by law, the Contractor will at all times observe and comply with all such laws, ordinances, regulations, orders and decrees.

3.08 ALLOWANCES

A. The Contractor will include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances will be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor will not be required to employ persons or entities against which the Contractor makes reasonable objection.

B. Unless otherwise provided in the Contract Documents:

1. Allowances will cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

2. Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts will be included in the allowances;

3. Whenever costs are more than or less than allowances, the Contract Sum will be adjusted accordingly by Change Order. The amount of the Change Order will reflect (1) the difference between actual costs and the allowances under Subparagraph 3.08 B.1. and (2) changes in Contractor's costs under Subparagraph 3.08 B.2.

3.09 CONTRACTOR'S MANAGEMENT TEAM

A. The Contractor will employ a competent, full-time Project Management Team (Team) reasonably acceptable to the Owner and the Design Professional, consisting of at least one Field Supervisor and necessary representatives who will be in attendance at the Project site full time during the progress of the Work until the date of Substantial Completion of the whole Work, or for such additional time thereafter as the Owner may determine to be necessary for the expeditious completion of the Work.

1. The names and qualifications of this Team for this Work will be submitted as part of Section 00420 – BIDDER'S GENERAL BUSINESS INFORMATION. They will have a minimum of five years of experience on similar projects of equal difficulty.

2. The Owner will not recognize any subcontractor on the Work. The Contractor will 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 Owner or the Design Professional.

3. The Team will each have full authority to act on the Contractor's behalf. It is agreed and understood that, if requested in writing by the Owner or the Design Professional, the Contractor will replace any member of the Team with another individual meeting the required qualifications within three days of the receipt of the request if the Team member is found to be unsatisfactory to the Owner or

the Design Professional for whatever reason. The Team will represent the Contractor and communications given to the Team will be as binding as if given to the Contractor. Important communications will be similarly confirmed on written request for each case. Should the Owner or the Design Professional find any person(s) employed on the Project to be incompetent, unfit, or otherwise objectionable for its duties, the Contractor will immediately cause the employee to be dismissed and said employee will not be re-employed on this Project without written consent of the Owner or the Design Professional.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

A. The Contractor will submit preliminary and CPM (or bar chart) construction schedules in accordance with requirements under Section 01315 – SCHEDULES, PHASING. The schedule will not exceed time limits current under the Contract Documents. The schedule will be revised at appropriate intervals as required by the conditions of the Work and Project, will be related to the entire Project to the extent required by the Contract Documents, and will provide for expeditious and practicable execution of the Work.

B. The Contractor will prepare and keep current, for the Design Professional's and Owner's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Design Professional and Owner reasonable time to review submittals.

C. The Contractor's performance will conform to the most recent schedules.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor will maintain at the site for the Owner one as-built set of the Drawings, Specifications, addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, as well as approved Shop Drawings, Product Data, Samples and similar required submittals. These will be available to the Owner and Design Professional and will be delivered to the Design Professional for submittal to the Owner upon completion of the work. As-Built drawings will be reviewed monthly as part of the pay application process.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Shop Drawings are drawings, diagrams, schedules, models and other data (including electronic data) specifically prepared for the work by the Contractor or a Subcontractor, Sub-Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

D. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

Review by the Design Professional or Owner is subject to the limitations of Subparagraph 4.02 G.

E. The Contractor will review, approve and submit to the Design Professional Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

F. The Contractor will perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Design Professional. Such work will be in accordance with approved submittals.

G. By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor thereby represents that the Contractor has determined and verified all dimensions, qualities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals, the Owner will be entitled to rely upon the Contractor's representation that such information is correct and accurate.

H. The Contractor will not be relieved of responsibility for deviations from requirements of the Contract Documents by the Owner's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Owner in writing of such deviation at the time of submittal and the Owner has given written approval to the specific deviation. The Contractor will not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Owner's approval thereof.

I. The Contractor will direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Design Professional or Owner on previous submittals. Unless such written notice has been given, the Design Professional's or Owner's approval of a resubmitted Shop Drawing, Product Data, Sample, or similar submittal will not constitute approval of any changes not requested on the prior submittal.

J. Informational submittals upon which the Owner is not expected to take responsive action may be so identified in the Contract Documents.

K. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Design Professional or Owner will be entitled to rely upon such certifications, and the Design Professional or Owner will not be required to make any independent examination with respect thereto.

L. The Contractor will keep one clean copy of each submittal brochure and each Shop Drawing, bearing the Design Professional's or Owner's review stamp, at the Job Site.

M. The Design Professional's or Owner's review is only for conformance with the design concept of the Project and compliance with the information given in the Contract

Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the Job Site, for information processes or techniques of construction, and for coordination of the Work of all trades.

N. Burden-of-proof that products, materials, Shop Drawings, samples and submittals comply with the Contract Documents in every respect and that any substitutions, variations, deviations or modifications do exactly what is specified and will, in fact, work well in coordination and harmony and will serve the intended purpose will rest entirely with the Contractor. It will not be the Design Professional's or Owner's responsibility to have the burden-of-proof to prove the contrary.

O. Submittals, requisitions, requests for interpretation, Shop Drawings and other items received by the Design Professional or Owner on Friday, Saturday, Sunday, on any normally recognized holiday, or on a day preceding such a holiday, will be considered received on the first working day (except Friday) which follows.

P. Owner's date stamp of receipt will evidence date of receipt, modified per Paragraph 3.12 O. above. Date indicated on Owner's transmittal letter or transmittal form will be considered as date returned to Contractor.

Q. Refer to Section 01340 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for additional requirements.

3.13 USE OF SITE

A. The right of possession of the premises and the improvements made thereon by the Contractor will remain at all times with the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents.

1. The Contractor will confine the Contractor's apparatus, the storage of materials and the operations of the Contractor's personnel to limits indicated by law, ordinances, the Contract Documents and permits and/or directions of the Design Professional and will not unreasonably encumber the premises with the Contractor's materials. The Owner will not be liable to the Contractor, the Subcontractors, their employees or anyone else with respect to the conditions of the premises.

2. Material will be arranged and maintained in an orderly manner with use of walks, drives, roads and entrances unencumbered. Store, place and handle material and equipment delivered to the Project Site so as to preclude inclusion of foreign substances or causing of discoloration. Pile neatly and compactly and barricade to protect public from injury. Protect material as required to prevent damage from weather or ground. Should it be necessary to move material at any time, or move sheds or storage platforms, the Contractor will move them as and when required at no additional cost to the Owner.

3. The Owner assumes no responsibility for materials stored in buildings or on the Project site. The Contractor will assume full responsibility for damage due to storing of materials. Repairing of areas used for placing of sheds, offices and storage of materials will be performed by the Contractor.

3.14 CUTTING AND PATCHING

A. The Contractor will be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

B. The Contractor will not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor will not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent will not be unreasonably withheld. The Contractor will not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

C. Refer to Section 01045 – CUTTING AND PATCHING for additional requirements.

3.15 CLEAN UP

A. The Contractor will keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor will remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

B. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof will be charged to the Contractor.

C. Daily Clean-Up: The Contractor will keep the premises free from accumulation of waste materials or rubbish caused by Contractor's operations on a daily basis. In areas used by the public or exposed to public view, the Contractor will keep these areas in such a state of cleanliness so as not to reflect unfavorably upon the "image" of the Owner or any airport authority concerned. In areas near airport operations, the Contractor will keep areas free from materials which could possibly be ingested into an aircraft engine or which could cause damage by being blown by aircraft engine blast effects.

D. Refer to Sections 01110 – AIRPORT PROJECT PROCEDURES and 01700 – PROJECT CLOSEOUT for additional requirements.

3.16 ACCESS TO WORK

The Contractor will provide the Owner and Design Professional access to the Work in preparation and progress wherever located.

3.17 ROYALTIES AND PATENTS

The Contractor will pay all royalties and license fees. The Contractor will defend suits or claims for infringement of patent rights and will hold the Owner and Design Professional harmless from loss on account thereof, but will not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent; the Contractor will be responsible for such loss unless such information is promptly furnished to the Owner.

3.19 RECORDS AND DOCUMENTS

The Contractor will maintain all records and documents relating to the Contract during the course of the Work and for a period of seven years after the date of Final Acceptance. This includes all books and other evidence (including but not limited to subcontracts, subcontract change orders, purchase orders, bid tabulations, proposals, and other documents associated with the Contract) bearing on the Contractor's costs and expenses under this Contract. The Contractor will make these records and documents available for inspection by the Owner at the Contractor's office at all reasonable times, without direct charge, and will provide electronic copies of all requested documents including but not limited to subcontracts, subcontractor change orders, purchase orders, bid tabulations, proposals, and all other documents associated with the project at no cost to the Owner If approved by the Owner, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents. If the Contractor fails to make the records and documents available, the Owner may, after written notice to the Contractor, take such action as may be necessary including the withholding of any further payment. Furthermore, failure to make such records and documents available may be grounds for termination pursuant to Paragraph 13.01 or grounds for Owner to seek damages from Contractor.

PART 4 – ADMINISTRATION OF THE CONTRACT

4.01 Design Professional

A. The Design Professional is referred to throughout the Contract Documents as if singular.

1. Wherever the term "Design Professional" appears in the Contract Documents, it will mean the Design Professional on record for the project or Owner's other authorized representative(s).

2. Wherever the term "Owner's authorized representative(s)" appears in the Contract Documents, it will include Owner, or Owner's other authorized representative(s).

B. In case of termination of employment of the Design Professional, the Owner will appoint a Design Professional against whom the Contractor makes no reasonable objection and whose status under the Contract Documents will be that of the former Design Professional.

4.02 DESIGN PROFESSIONAL'S ADMINISTRATION OF THE CONTRACT

A. The Design Professional will provide administration of the Contract as described in the Contract Documents, and will be the Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the correction period described in Paragraph 11.02. The Design Professional will advise and consult with the Owner. The Design Professional will have authority to act on behalf of the Owner.

B. The Design Professional will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. However, the Design Professional will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work. On the basis of on-site observations, the Design Professional will keep the Owner

informed of the progress of the Work and will endeavor to guard the Owner against defects and deficiencies in the Work.

C. The Design Professional will not have control over or charge of, and will not be responsible for, construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.03. The Design Professional will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Design Professional will not have control over or charge of, and will not be responsible for, acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

D. Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor will endeavor to communicate through the Design Professional. Communications by and with the Design Professional's consultants will be through the Design Professional. Communications by and with subcontractors and material suppliers will be through the Contractor. Communications by and with separate contractors will be through the Owner.

E. Based on the Design Professional's observations and evaluations of the Contractor's Applications for Payment, the Design Professional will review and certify the amounts due the Contractor and will approve or disapprove the Application for Payment.

F. The Owner and Design Professional will have authority to reject Work which does not conform to the Contract Documents. Whenever the Owner or Design Professional considers it necessary or advisable for implementation of the intent of the Contract Documents, the Owner or Design Professional will have authority to require additional inspection or testing of the Work in accordance with Subparagraphs 12.05 B. and 12.05 C., whether or not such work is fabricated, installed or completed. However, neither this authority of the Owner or Design Professional nor a decision made in good faith either to exercise or not to exercise such authority will give rise to a duty or responsibility of the Owner or Design Professional to the Contractor, subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

G. The Design Professional will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and only to the extent which the Owner or Design Professional believes desirable to protect the Owner's interests. The Design Professional's action will be taken with reasonable promptness, while allowing sufficient time in the Design Professional's professional judgment to permit adequate review, taking into account the time periods set forth in the latest recognized Construction Schedule prepared by the Contractor and reviewed by the Design Professional. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Design Professional's review of the Contractor's submittals will not relieve the Contractor of the obligations under Paragraphs 3.03, 3.05 and 3.12. The

Design Professional's review will not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures. The Design Professional's approval of a specific item will not indicate approval of an assembly of which the item is a component.

H. The Design Professional or Owner will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.04.

I. The Design Professional will conduct inspections in conjunction with the Owner to determine the date or dates of Substantial Completion and the date of Final Acceptance, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract and assembled by the Contractor, and will review and certify a final Application for Payment upon compliance with the requirements of the Contract Documents.

J. The Design Professional, in conjunction with the Owner, will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of the Contractor. The Design Professional's response to such requests will be made with reasonable promptness and within time limits agreed upon. The Design Professional may, as the Design Professional judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work. Such drawings or instructions may be affected by other supplemental instruction or other notice to the Contractor and, provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work will be executed in accordance with such additional drawings or instructions without additional cost or extension of the Contract Time.

K. Interpretations and decisions of the Design Professional, in conjunction with the Owner, will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Design Professional will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

L. The Design Professional's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

K. When the Contractor considers that the whole work included in a construction contract, or a portion thereof designated in the contract documents for separate completion, is complete, the Contractor will notify the Owner and Design Professional in writing of the completion of the portion or the whole of the construction; and for all design work that originally required certification by a Professional Engineer, the Design Professional shall provide an Engineer's Certification of Compliance, signed and sealed by a Professional Engineer, the form of which is attached to the FDOT Public Transportation Grant Agreement to the Owner and Contractor in a timely manner. The certification shall state that work has been completed in compliance with the Project construction plans and specifications. If any deviations are found from the approved plans or specifications, the certification shall include a list of all deviations along with an explanation that justifies the reason to accept each deviation.

4.03 CLAIMS AND DISPUTES

A. Definition. A Claim is a written demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, or an extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate claims will rest with the party making the claim.

1. If for any reason the Contractor deems that additional cost or Contract Time is due to the Contractor for Work not clearly provided for in the Contract Documents or previously authorized changes in the Work, the Contractor will notify the Owner in writing of its intention to claim such additional cost or Contract Time before the Contractor begins the Work on which the Contractor bases the claim. If such notification is not given or the Owner is not afforded proper opportunity by the Contractor for keeping strict account of actual cost or time as required, then the Contractor hereby agrees to waive any claim for such additional cost or Contract Time.

2. Such notice by the Contractor and the fact that the Owner or Design Professional has kept account of the cost or time of the Work will not in any way be construed as proving or substantiating the validity of the Claim. When the Work on which the Claim for additional cost or Contract Time is based has been completed, the Contractor will, within 21 calendar days, submit Contractor's written Claim to the Owner. The failure to give notice as required herein will constitute a waiver of said Claim. Claims arising prior to Final Payment or the earlier termination of the Contract will be referred initially to the Owner for action as provided in Paragraph 4.04.

B. Claims must be made within 21 calendar days after occurrence of the event giving rise to such Claim or within 21 calendar days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. If the Contractor wishes to reserve its rights under this Paragraph, written notice of any event that may give rise to a Claim must be given within 21 calendar days of the event, whether or not any impact in money or time has been determined. Claims must be made by written notice. Any change or addition to a previously made Claim will be made by timely written notice in accordance with this Paragraph. The failure to give notice as required herein will constitute a waiver of said Claim.

C. Continuing Contract Performance. Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor will proceed diligently with performance of the Contract. Owner, however, will be under no obligation to make payments on or against such disputed claims, disputes or other matters in question during the pendency of any proceedings to resolve such disputed claims, disputes or other matters in question.

D. Non-Waiver of Claims: Final Payment. The making of final payment will not constitute a waiver of claims by the Owner.

E. Claims For Concealed or Unknown Conditions. Owner may make available to the Contractor prior to the bid opening and during the performance of the Work, Record Documents and Drawings pertaining to the existing structures and/or facilities relative to this Project. Record Documents and Drawings will not be considered a part of the

Contract Documents. Owner does not warrant the accuracy of such Record Documents and Drawings to the Contractor and the Contractor will be solely responsible for all assumptions made in reliance thereupon. Record Documents and Drawings are not warranted or intended to be complete depictions of existing conditions, nor do they necessarily indicate concealed conditions. The locations of electrical conduit, telephone lines and conduit, computer cables, FAA cables, storm lines, sanitary lines, irrigation lines, gas lines, mechanical apparatus and appurtenances, HVAC piping/ductwork, and plumbing may only appear schematically, if at all, and the actual location of such equipment is in many cases unknown. Contractor will take the foregoing into consideration when preparing its bid, and will not be entitled to any additional compensation on account of concealed conditions except as specifically set forth below.

1. Should the Contractor encounter concealed conditions in an existing structure or below the surface of the ground, not discoverable by a careful inspection and differing materially from conditions ordinarily encountered and generally recognized in or about a site of this type, the Contractor will stop work at the location where the concealed condition was discovered and give immediate written notice of the condition to the Owner. The Owner and Design Professional shall investigate and adjust the Contract Sum and/or time by Change Order upon claim by either party, if made before conditions are disturbed and in no event later than 21 days after the first observance of the conditions. Nothing herein is intended to limit or modify the obligations of the Contractor set forth in Section 01545 – UTILITIES. Contractor shall not be entitled to a Change Order for the Contract Sum and/or time if the Contractor knew of the existence of such conditions at the time Contractor bid, or the existence of such conditions could have been reasonably discovered or revealed as a result of any examination, investigation, exploration, test, or study of the site and contiguous areas as required by the Contract, or if Contractor failed to give written notice as required by this Article.

2. There will be no adjustment of the Contract Sum on account of other costs resulting from topsoil or water conditions including, without limitation, costs on account of delay, administration, operations, temporary construction, cave-in or collapse of excavations, or pumping.

F. Claims for additional cost. If the Contractor wishes to make claim for an increase in the Contract Sum, written notice as provided herein will be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under paragraph 10.03. Claim will be filed in accordance with the procedure established herein. Anticipated, unanticipated, abnormal or adverse weather conditions will not be the basis of a claim for additional cost. The Contract Sum will not be increased for any weather related conditions.

G. CLAIMS FOR ADDITIONAL TIME.

1. If the Contractor wishes to make claim for an increase in the Contract Time, written notice as provided herein will be given. The Contractor will have the burden of demonstrating the effect of the claimed delay on the Contract Time, and will furnish the Owner with such documentation relating thereto as the Owner will reasonably require. In the case of a continuing delay only one claim is necessary.

2. The Contract Time will not be increased for any reasonably anticipated weather related delay. The Owner may consider adverse weather conditions not reasonably anticipated as a basis of a claim for additional time.

H. ESCROW OF BID DOCUMENTS.

1. The Contractor agrees that all documents relied upon in making or supporting their Bid will be retained in escrow prior to the date the Contract is awarded and preserved and updated during the course of the Work until Final Payment is made. The Owner will have the right to inspect any and all such Bid Documents and to verify that such Bid Documents are properly escrowed prior to the time of the Award of the Contract, or at any time thereafter during the course of the Work.

a. If any Claim is made pursuant to the Contract, the Contractor will provide for the Owner's review, at the Owner's request, all escrowed Bid Documents. If the Owner requests to review the escrowed Bid Documents and the Contractor fails to timely provide them or has failed to preserve them, no claim by the Contractor will be honored by the Owner.

b. If the Contractor contends that such Bid Documents are proprietary or otherwise confidential, the Contractor will so state as to any such documents, will provide them to the Owner as part of the Claim process, and will identify all such documents as exempted from disclosure under Florida Statute Chapter 119.

c. Said escrowed Bid Documents referred to in this Part will be subject to review in the event of any audit. The Owner may require that an appropriate audit be conducted. In the event the audit supports the Contractor's claim, the Owner will pay for the audit. In the event the audit does not support the Contractor's claim, the Contractor will pay for the audit.

d. The Contractor will provide all information and reports requested by the Owner, or any of their duly authorized representatives, or directives issued pursuant thereto, and will permit access, for the purpose of audit and examination to the Contractor's books, records, accounts, documents, papers or other sources of information and its facilities, as may be determined by the Owner to be pertinent to ascertain compliance with this Part. The Contractor will keep all Project accounts and records which fully disclose the amount of the Bid. The accounts and records will be kept in accordance with an accounting system that will facilitate an effective audit in accordance with the Single Audit Act of 1984.

4.04 RESOLUTION OF CLAIMS AND DISPUTES

A. The failure of Owner to enforce at any time or for any period of time any one or more provisions of this Contract will not be construed to be and will not be a waiver of any such provision or provisional or of its right thereafter to enforce each and every provision.

B. The following shall occur as a condition precedent to the Owner's review of a claim unless waived in writing by the Owner:

Field Representatives' Meeting: Within five days (5) after a dispute occurs, the Contractor's senior project management personnel who have authority to resolve the dispute shall meet with the Design Professional and Owner's project representative who have authority to resolve the dispute, in a good faith attempt to resolve the dispute. If a party intends to be accompanied at a meeting by legal counsel, the other party shall be given at least three (3) working days' notice of such and also may be accompanied by legal counsel. All negotiations pursuant to this clause are confidential and shall be treated as compromise and settlement negotiations for purposes of rules of evidence.

Management Representatives' Meeting: If the Field Representatives' Meeting fails to resolve the dispute, a senior executive for the Contractor and for the Owner, neither of which have day to day Project management responsibilities, shall meet, within ten days (10) after a dispute occurs, in an attempt to resolve the dispute and any other identified disputes or any unresolved issues that may lead to dispute. The Owner may invite the Design Professional to this meeting. If a party intends to be accompanied at a meeting by legal counsel, the other party shall be given at least three (3) working days' notice of such and also may be accompanied by legal counsel. All negotiations pursuant to this clause are confidential and shall be treated as compromise and settlement negotiations for purposes of rules or evidence.

Following the Field Representatives' Meeting and the Management Representatives' Meeting, the Owner will review the Contractor's claims and may (1) request additional information from the Contractor which will be immediately provided to Owner, or (2) render a decision on all or part of the claim. The Owner will notify the Contractor in wiring of the disposition of the claim within 21 days following the receipt of such claim or receipt of additional information requested.

1. If the Owner decides that the Work relating to such Claim should proceed regardless of the Owner's disposition of such Claim, the Owner will issue to the Contractor a written directive to proceed. The Contractor will proceed as instructed.

PART 5 – SUBCONTRACTORS

5.01 DEFINITIONS

A. A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate Contractor or subcontractors of a separate Contractor.

B. A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work. The term "Sub-Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-Subcontractor or an authorized representative of the Sub-Subcontractor.

C. The Owner or Design Professional will not recognize any Subcontractor on the Work. The Contractor will 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 Owner or Design Professional.

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

A. Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, will furnish in writing to the Owner, the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. After due investigation, the Owner will promptly reply to the Contractor in writing stating whether or not the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply promptly will constitute notice of no reasonable objection.

B. The Owner reserves the right to investigate the prequalification and qualifications and responsibility of proposed or actual Subcontractors, and to prohibit same from performing Work on the Project where such investigation, in the judgment of the Owner, reveals that such Subcontractors are unqualified and/or non-responsible. The Owner's criteria for such determination may include, without limitation: financial condition, experience, character of workers and equipment, and past performance. The Contractor will not contract with a proposed person or entity to which the Owner has made reasonable and timely objection. The Contractor will not be required to contract with anyone to whom the Contractor has made reasonable objection.

C. If the Owner has reasonable objection to any such proposed person or entity, the Contractor will submit a substitute to whom the Owner have no reasonable objection.

D. The Contractor will not change a Subcontractor, person or entity listed in Contractor's Subcontractors List without permission of the Owner.

E. Owner reserves the right but does not assume the obligation to pay any and all subcontractors and suppliers directly if a dispute arises with the Contractor. Contractor agrees that any such payment would not be an interference with contractual relations.

5.03 SUBCONTRACTUAL RELATIONS

By appropriate contract, written where legally required for validity, the Contractor will require each Subcontractor, to the extent of the work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract Documents, assumes toward the Owner and Design Professional. Each subcontract agreement will preserve and protect the rights of the Owner and Design Professional under the Contract Documents with respect to the work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and will allow to the Subcontractor, unless specifically provided otherwise in the subcontract, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor will require each Subcontractor to enter into similar contracts with Sub-Subcontractors. The Contractor will make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the

Subcontractor terms and conditions of the proposed subcontract which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-Subcontractors. The Contractor will include a provision providing the Owner the same rights to audit at the subcontractor level in all of its subcontractor agreements executed to effect project completion.

PART 6 – CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.01 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

A. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

B. When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case will mean the Contractor who executes each separate Owner-Contractor contract.

C. The Contractor, with the Owner's assistance, will coordinate each separate contractor with the Work of the Contractor, who will cooperate with them. The Owner will provide for the coordination of the Owner's own forces with the Work of the Contractor, who will cooperate with them. The Contractor will coordinate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor will make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules will then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.02 MUTUAL RESPONSIBILITY

A. The Contractor will afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and will connect and coordinate the contractors' construction and operations with theirs as required by the Contract Documents.

B. If any part of the Contractor's Work depends, for proper execution or operation, upon the Work or any applicable portion thereof, of any other separate Contractor, the Owner will give the Contractor written notice of the date when the other contractor will have completed its construction or any applicable portion thereof and the Contractor will have 15 days from the date so specified within which to inspect the other contractor's construction or any applicable portion thereof and to accept said construction or to reject in a written statement to the Owner reciting all discrepancies or defects which affect Contractor's work and, therefore, must be remedied. Upon receipt of such statement, the Design Professional will see that necessary corrections are made and will notify the Contractor when such corrective work is to be complete. The Contractor will have 15 days from the date so specified within which to inspect and report again, in order to determine that discrepancies or defects have been corrected.

1. Failure of the Contractor to inspect and report, as set forth above, will constitute an acceptance of the other contractor's construction or any

applicable portion thereof as fit and proper to receive Contractor's Work, except as to latent defects which may develop in the separate contractor's construction or any applicable portion thereof after the execution of the Contractor's work.

2. Upon completion of the other contractor's construction or any applicable portion thereof, the area will be turned over to the Contractor.

C. Costs caused by delays or defective construction will be borne by the party responsible therefore.

D. The Contractor will promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.02 E.

E. Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor will, upon due notice by the Owner, settle with such other contractor by contract if other contractor will so settle. If such separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner will notify the Contractor who will defend such proceedings with the cooperation of the Owner and, if any judgment against the Owner arises therefrom, the Contractor will pay or satisfy same to the extent caused by the fault of the Contractor and will reimburse the Owner for all reasonable attorneys' fees and court costs which the Owner has incurred.

F. The Owner and each separate contractor will have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

6.03 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible as the Owner, in its sole discretion, determines to be just.

PART 7 – CHANGES IN THE WORK

7.01 CHANGES

A. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Supplemental Agreement, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Part and elsewhere in the Contract Documents.

1. Any Claim for payment for changes in the Work that is not covered by written Change Order will be rejected by the Owner. The Contractor, by submitting the Bid, acknowledges and agrees that the Contractor will not be entitled to payment for changes in the Work unless such Work is specifically authorized in writing by the Owner in advance. The terms of this Part may not be waived by the Owner unless such waiver is in writing and makes specific reference to this Part.

B. A Change Order will be based upon contract among the Owner and Contractor. A Construction Change Directive requires a contract by the Owner and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Owner alone.

C. Changes in the Work will be performed under applicable provisions of the Contract Documents, and the Contractor will proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

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

E. ALTERATION OF WORK AND QUANTITIES.

1. The Owner reserves and will have the right to make such alterations in the Work as may be necessary or desirable to complete the Work originally intended in an acceptable manner. Unless otherwise specified herein, the Owner will be and is hereby authorized to make such alterations in the Work as may increase or decrease the originally awarded Contract Work, provided that the aggregate of such alterations does not change the total Contract cost or the total cost of any major Contract item by more than 25% (total cost being based on the unit prices and estimated quantities in the awarded Contract). Alterations that do not exceed the 25% limitation will not invalidate the Contract nor release the Surety, and the Contractor agrees to accept payment for such alterations as if the altered Work had been a part of the original Contract. These alterations which are for Work within the general scope of the Contract will be covered by "Change Orders" issued by the Owner. Change Orders for altered Work may include extensions of Contract Time where, in the Design Professional's opinion, such extensions are commensurate with the amount and difficulty of added Work.

2. Should the aggregate amount of altered Work exceed the 25% limitation specified above, such excess altered Work will be covered by Supplemental Agreement. 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.

7.02 CHANGE ORDERS

A. A Change Order is a written instrument prepared by the Owner and signed by the Owner, Contractor and Design Professional, stating their agreement upon all of the following:

1. a change in the Work;

2. the amount of the adjustment in the Contract Sum, if any;

3. the extent of the adjustment in the Contract Time, if any; and

4. changes to the terms and conditions of this Contract including the W/MBE or DBE percentage, if any.

B. Methods used in determining adjustments to the Contract Sum will include those listed in Paragraph 7.03 B.1.

C. Supplemental Agreement. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded Contract, or any major Contract item, by more than 25%, such increased or decreased Work being within the scope of the originally awarded Contract; or (2) Work that is not within the scope of the originally awarded Contract.

7.03 CONSTRUCTION CHANGE DIRECTIVES

A. A Construction Change Directive is a written order prepared by the Owner or Design Professional and signed by the Owner, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum, Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

B. A Construction Change Directive will be used in order to expedite the Work and avoid or minimize delays in the Work which may affect the Contract Sum or Contract Time. When determined by the Owner to be in the Owner's best interest, the Owner may, with or without the Contractor's agreement, direct or order the Contractor to proceed with changes in the Work by the issuance of a Construction Change Directive.

1. If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment will be based on one of the following methods:

   a. Mutual acceptance of a lump sum, properly itemized and supported by sufficient substantiating data to permit evaluation;

   b. By unit prices stated in the Contract Documents or otherwise mutually agreed upon;

   c. By the cost estimated method as described in Paragraph 7.03 C., plus the accepted percentage, if applicable. The Contractor's estimate will become a fixed price which will not be changed by any variation in the actual cost of executing the Work covered by the change;

   d. Cost to be determined in a manner agreed upon by the parties, plus, if applicable, percentage; or

   e. As provided in Paragraph 7.03 F., by actual cost determined after the Work covered by the change is completed, plus, if applicable, percentage.

2. As used in this Paragraph 7.03, Construction Change Directive's "cost" will mean the estimated or actual net increase in cost to the Contractor or Subcontractor for performing the Work covered by the change, including actual payments for

materials, equipment rentals, expendable items, wages and associated benefits to workers and to supervisors employed full time at the site where the Work is performed, insurance, bonds, and other provable direct costs, but not including any administrative, accounting or expediting costs, or other indirect or overhead costs, or any wages or benefits of supervisory personnel not assigned full time to the site, or any amount for profit or fee to the Contractor, Subcontractor, or Sub-Subcontractor. Rates for the Contractor and Subcontractor owned equipment will not exceed the rates listed in the Associated Equipment Distributors rental rate book as adjusted to the regional area of the Work under this Contract.

3. "Percentage" will mean an amount to be added to the cost for overhead and profit and any other expense which is not included in the cost of the Work covered by the change, as defined above. The maximum percentage for total overhead and profit and any other expense which is not included in the cost of the Work will be as follows:

   a. For the Contractor, 15% of any net increase of costs of any Work performed by the Contractor's own forces on-site only.

   b. For the Subcontractor, 10% of any net increase of cost of any Work performed by the Subcontractor's own forces on-site only, plus 5% of any net increase in the cost of the Work for the Contractor on-site only.

   c. Per the Contract negotiations and as noted in the exhibit(s).

4. When in the reasonable judgment of the Owner a series of Construction Change Directives or Change Orders affect a single change, the percentage will be calculated on the cumulative net increase in cost, if any.

5. Overhead will include the following:

   a. Supervision wages, timekeepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost."

C. Upon request of the Owner, the Contractor will, without cost to the Owner, submit to the Owner, in such form as the Owner may require an accurate written estimate of the cost of any proposed extra work or change. The estimate will indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this Part. Unit labor costs for the installation of each item of materials will be shown if required by the Owner. The Contractor will promptly revise and resubmit such estimate if the Owner determines that it is not in compliance with the requirements of this Part, or that it contains errors of fact or mathematical errors.

1. If required by the Owner, in order to establish the exact cost of new Work added or of previously required Work omitted, the Contractor will obtain and furnish to the Owner bona fide proposals from recognized suppliers for furnishing any material included in such Work. Such estimates will be furnished promptly so as to occasion no delay in the Work and will be furnished at the Contractor's expense. The Contractor will state in the estimate any extension of

time required for the completion of the Work if the change or extra work is ordered.

D. Upon receipt of a Construction Change Directive, the Contractor will promptly proceed with the change in the Work involved and advise the Owner of the Contractor's agreement or disagreement with the method provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum and/or Contract Time.

E. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including the adjustment in Contract Sum and/or Contract Time or the method for determining them. Such agreement will be effective immediately and will be subsequently recorded in/as a Change Order.

F. If the Contractor does not respond promptly or disagrees with the method for adjustment of the Contract Sum, the method and the adjustment will be determined by the Owner on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a percentage for overhead and profit. In such case, and also under Paragraph 7.03 B.1.(e), the Contractor will keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph will be limited to the following:

1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

2. Costs of materials, supplies and equipment, including costs of transportation, whether incorporated or consumed;

3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and

4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

G. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum will be actual net cost as confirmed by the Owner. When both additions and credits covering related Work or substitutions are involved in a change, the percentage for overhead and profit will be figured on the basis of net increase, if any, with respect to that change.

H. If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method will be referred to the Design Professional for determination.

I. When the Owner and Contractor agree with the determination made by the Design Professional concerning the adjustments in the Contract Sum and/or Contract Time, or otherwise reach agreement upon the adjustments, such agreement will be effective immediately and will be subsequently recorded in preparation and execution of an appropriate Change Order.

7.04 MINOR CHANGES IN THE WORK

The Owner will have authority to order minor changes in the Work not involving adjustment to the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order and will be binding on the Owner and Contractor. The Contractor will carry out such written orders promptly.

PART 8 – TIME

8.01 DEFINITIONS

A. Unless otherwise provided, the Contract Time(s) is the period of time allotted in the Contract Documents for Substantial Completion of the Work or designated portion thereof as defined in Paragraph 8.01 C., including adjustments thereto.

B. The date of commencement of the Work is the date established in a written notice to proceed. Work under this Contract will not commence until the Owner has issued a written notice to proceed. Notwithstanding the previous sentence, preliminary work such as procuring Insurance Policy Endorsements, Certificates of Insurance and Payment and Performance Bonds can proceed after the Contract is signed and prior to the Notice to Proceed. The Contractor will begin the work to be performed under the Contract within ten days of the date set by the Owner in a written notice to proceed but, in any event, the Contractor will notify the Owner at least 48 hours in advance of the time actual construction operations will begin. The date will not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

C. The date of Substantial Completion is the date certified by the Owner in accordance with Paragraph 9.07.

D. The term “day” as used in the Contract Documents will mean calendar day unless otherwise specifically defined.

E. The Contractor’s plea that insufficient Contract Time was specified will not be a valid reason for extension of Contract Time. No extension of Contract Time for completion will be granted.

8.02 PROGRESS AND COMPLETION

A. Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Contract the Contractor confirms that the Contract Time is a reasonable period for performing the Work. In the event the Contractor fails to promptly complete the Work herein within the Contract Time(s) provided, liquidated damages will accrue in the amount(s) and manner specified in the Contract.

B. The Contractor will furnish sufficient forces, construction plant and equipment, and will work such hours, including night shifts and other overtime operations, as may be necessary to insure prosecution of the Work in accordance with the Construction Schedule. Contractor will take such steps as may be necessary or as may be directed by the Owner to improve Contractor’s progress by increasing the number of shifts,

overtime operations, days of work, and amount of construction plant, as may be required, at no additional cost to the Owner.

C. Maintenance of Schedule: The Contractor will prosecute the Work with sufficient forces, materials, and equipment to maintain progress in accordance with the Construction Schedule. Should the Work in whole or in part fall behind the Construction Schedule, or should the progress of the Work appear to the Owner to be inadequate to assure completion on the completion date(s) specified in the Contract, the Contractor will, upon written notice from the Owner, take appropriate steps within seven days of such notice to put the Work back on schedule and meet the specified completion date(s).

1. Should the Contractor fail to institute appropriate measures within seven days, or should the measures taken fail to put the Work back on schedule within 14 days of such notice, the Owner may, but will not be required to, supplement the Contractor's forces, materials and/or equipment with other forces, materials and/or equipment. The cost of such other forces, materials and/or equipment will be deducted by the Owner from sums otherwise owing to the Contractor. The Owner's use of such supplemental forces, materials and/or equipment will not excuse the Contractor from performing all of its obligations under the Contract Documents or relieve the Contractor from liquidated damages. The Contractor will coordinate and work together with such supplemental forces, materials and/or equipment.

2. Failure of the Contractor to comply with the requirements under this Paragraph will be grounds for determination that the Contractor is not prosecuting the Work with such diligence as will insure completion within the time(s) specified and such failure constitutes a material breach of the Contract Documents. Upon such determination, the Owner may terminate the Contractor's right to proceed with the Work, or any separate part thereof, in accordance with Part 13, TERMINATION OR SUSPENSION OF THE CONTRACT.

D. The Contractor will proceed expeditiously with adequate forces and will achieve Substantial Completion within the Contract Time(s).

8.03 DELAYS AND EXTENSIONS OF TIME

A. No claim for damages or any claim other than for an extension of time will be made or asserted against the Owner by reason of any Delay, whether such Delay is related to (i) late or early completion, (ii) delay in the commencement, prosecution or completion of the Work, (iii) hindrance or obstruction in the performance of the Work, (iv) loss of productivity, or (v) other similar claims (collectively "Delay"), whether or not such Delay is foreseeable, unless the Delay is caused by acts of the Owner constituting fraud or active interference with the Contractor's performance of the Work, and only to the extent such acts continue after Contractor furnishes the Owner with notice of such fraud or active interference. The Contractor will not be entitled to an increase in the Contract Sum or payment or compensation of any kind from the Owner for direct, indirect, consequential, impact or other costs, expenses or damages, including but not limited to: damages related to loss of business, loss of opportunity, impact damages, loss of financing, principal office overhead and expenses, loss of profits, loss of bonding capacity and loss of reputation; costs of acceleration or inefficiency, arising because of

Delay, disruption, interference or hindrance from any cause whatsoever; provided, however, that this provision will not preclude recovery of direct and actual damages by the Contractor for hindrances or delays due solely to fraud or active interference on the part of the Owner. Otherwise, the Contractor may be entitled only to extensions of the Contract Time as the sole and exclusive remedy for such resulting delay, in accordance with and to the extent specifically provided above. The Owner's exercise of any of its rights or remedies under the Contract Documents (including but not limited to, order changes in the Work, directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of Owner's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the Work.

B. Claims relating to time will be made in accordance with applicable provisions of Paragraph 4.03. Contractor's plea that insufficient time was specified will not be a valid reason for extension of the Contract time. Contract time will not be extended for a weather related delay except as provided in Paragraph 4.03.

1. Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after that 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.

PART 9 – PAYMENTS AND COMPLETION

9.01 CONTRACT SUM

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

9.02 SCHEDULE OF VALUES

A. Before submitting the first Application for Payment, the Contractor will submit to the Owner and the Design Professional a Schedule of Values. Refer to Section 01370 – SCHEDULE OF VALUES for additional information.

1. The Schedule of Values will be approved by the Owner and the Design Professional prior to submitting the initial Application for Payment.

2. The Schedule of Values will be in a form as required by the Owner and the Design Professional to adequately establish costs of the Work.

3. This Schedule of Values will be prepared in such a form and supported by such data to substantiate its accuracy in reflecting the above breakdown for administrative and payment purposes as the Owner or Design Professional may require and will be revised later if found by the Design Professional to be inaccurate. If the Contract involves multiple projects and/or airports, project and/or airport sub-totals will be required.

4. This Schedule of Values, unless objected to by either the Owner or the Design Professional, will be used only as a basis for the Contractor's Application for Payment.

5. The Schedule of Values must be sent electronically in Microsoft Excel format along with the Application for Payment.

6. Initial Payment Application: The principal administrative actions and submittals which will precede or coincide with submittal of the Contractor's first Application for Payment are as follows, but not necessarily by way of limitation:

   a. Listing of Subcontractors and principal suppliers and fabricators.

   b. Schedule of Values.

   c. Initial recognized CPM (or Bar Chart) Construction Schedule.

   d. Schedule of submittals.

   e. Stored Material spreadsheet and verification form.

   f. Subcontractor signed agreements.

   g. E-Verify compliance plans for Contractor and subcontractors per Article 34, E-Verify Requirement. Subsequent applications for payment will include E-Verify compliance plans for subcontractors not included with the initial application for payment.

   h. E-Verify Certifications for subcontractors. Subsequent applications for payment will include E-Verify Certifications for subcontractors not included with the initial application for payment.

   i. E-Verify reports for any new employees hired by the Contractor and subcontractors since the start of the Contract Term. Subsequent applications for payment will include E-Verify reports for any new employees hired by the Contractor and subcontractors not included with the initial application for payment. E-Verify reports will only be required when the Contractor and subcontractors hire new employees and will not be required if the Contractor and subcontractors do not hire any new employees.

9.03 APPLICATIONS FOR PAYMENT

A. The Contractor will, as a condition precedent to the right to receive any monthly payment, submit to the Owner, an Application for Payment, sample attached herein and identified as Exhibit A – Aviation Authority Application for Payment.

1. Scope of Payment: For performance of this Contract, the Owner will make payments in U.S. Dollars to the Contractor in accordance with the Owner approved Schedule of Values, which will be based on the Contract Sum amount established by the Contractor in Section 00300 – BID FORM. It is understood that the Contract Sum amount to be paid to the Contractor will be totally based on the said amount contained in Section 00300 – BID FORM and made a part of this Contract for the Work actually complete.

   a. The Contractor will 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 prosecution thereof, subject to the provisions of Paragraph 11.02 G., herein.

2. With the exception of the month of September, all notarized Applications for Payment will be submitted to the Owner by the third of each month. In the event that the third of the month falls on a Saturday, Sunday, or non-working day, Applications for Payment are due the prior business day. Payment will be made on the twenty fifth of the month. If the twenty fifth of the subsequent month falls on a Saturday, Sunday or non-working day, then payment will be made on the next business day. Applications for Payment submitted more than 25 days prior to the third of the month will be rejected and returned. Due to the end of fiscal year financial closeout, September Applications for Payment will be required to be submitted by September 12th, and in the event that the 12th falls on a Saturday, Sunday, or non-working day, Applications for Payment are due the next business day and a subsequent payment will be made the second Friday of October. The Owner requires the Contractor to have a pencil copy review and approval of all Applications for Payment with the Owner's Construction Project Manager prior to their submittals.

3. The Contractor will submit to the Owner via email to AppforPayment@TampaAirport.com, one electronic copy of an executed and notarized original of an itemized Application for Payment prepared on a form that is on the CD supplied by the Owner at the pre-construction meeting and based on the agreed Schedule of Values and copy (pdf) of all submitted backup documents, supported by such data substantiating the Contractor's right to payment as the Owner or Design Professional may require and reflecting retainage for all Work performed through the last day of each month or agreed upon date. The Application for Payment will be certified by a person duly authorized in writing to execute contractual instruments on behalf of the Contractor.

   a. Each Application for Payment will include the Contractor's signed notarized statement, based on the agreed Schedule of Values of the value of the Work. The total payment for each month will be broken down according to the specific items from the Schedule of Values that have been completed/delivered for which payment is requested. All such payments will be commensurate with the actual progress of the Work which must be substantiated and itemized in the Monthly Construction Schedule. Payment will not be made for any Work which cannot be so substantiated. Refer to Section 01315 – SCHEDULES, PHASING.

   b. All progress payments will be subject to correction following the discovery of an error, misrepresentation, or unallowable cost in any previous Application for Payment. Approval of such erroneous Application for Payment will not in any respect be taken as an admission by the Owner of the amount of Work completed, or the release of the Contractor from any of its responsibility under the Contract.

4. The Contractor's design and construction schedule will be updated on a monthly basis and a copy thereof submitted with each of the Contractor's Applications

for Payment. This schedule update shall include a thirty (30) day "look-ahead schedule", projected variances and calculation of the number of days difference between the as-built critical path and the Project Schedule critical path. Contractor shall, with each Application for Payment, provide completed monthly updated information for the previous month on the Project Schedule and updated information on manpower indicated as-built and as-planned conditions. The updated information in the Project Schedule shall not modify any milestone dates in the Project Schedule that Owner has previously approved. The Owner will not approve for payment an Application for Payment not containing the Contractor's submission of an approved monthly design and construction schedule update. Refer to General Requirements Section 1315 – SCHEDULES, PHASING.

5. In addition to the schedule updates required above, with each Application for Payment, Contractor shall, in addition to documentation required under the Contract, submit the following information which is required to process any Application for Payment including a monthly status report concisely but completely describing in narrative form, the current status of the Work including, without limitation:

a. A review of actual progress during the month in comparison to the Project Schedule and, if actual progress is behind schedule, discussion of any "work around" or "catch up plan" that Contractor has employed or will employ to recover the original Project Schedule;

b. A concise statement of the outlook for meeting future Project Schedule dates, and the reasons for any change in outlook from a previous report;

c. A concise statement of significant progress on major items of Work during the report period, with progress photographs as necessary to document the current status of the Work;

d. A review of any significant technical problems encountered during the pay application period and the resolution or plan for resolution of the problems;

e. An explanation of any corrective action taken or proposed;

f. A complete review of the status of Change Orders, including a review of any changes in the critical path for the Project Schedule which result from Change Orders approved by Owner during the month, as well as a review of the schedule impact of Change Order requests then pending;

g. A summary of any claims anticipated by the Contractor with respect to the Work, including the anticipated cost and schedule impacts of any such claims;

h. A cumulative summary of the number of days of, and the extent to which the progress of the Work was delayed by, any of the causes for which Contractor could be entitled to an extensions of the Contract Time; and

i. An updated material purchase log.

6. Further, the Design Professional will not recommend for payment by the Owner an Application for Payment without satisfactory documentation of material and services purchases scheduled to have been issued during the period of time

covered by the Application for Payment. Copies of issued Purchase Orders and Contract (subcontracts) will be considered satisfactory documentation. Refer to Section 01315 – SCHEDULES, PHASING.

a. Entries will match current data of the Schedule of Values and Construction Schedule. Listing will include amounts of fully executed Change Orders per project approved by the Owner prior to the last day of the "period of work" covered by the Application for Payment. Incomplete Applications for Payment will be returned by the Owner without action.

b. For Contracts with a prescribed DBE or W/MBE goal or participation, the Contractor will submit via email to AppforPayment@TampaAirport.com with each Application for Payment the completed Commitment Form showing the detailed accounting for all DBE or W/MBE participation as applicable. Contractor will submit one (1) in electronic format.

This accounting will include:

(1) the names and addresses of DBE or W/MBE firms that have participated on the Contract;

(2) a description of the Work each named DBE or W/MBE form has performed; and

(3) the value of Work performed by each named DBE or W/MBE firm;

(4) addition or replacement of approved DBE or W/MBE firms;

(5) at 50% completion – a plan of action properly reflecting anticipated DBE or W/MBE achievement of commitment; and

c. Not Used.

7. The Contractor will submit with each Application for Payment a detailed accounting of the value of Work performed to date by their Subcontractors. Submission detail will be organized identifying the supporting information.

This accounting will include:

a. the names and addresses of their Subcontractors that have participated on the Contract;

b a description of the Work each of their Subcontractors has performed;

c. the value of Work performed by each of their Subcontractors;

d. fully signed Subcontractor agreements;

e. copies of statutory Waivers of Right to Claim against the Payment Bond given by each subcontractor, supplier, and sub – contractor and supplier for sub-contractor for the period up to the date of the Application for Payment; and

f. equipment purchased for and paid by the Owner must be identified when invoiced so that an asset tag can be attached to that equipment. A detail listing in Excel format must be submitted with the invoice when equipment is purchased. Final accounting for all assets will be performed at the completion of the project. Any assets unaccounted for will be reimbursed to the Owner.

8. The Design Professional will not recommend for payment by the Owner an Application for Payment without the Contractor's submission of the detailed DBE or W/MBE accounting.

9. The Design Professional will approve or disapprove the Contractor's Application for Payment within seven days after the receipt thereof and, upon approval, promptly issue to the Owner an Application for Payment recommending payment to the Contractor. Upon receipt by the Owner of the approved Application for Payment, the Owner will make payment according to the Owner's standard payment procedures following the month in which the Application for Payment was submitted. The Contractor agrees to pay each Subcontractor for satisfactory performance of its subcontract within 10 days after the Contractor's receipt of payment from the Owner. The Contractor agrees further to release retainage payments to each Subcontractor within 10 days upon receipt from Owner and after the Subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written notice to the Owner. This clause applies to both DBE or W/MBE and non-DBE or W/MBE subcontractors.

10. The Owner will pay to Contractor 95% of all Applications for Payment submitted by Contractor. The Applications for Payment will represent the actual value, based on the Contract amount, of the Work satisfactorily performed on the Schedule of Values, less the aggregate of all previous payments, and will reflect a retainage of 5% of the total amount payable for Work satisfactorily completed to date. Upon written request from the Contractor, retainage may be released to the Contractor, in the sole discretion of the Owner, for the Work or designated portions thereof upon reaching Substantial Completion, as defined in Section 9.07, Substantial Completion. Any amounts that are the subject of a good-faith dispute, the subject of a claim brought pursuant to F.S. § 255.05, or are otherwise the subject of a claim or demand, will not be released. Retainage will not be withheld on design and construction administration fees, if any.

    The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 10 days after the Contractor has received a partial payment. The Contractor is required to fully pay retainage to the subcontractor within 10 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when (1) all the tasks called for in the subcontract have been accomplished and documented as required by the Owner, (2) the Work or a designated portion of the Work which the subcontractor worked on has reached Substantial Completion (incremental acceptance) and (3) no good-faith disputes or claims involving the subcontractor have manifested.

Notwithstanding the foregoing, at the Owner's sole option, when at least 95% of the Work has been completed, the Engineer 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. Subject to Fla. Stat. Section 255.078 (if applicable), 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. Upon written request from the Contractor, the remainder (if any) may be released to the Contractor.

Notwithstanding the foregoing, at the Contractor's option, 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.

11. In addition, the Owner may withhold or suspend additional payments or portions thereof to such extent as may be necessary to protect itself from loss on account of:

a. Work or execution thereof not performed or not in accordance with the Contract Documents.

b. The cost of the Work performed by the Owner, or contracted to others by the Owner, on behalf of the Contractor where said Work or the costs thereof are identified in the Contract Documents as the responsibility of the Contractor.

c. Whether items of Work remain to be corrected or completed following Substantial Completion or Final Acceptance.

d. Non-compliance with the Owner's DBE or W/MBE Policy or failure to meet the prescribed DBE goal or W/MBE expectancy set forth in this Contract, or to establish a good faith effort to do so.

(1) Failure of the Contractor to make a good faith effort to achieve DBE goal or W/MBE goal may be a material breach of this Contract. The determination of whether the Contractor's efforts were made in "good faith" will be made by the Owner.

(2) Unless otherwise provided in the Contract Documents, payment will only be for Work in place.

e. Other non-compliance with the Contract, Owner Policies or Procedures.

B. The Owner will have the right to omit or order non-performance of a portion of the Work in the best interest of the Owner.

1. Should the Owner omit or order non-performance of a portion of the Work, the Contract Sum will be reduced accordingly. However, the Contractor will be paid for any such work actually completed and acceptable prior to the order to omit or non-perform.

2. Should the Owner omit or order non-performance of a portion of the Work, acceptable materials ordered by the Contractor or delivered to the Work prior to the date of the Owner's order will be paid for at the actual cost to the Contractor and will become the property of the Owner.

3. 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 Owner's order. Such additional costs incurred by the Contractor must be directly related to the deleted Contract item and will be supported by certified statements by the Contractor as to the nature the amount of such costs.

C. Payments may be made on account of non-perishable materials or equipment not incorporated in the Work but delivered and suitably stored at the site, upon the following conditions being met:

1. The Materials have been stored or stockpiled in a manner acceptable to the Owner and Design Professional.

2. The Contractor has furnished the Design Professional with satisfactory evidence that the materials and transportation costs have been paid.

3. The Contractor has furnished the Design Professional with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

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

5. The Contractor has furnished to the Owner and Design Professional copies of paid invoices of all stored materials and all stored material listed in Excel format and as a hard copy and a stored material verification form. All supporting backup must be labeled with the Schedule of Values item number and calculation of item number listed on the Schedule of Values.

6. Documentation that all material meets specification requirements.

7. The Contractor will be responsible for all loss or damage of any type to such materials or equipment and will make suitable replacement or repair as necessary at the Contractor’s own expense.

8. The Contractor will be responsible for security with respect to all such stored materials and equipment.

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

10. Payments for material on hand for delivered material to be used in one item of Work must exceed $3,000.00, and not scheduled to be incorporated into the work within sixty days after delivery.

11. It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials will in no way relieve the Contractor of its responsibility for furnishing and placing such materials in accordance with the requirements of the Contract Documents.

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

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

14. In no case will the amount of 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.

Notwithstanding the foregoing, the Owner may in its sole and absolute discretion, in special circumstances approve in writing in advance the waiver or one or more of the above conditions for payment of non-perishable materials or equipment not incorporated in the Work.

D. The Contractor warrants that title to all work covered by an Application for Payment will pass to the Owner upon receipt of payment by the Contractor. The Contractor further warrants that upon submittal of an Application for Payment, all work for which certificates for payment have been previously issued and payments received from the Owner will, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances (hereinafter referred to in this Part as liens) in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials or equipment relating to the Work.

9.04 CERTIFICATES FOR PAYMENT

A. The Design Professional will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Design Professional determines is properly due, or notify the Contractor and Owner in writing of the Design Professional's reasons for withholding certification in whole or in part as provided in Subparagraph 9.05 A.

B. The issuance of a Certificate for Payment will constitute a representation by the Design Professional to the Owner, based on the Design Professional's observations at the site and review of the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Design Professional's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to

results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Design Professional. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Design Professional has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the work, (2) reviewed construction means, methods, techniques, sequences or procedures, or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

C. In taking action on the Contractor's Applications for Payment, the Design Professional will be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and will not be deemed to represent that the Design Professional has made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Subparagraph 9.04 B. or other supporting data, that the Design Professional has made exhaustive or continuous on-site inspection or that the Design Professional has made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner will be performed by the Owner, acting in the sole interest of the Owner.

9.05 DECISIONS TO WITHHOLD CERTIFICATION

A. The Design Professional may decide not to certify the Application for Payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Design Professional's opinion the representations to the Owner required by Subparagraph 9.04 B. cannot be made. If the Design Professional is unable to certify payment in the amount of the Application for Payment, the Design Professional will notify the Contractor and Owner as provided in Subparagraph 9.04 A. If the Contractor and Design Professional cannot agree on a revised amount, the Design Professional will promptly issue an Application for Payment for the amount for which the Design Professional is able to make such representations to the Owner. The Design Professional may also decide not to certify payment, or because of subsequently discovered evidence or subsequent observations may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Design Professional's opinion to protect the Owner from loss because of:

1. defective Work not remedied;

2. third party claims filed or reasonable evidence indicating probable filing of such claims;

3. failure of the Contractor to make payment properly to Subcontractors or for labor, materials or equipment;

4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

5. damage to the Owner or another Contractor;

6. reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to complete the Work and to cover actual or liquidated damages for the anticipated delay;

7. persistent failure to carry out the Work in accordance with the Contract Documents; and/or

8. failure of the Contractor to provide satisfactory documentation of material and services purchased in accordance with the Construction Schedule.

9. other failure of the Contractor to comply with the Contract, Owner Policies or Procedures.

B. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.06 PROGRESS PAYMENTS

A. After the Design Professional has certified the Application for Payment, the Owner will endeavor to make payment according to the Owner's standard payment procedures. If deficiencies are found, a standard deficiency e-mail will be sent to the Contractor to resolve within 24 hours. If the deficiency is not resolved within that time, the Application will be returned.

B. Prompt Payment Clause. The Contractor agrees to pay each subcontractor under the Contract for satisfactory performance of its contract no later than 10 days from the receipt of each payment the Contractor receives from the Owner. The Contractor agrees further to release retainage payments to each subcontractor upon receipt from Owner and within 10 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above-referenced time frame may occur only for good cause following written notice to the Owner. This clause applies to both D/W/MBE and non-D/W/MBE subcontractors.

C. Neither the Owner nor the Design Professional will have an obligation to pay or to see to the payment of money to a Subcontractor, Sub-Subcontractor or material supplier.

D. The payment of any Application for Payment prior to Final Acceptance of the Work by the Owner will in no way constitute an acknowledgement of the acceptance of the Work, or in any way prejudice or affect the obligation of the Contractor to repair, correct, renew, or replace, at the Contractor's expense, any defects, imperfections or design errors or omission in the design, construction, or in the strength or quality of the equipment or materials used in or about the construction of the Work under Contract and its appurtenances, or any damage due or attributed to such defects, which defect, imperfection, or damage will have been discovered on or before the Final Acceptance of the Work. The Contractor will be liable to the Owner for failure to correct same as provided herein.

E. An Application for Payment, a certified progress payment, or partial or entire use or occupancy of the Project by the Owner will not constitute acceptance of Work not in accordance with the Contract Documents.

F. The Owner may deduct from the balance due the Contractor under the provisions of the Contract Documents any liquidated damages which may have accrued.

G. Provision for assessment of liquidated damages for delay will in no manner affect the Owner's right to terminate the Contract as provided in Part 13, TERMINATION OR SUSPENSION OF THE CONTRACT or elsewhere in the Contract Documents. The Owner's exercise of the right to terminate will not release the Contractor from its obligation to pay said liquidated damages in the amounts set out in the Contract.

9.07 SUBSTANTIAL COMPLETION

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

B. When the Contractor considers that the whole Work, or a portion thereof designated in the Contract Documents for separate completion, is substantially complete and the premises comply with Paragraph 3.13 A., the Contractor will submit to the Design Professional: (1) the permits and certificates referred to in Paragraph 12.05 D., and (2) the Contractor's request for inspection by the Owner and Design Professional.

1. The Owner and Design Professional will then make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the inspection discloses any item which is not in accordance with the requirements of the Contract Documents, the Design Professional will then prepare and submit to the Contractor a comprehensive list of items to be completed and/or corrected. The Contractor will proceed promptly to complete and correct items on the list before issuance of the Certificate of Substantial Completion by the Owner. The Contractor will then submit a request for another inspection to determine Substantial Completion. Repeat inspections will be performed prior to issuance of the Certificate of Substantial Completion by the Owner.

2. All Work items or Contract requirements which remain incomplete/unsatisfied at the Date of Substantial Completion will become part of the Final Acceptance punch list. For projects with a value under $10 million, within 30 days after Substantial Completion, the Owner will develop the Final Acceptance punch list and will provide it to the Contractor within five days after its completion. The Contractor will be allowed a minimum of 30 days after delivery of the Final Acceptance punch list to complete the items listed on the Final Acceptance punch list. However, for projects with a value over $10 million, within 60 days after Substantial Completion, the Owner will develop the Final Acceptance punch list and will provide it to the Contractor within five days after its completion. The Contractor will be allowed a minimum of 30 days after delivery of the Final Acceptance punch list to complete the items listed on the Final Acceptance punch list.

3. When the Work or designated portion thereof is substantially complete, the Owner will prepare a Certificate of Substantial Completion which will establish: the date of Substantial Completion; responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work; and

insurance. All Warranties required by the Contract Documents will commence on the date of Substantial Completion. The Certificate of Substantial Completion will be submitted to the Design Professional and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

C. Upon Substantial Completion of the whole Work and upon application by the Contractor and certification by the Design Professional, the Owner will make payment, reflecting adjustment in retainage, if any, for such Work as provided in the Contract Documents.

D. After Substantial Completion of the whole Work, the Design Professional may, at the Design Professional's discretion and with the consent of the Contractor's Surety, approve an Application for Payment from which will be retained an amount not less than 1.5 times the Contract value or 1.5 times the estimated cost, whichever is greater, of the Work remaining to be done. Remaining retainage will be released with Final Payment after Final Acceptance of the whole Work.

E. After Substantial Completion, closeout documents as required in Section 01700, Project Closeout, can be submitted to the Owner. The Owner will provide a detailed list of the closeout documents required after receipt and acceptance of the Final Acceptance punch list.

9.08 PARTIAL OCCUPANCY OR USE

A. The Owner or separate contractors may occupy or use any completed or partially completed portion of the Work at any stage. Such partial occupancy or use may commence whether or not the portion is substantially complete. When the Contractor considers a portion substantially complete, the Contractor will prepare and submit a list to the Design Professional as provided under Subparagraph 9.07 B.

B. Immediately prior to such partial occupancy or use, the Owner, Contractor and Design Professional will jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

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

9.09 FINAL COMPLETION AND FINAL PAYMENT

A. Upon receipt of written notice that inspection of the whole Work is ready for Final Acceptance, the Owner and Design Professional will promptly make such inspection and, when the Owner and Design Professional finds the Work acceptable under the Contract Documents and the Contract fully performed, the Owner will promptly issue a Certificate of Final Acceptance stating that to the best of the Owner's and Design Professional's knowledge, information and belief, and on the basis of the Owner's and Design Professional's observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents. The Design Professional's Certification of the Final Application for Payment will constitute a further representation that conditions listed in Paragraph 9.09 B. as precedent to the Contractor's being entitled to Final Application for Payment have been fulfilled. In the

Final Certificate for Payment, the Design Professional will state the date on which the whole Work was fully complete and acceptable, which date will be the date of Final Acceptance.

B. Neither final payment nor any remaining retained percentage will become due until the Contractor submits to the Design Professional (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) all final certified payrolls, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If the Contractor fails to furnish such releases or waivers as the Owner reasonably requires satisfying the Owner that there are no outstanding liens, the Owner may require the Contractor, at the Contractor's expense, to furnish a bond satisfactory to the Owner to indemnify the Owner against such liens. If such lien remains unsatisfied after payments are made, the Contractor will refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees. Upon satisfactory final acceptance of all Work required by the Contract Documents, receipt of notice of final acceptance from the Design Professional and compliance with project closeout of Section 01700 – PROJECT CLOSEOUT, the Contractor will make Application for Final Payment in the same format as progress payments.

C. Acceptance of final payment by the Contractor, a Subcontractor or material supplier will constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of Final Application for Payment. Such waivers will be in addition to the waiver described in Subparagraph 4.03 D.

D. All closeout documentation shall be furnished at least seven days before submission of Application for Final Payment.

E. The Contractor is required to provide all information and supporting documentation required to enable the Owner to receive any applicable state or federal grants.

PART 10 – PROTECTION OF PERSONS AND PROPERTY

10.01 SAFETY PRECAUTIONS AND PROGRAMS

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

10.02 SAFETY OF PERSONS AND PROPERTY

A. The Contractor will take reasonable precautions for safety of, and will provide reasonable protection to prevent damage, injury or loss to;

1. employees performing Work and other persons who may be affected thereby;

2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, or under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-Subcontractors;

3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and

4. any other property of the Owner, or construction by separate contractors.

B. The Contractor will give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

C. The Contractor will erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Owners and users of adjacent sites and utilities.

D. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor will exercise utmost care and carry on such activities under supervision of properly qualified personnel.

E. The Contractor will promptly remedy damage and loss to property referred to in Paragraphs 10.02 A.2. and 10.02 A.3. caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, except damage or loss solely attributable to acts or omissions of the Owner or Design Professional or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

F. The Contractor will designate a competent person of the Contractor's organization at the site whose duty will be the prevention of accidents. This person will be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Design Professional.

G. The Contractor will not load or permit any part of the construction or site to be loaded so as to endanger its safety.

H. The Contractor will comply with the provisions of the Occupational Safety and Health Act of 1970, 84 Stat. 1190, 29 U.S.C. 611 et seq. (as amended), and applicable regulations and requirements under said Act. The Contractor will maintain an accurate record of all accidents causing death, traumatic injury, occupational disease, or damage to property, materials, supplies and equipment incidental to Work performed under this Contract.

I. The Contractor will be responsible for the preservation of all public and private property and will protect carefully from disturbance or damage all land monuments and property

markers until the Design Professional has witnessed or otherwise referenced their location and will not move them until directed.

J. The Contractor will be responsible for all damage or injury to property of any character during the prosecution of the Work resulting from any act, omission, neglect, or misconduct in the Contractor's manner or method of executing the Work, or at any time due to defective Work or materials, and said responsibility will not be released until the Project will have been completed and accepted.

K. 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, Contractor will restore, such property, at the Contractor's own expense, 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 Contractor will make good such damage or injury in an acceptable manner.

L. Work that is to remain in place which is damaged or defaced by reason of Work performed under this Contract will be restored at no additional cost to the Owner.

M. Until the Design Professional's Final Written Acceptance of the whole Work, excepting only those portions of the Work accepted in accordance with Paragraph 9.07 B. herein, the Contractor will have the charge and care thereof and will 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 will 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 Completion and will bear the expense thereof.

N. If the Work is suspended for any cause whatsoever, the Contractor will be responsible for the Work during such suspension and will take such precautions necessary to prevent damage to the Work. The Contractor will provide for normal drainage and will erect necessary temporary structures, signs, or other facilities. If the Owner orders the suspension of the Work, additional compensation or extension of time may be claimed by the Contractor. During such period of suspension of Work, the Contractor will properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedlings, and sod furnished under the Contract, and will take adequate precautions to protect new tree growth and other important vegetative growth against injury.

O. The Contractor will be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor will be responsible to the Owner for the acts and omissions of all Contractor's employees and Subcontractors, their agents and employees, and all other persons performing any of the Work under a contract with the Contractor.

10.03 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor will act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency will be determined as provided in Paragraph 4.03 and Part 7, CHANGES IN THE WORK.

PART 11 – UNCOVERING AND CORRECTION OF WORK

11.01 UNCOVERING OF WORK

A. If a portion of the Work is covered contrary to the Owner's/Design Professional's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Owner/Design Professional, be uncovered for the Owner's/Design Professional's observation and be replaced at the Contractor's expense without change in the Contract Time.

B. If a portion of the Work has been covered which the Design Professional has not specifically requested to observe prior to its being covered, the Owner/Design Professional may request to see such Work and it will be uncovered by the Contractor. If such work is in accordance with the Contract Documents, costs of uncovering and replacement will, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor will pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner will be responsible for payment of such costs.

11.02 CORRECTION OF WORK

A. The Contractor will promptly correct Work rejected by the Owner/Design Professional for failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor will bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Design Professional's services and expenses made necessary thereby.

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

C. The Contractor will remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

D. If the Contractor fails to correct non-conforming work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.04. If the Contractor does not proceed with correction of such non-conforming work within a reasonable time fixed by written notice from the Owner or Design Professional, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may, upon ten additional days' written notice, sell such materials and equipment at auction or at private sale and will account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Owner's or Design Professional's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum will be reduced by the deficiency. If payments

then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor will pay the difference to the Owner.

E. The Contractor will bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate Contractors caused by the contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

F. Nothing contained in Paragraph 11.02 will be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Subparagraph 11.02 B relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

G. Upon completion of the whole Work, the Owner and the Design Professional will expeditiously make final inspection in accordance with Section 01700 – PROJECT CLOSEOUT, and will notify the Contractor of Final Acceptance. Such Final Acceptance, however, will not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the whole Work, nor will the Owner be precluded or stopped from recovering from the Contractor or Contractor's Surety, or both, such overpayment as may be sustained, by failure on the part of the Contractor to fulfill Contractor's obligations under the Contract. A waiver on the part of the Owner of any breach of any part of the Contract will not be held to be a waiver of any other or subsequent breach.

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

11.03 ACCEPTANCE OF NON-CONFORMING WORK

If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate as determined by the Owner in its reasonable discretion Such adjustment will be effected whether or not Final Payment has been made.

PART 12 – MISCELLANEOUS PROVISIONS

12.01 GOVERNING LAW

The Contract will be governed by the law of the State of Florida. Venue for any action, arising from or related to the Contract, will be in the Florida State Circuit Court in and for the 13th Circuit, Hillsborough County, such court having sole and exclusive jurisdiction. Confidential mediation with a mediator selected by the Owner shall be a condition precedent to litigation.

12.02 SUCCESSORS AND ASSIGNS

A. The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors,

assigns and legal representatives of such other party in respect to covenants, contracts and obligations contained in the Contract Documents. Except as hereinafter provided, the Contractor will not assign or sublet this Contract in whole or in part without the written consent of the Owner, nor will the Contractor assign any monies due or to become due to Contractor hereunder without the previous written consent of the Owner. If the Contractor attempts to make such assignment without such consent, the Contractor will nevertheless remain legally responsible for all obligations under the Contract.

B. The Owner reserves the right to transfer its interests herein to any other governmental body created or authorized by law to operate the Airport.

12.03 WRITTEN NOTICE

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

12.04 RIGHTS AND REMEDIES

A. Except as otherwise provided in the Contract Documents, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder will be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

B. No action or failure to act by the Owner or Design Professional will constitute a waiver of a right or duty afforded them under the Contract, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

C. Continued performance by the Owner as to the terms of this Contract after default by the Contractor will not be deemed a waiver by the Owner of the right to cancel for any subsequent default. Inspections, measurements or certificates issued by the Owner, payments of money, acceptance of any Work, grants of any extension of time, or any other action taken by the Owner will not operate as a waiver of any provisions of the Contract or any power therein reserved to the Owner of any rights to damages therein provided. Any waiver of any breach of Contract will not be held to be a waiver of any other or subsequent breach.

D. To the maximum extent permitted by applicable law, Contractor agrees it will not seek equitable adjustment of the terms of this Contract and that its remedies are limited to those specified herein.

12.05 TESTS AND INSPECTIONS

A. Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction will be made at an appropriate time. The Contractor will give the Owner and Design Professional timely notice of its readiness so the Design Professional may observe such inspections, tests or approvals conducted by the Contractor or public

authorities other than the Owner. (Refer to Section 01410 – Testing Laboratory Services).

B. If the Owner, Design Professional, or other public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 12.05 A., the Design Professional will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval and the Contractor will give timely notice to the Owner and Design Professional of when and where such tests, inspections or approvals are to be made so the Design Professional may observe such procedures. The Owner will bear such costs except as provided in Subparagraph 12.05 C.

C. If such procedures for testing, inspection or approval under Subparagraphs 12.05 A. and 12.05 B. reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor will bear all costs made necessary by such failure including those of repeated procedures and compensation for the Design Professional's services and expenses.

D. The Contractor will secure and promptly deliver to the Owner or Design Professional any required certificates of testing, inspection or approval, any occupancy permits, any certificates of final inspection of any part of the Contractor's Work and any operating permits for any mechanical apparatus, such as elevators, boilers, air compressors, etc., which may be required by law to permit full use and occupancy of the premises by the Owner. Receipt of such permits or certificates by the Owner or Design Professional will be a condition precedent to Substantial Completion of the Work or designated portion thereof.

E. Tests or inspections conducted pursuant to the Contract Documents will be made promptly to avoid unreasonable delay in the Work.

F. Notwithstanding any dispute which may arise out of the Work, the Contractor will carry on the work and maintain effective progress to complete same within the Contract Time(s) set forth in the Contract Documents.

12.06 E-VERIFY REQUIREMENTS/UNAUTHORIZED ALIENS

A. The Contractor agrees to comply with the State of Florida, Office of the Governor, Executive Order Number 11-116 (Verification of Employment Status), which states that all agencies under the direction of the Governor are to include, as a condition of all state contracts for the provision of goods or services to the state in excess of nominal value, an express requirement that contractors utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the contractor during the contract term, and an express requirement that contractors include in such subcontracts the requirement that subcontractors performing work or providing services pursuant to the state contract utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term. Any projects with Florida Department of Transportation (FDOT) funding will contain this assurance as a condition for any new Joint Participation Agreements dated after January 4, 2011. The Contractor will verify all of their new employees and will require that their subcontractors verify all of their new employees in accordance with the E-verify requirements set out above.

B. FDOT considers the employment by any contractor of unauthorized aliens a violation of Section 274A(e) of the Immigration and Nationality Act. If the Contractor knowingly employs unauthorized aliens, such violation will be cause of unilateral cancellation of this Contract.

C. By entering into this Contract, the Contractor becomes obligated to comply with the provisions of Section 448.095, Fla. Stat., "Employment Eligibility." This includes but is not limited to utilization of the E-Verify System to verify the work authorization status of all newly hired employees, and requiring all subcontractors to provide an affidavit attesting that the subcontractor uses the E-verify system and subcontractor does not employ, contract with, or subcontract with, an unauthorized alien. Failure to comply will lead to termination of this Contract, or if a subcontractor knowingly violates the statute, the subcontract must be terminated immediately. Any challenge to termination under this provision must be filed in the Circuit Court no later than 20 calendar days after the date of termination. If this contract is terminated for a violation of the Section 448.095 by the Contractor, the Contractor may not be awarded a public contract for a period of 1 year after the date of termination.

12.07 LOBBYING AND INFLUENCING FEDERAL OR STATE EMPLOYEES - 49 CFR part 20, Appendix A

The Contractor certifies by signing and submitting its bid and this Contract, to the best of his or her knowledge and belief, that:

A. No Federal appropriated funds have been paid or will be paid, by or on behalf of the Contractor, 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.

B. 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.

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.

The Contractor or offeror must place the language of this certification in all contracts, purchase orders and other documents binding contractors, subcontractors and suppliers and require that all contractors, subcontractors and suppliers execute such certification 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.

No funds received pursuant to this Contract may be expended for lobbying the Florida Legislature, judicial branch, or any state agency, in accordance with Section 216.347, Florida Statutes.

PART 13 – TERMINATION OR SUSPENSION OF THE CONTRACT

13.01 TERMINATION BY THE OWNER FOR CAUSE

A. Owner may terminate this Contract for cause if the Contractor:

1. Fails to commence the Work within the time specified, fails to maintain adequate progress toward completion of the Work, discontinues the prosecution of the Work, abandons the prosecution of the Work, or fails to resume Work which has been discontinued within a reasonable time after notice to do so; or

2. Fails to perform the Work, fails to provide a sufficient number of adequately skilled workers or supervisory staff who actively staff the Project and prosecute the Work, or fails to have available at the site proper equipment or materials to assure completion of the Work in accordance with the terms of the Contract Documents; or

3. Performs the Work unsuitably, or neglects or refuses to remove materials or to perform anew such Work as may be rejected by Owner as unacceptable or unsuitable; or

4. Fails to comply with Contract requirements regarding minimum wage payments, EEO, W/MBE or DBE requirements; or

5. Disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; or

6. Allows any final judgment against it to remain unsatisfied for a period of 30 days; or

7. Becomes insolvent, is declared bankrupt, files for reorganization under the bankruptcy code or commits any act of bankruptcy or insolvency, either voluntarily or involuntarily; or

8. Makes an assignment for the benefit of creditors or attempts to assign its rights or obligations under this Contract or any part thereof to any third-party without the prior written consent of the Owner; or

9. Consents to or is the subject of any order or decree of any court or

governmental authority or agency having jurisdiction appointing a receiver, trustee, or liquidator to take possession or control of all or substantially all of the Contractor's property for the benefit of creditors; or

10. Materially breaches any provision in this Contract; or

11. If at any time the Surety executing the bonds is determined by the Owner to be unacceptable and the Contractor fails to furnish an acceptable substitute Surety within ten days after notice from the Owner or;

12. Fails or refuses to perform any other obligation under this Contract, or fails to remedy such nonperformance within seven (7) days after notice of the occurrence by the Owner; or

13. Fails to achieve the required dates of Substantial and/or Final Completion.

B. When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies available, give notice, in writing, to the Contractor and the Contractor's Surety. If the Contractor within a period of ten days after receiving such notice has not commenced in good faith to cure such cause or breach, or if having commenced such cure is not proceeding diligently to complete the cure, the Owner will have full power and authority, without violating this Contract, to immediately take the prosecution of the Work out of the hands of the Contractor, may declare the Contractor in default, and may terminate, in whole or in part, this Contract.

1. Upon termination of this Contract, the Owner may, subject to any prior rights of the Contractor's Surety:

a. Take possession of the site and of all materials, equipment, tools, electronic drawings, including but not limited to BIM models, shop drawings and machinery thereon owned by the Contractor; and

b. Finish the Work by whatever method the Owner may deem expedient and necessary.

C. When the Owner terminates this Contract for cause, the Owner will be entitled to hold all amounts due the Contractor at the date of termination until completion of the Work and final evaluation of the Owner's damages associated with the termination. The Contractor will be liable to the Owner for costs and expenses incurred by the Owner in completing the Work, and also for losses, damages, costs and expenses including, but not limited to, direct, indirect and consequential damages. If such costs and expenses exceed the sum that would have been payable under this Contract, then the Contractor and the Surety will be liable and will pay to the Owner the amount of such excess. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including any and all additional costs and expenses to the Owner, such excess, to the extent earned, will be paid to the Contractor and/or Contractor's Surety.

D. Upon termination of this Contract, the Owner has no liability for anticipated profits for unfinished Work.

E. Termination of this Contract, or any portion thereof, will not relieve the Contractor or the Contractor's Surety of their liability for past and future damages, losses or claims on Work performed or on account of any act, omission, or breach by the Contractor. Liability for liquidated damages, if any, will continue to accrue as set forth in the Contract Documents.

F. The Owner's right to termination, as set forth herein, shall be in addition to and not a limitation of any and all other rights and remedies available to the Owner, at law, in equity or under the terms of this Contract. If the Owner improperly terminates this Contract for cause, this termination for cause will be converted to and deemed to be a termination for convenience in accordance with the provisions of Paragraph 13.03. In such case, Contractor shall only be entitled to those rights and remedies expressly stated in Paragraph 13.03 and in no event shall Contractor be entitled to any damages or remedies for wrongful termination.

G. Termination of this Contract, or portion thereof, under this Article does not relieve the Contractor or the Contractor's Surety of its responsibilities for the completed portion of the Work or its obligation for and concerning any just claims arising out of the Work performed.

13.02 SUSPENSION BY THE OWNER FOR CONVENIENCE

The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine. If the whole Work is suspended, all days elapsing due to causes not the fault of the Contractor between the effective dates of the Owner's order to suspend and subsequent order to resume the Work will be excluded from the Contract Time.

13.03 TERMINATION FOR CONVENIENCE OF OWNER

A. Not withstanding anything else in this Contract, the Owner may terminate performance of the Work under this Contract in whole or in part if the Owner determines that a termination is in the Owner's best interest or its sole and absolute discretion. The Owner will terminate by delivery to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

B. After receipt of a Notice of Termination, and except as directed by the Owner, the Contractor will immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this Paragraph:

1. Complete Work not terminated and stop Work as specified in the Notice of Termination.

2. Place no further subcontracts or orders (referred to as subcontracts in this paragraph) for materials, services, or facilities, except as necessary to complete the continued portion of the Contract.

3. Terminate all subcontracts to the extent they related to the Work terminated.

4. Assign to the Owner, as directed, all rights, title, and interest of the Contractor under the subcontract terminated, in which case the Owner will have the right

to settle or to pay any termination settlement proposal arising out of those terminations.

5. With approval or ratification to the extent required by the Owner, settle all outstanding liabilities and termination settlement proposals arising from the terminations of subcontracts (the approval or ratification will be final for purposes of this paragraph).

6. As directed by the Owner, transfer title and deliver to the Owner (1) the fabricated or unfabricated parts, Work in progress, completed Work, supplies, and other material produced or acquired for the Work terminated, and (2) the completed or partially completed plans, drawings, information, and other property that, if the Contract had been completed, would be required to be furnished to the Owner.

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

8. Take any action that may be necessary, or that the Owner may direct, for the protection and preservation of the property related to this Contract that is in the possession of the Contractor and in which the Owner has or may acquire an interest.

9. Use its best effort to sell, as directed or authorized by the Owner, any property of the types referred to in Subparagraph 13.03 B.6. above; provided, however, that the Contractor (1) is not required to extend credit to any purchaser and (2) may acquire the property under the conditions prescribed by, and at process approved by, the Owner. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Owner under this Contract, credited to the price or cost of the Work, or paid in any manner directed by the Owner.

C. The Contractor may submit to the Owner a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Owner. Within 30 days, the Owner will accept title of those items and remove them or enter into a storage contract. The Owner may verify the list upon removal of the items or, if stored, within 45 days from submission of the list, and will correct the list, as necessary, before final settlement.

D. After termination, the Contractor will submit a final termination settlement proposal to the Owner in the form and with the certification prescribed by the Owner. The Contractor will submit the proposal promptly, but no later than 60 days from the effective date of termination, unless extended in writing by the Owner upon written request of the Contractor. If the Contractor fails to submit the proposal within the time allowed, the Owner may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and will pay the amount determined. No further compensation will be considered if the Contractor fails to meet the submittal requirements.

1. Subject to Paragraph 13.03 D. above, the Contractor and the Owner may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit of Work done. However, the agreed amount may not exceed the total Contract sum as reduced by (1) the amount of payments previously made and (2) the Contract Sum of Work not terminated. The Contract will be amended and the Contractor paid the agreed amount. Paragraph 13.03 F. below will not limit, restrict, or affect the amount that may be agreed upon to be paid under this Paragraph.

E. If the Contractor and the Owner fail to agree on the whole amount to be paid the Contractor because of termination of the Work, the Owner will pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under Paragraph 13.03 D.1. above:

1. For Contract Work performed before the effective date of termination, the total (without duplication of any items) of:

    a. The cost of this Work;

    b. The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the termination portion of the Contract if not included in subdivision a. above; and

    c. A sum, as profit on a. above, which will not exceed 5%. If it appears, however, that the Contractor would have sustained a loss on the entire Contract had it been completed, the Owner will allow no profit under this subparagraph c. and will reduce the settlement to reflect the indicated rate of loss.

    d. 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 of Work completed at the Bid Unit Price or as mutually agreed for items of Work partially completed. No claims or loss of anticipated profits will be considered for items of Work completed at the Bid Unit Prices.

2. The reasonable costs of settlement of the Work terminated, including:

    a. Reasonable accounting, clerical, and other expenses necessary only for the preparation of termination settlement proposals and support data;

    b. The termination and settlement of subcontracts (excluding the amounts of such settlements);

    c. Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory; and

    d. 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 site will be considered..

F. Except for normal spoilage, and except to the extent that the Owner expressly assumed the risk of loss, the Owner will exclude from the amounts payable to the Contractor under Paragraph 13.03 E. above, the fair value, as determined by the Owner, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner or to the buyer.

G. In arriving at the amount due the Contractor under this paragraph, there will be deducted:

1. All unliquidated advance or other payments to the Contractor under the terminated portion of the Contract;

2. Any claim which the Owner has against the Contractor under this Contract;

3. The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this paragraph and not recovered by or credited to the Owner; and

4. Contractor expressly waives any claim for loss of anticipated profit, overhead of any kind, including home office and jobsite overhead, or other indirect impacts.

H. Unless otherwise provided in this Contract or by statute, the Contractor will maintain all records and documents (including but not limited to subcontracts, subcontractor change orders, purchase orders, bid tabulations, proposals, and all other documents associated with the project) relating to the termination portion of this Contract for seven years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this Contract. The Contractor will make these records and documents available to the Owner, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Owner, photographs, microphotographs, electronic media or other authentic reproductions may be maintained instead of original records and documents.

PART 14 – AUDIT REQUIREMENTS

14.01 PAYMENTS

In connection with payments to the Contractor under this Contract, it is agreed the Contractor will maintain full, accurate and detailed books of account and records customarily used in this type of business operation in accordance with generally accepted accounting principles. The Owner, FAA, Federal Highway Administration, Florida Department of Transportation and the Comptroller General of the United States, or any duly authorized representative of each, may have the right to audit the Contractor's records for the purpose of making audits, examinations, excerpts, and/or transcriptions and to determine payment eligibility under this Contract and compliance with this Contract. The Owner also has the right to perform inspections or attestation engagements. Access will be to any and all of the Contractor's records, including books, documents, papers, accounting procedures and practices, and any other supporting evidence the Owner deems pertinent to this Contract, as well as records of parent, affiliate and subsidiary companies. The Contractor shall maintain such books and records for seven years after the end of the term of this Contract.

14.02 ACCESS TO RECORDS

If the records are kept at locations other than the Airport, Contractor will arrange for said records to be brought to a location convenient to Owner's auditors to conduct the engagement as set forth in this Article or Contractor may transport Owner's team to location of the records for purposes of undertaking

said engagement. In such event, Contractor will pay reasonable costs of transportation, food and lodging for Owner's team.

14.03 RECORDS FORMAT

In the event the Contractor maintains its accounting or Project information in electronic format, upon request by the Owner's auditors, the Contractor will provide a download of its accounting or Project information in an electronic format allowing readership in Microsoft Office products or Adobe Acrobat software.

14.04 RECORDS DELIVERY

Contractor agrees to deliver or provide access to all records requested by Owner's auditors within 14 calendar days of the request at the initiation of the engagement and to deliver or provide access to subsequent requests during the engagement within 7 calendar days of each request. The parties recognize that the Owner will incur additional costs if records requested by Owner's auditors are not provided in a timely manner and that the amount of those costs is extremely difficult to determine with certainty. Consequently, the parties agree that Contractor may be assessed liquidated damages of $100.00, in addition to other contractual financial requirements, for each item in a records request, per calendar day, for each time Contractor is late in submitting requested records to perform the engagement. Accrual of fees will continue until specific performance is accomplished. The parties expressly agree that these liquidated damages are not a penalty and represent reasonable estimates of fair compensation for the losses that reasonably may be anticipated from such failure to comply.

14.05 ENGAGEMENT

The Owner has the right during any engagement to interview the Contractor's employees, subcontractors, subconsultants, suppliers or any other persons associated with the Work or this Contract, to make photocopies, and to inspect any and all records upon request. The right to initiate an engagement, inspection or attestation engagement will extend during the Contract period and for six years after the completion date of the Work, or six years after the termination of this Contract, whichever occurs later.

14.06 RECORDS RETENTION

The Contractor will provide all information and reports requested by the Owner, or any of their duly authorized representatives, or directives issued pursuant thereto, and will permit access, for the purpose of performing an audit, examination, inspection, or attestation engagement, to the Contractor's books, records, accounts, documents, papers, or other sources of information, and its facilities as may be determined by the Owner to be pertinent to ascertain compliance with this Article. The Contractor will keep all Project accounts and records which fully disclose the amount of the Contractor's Bid. The accounts and records will be kept in accordance with an accounting system that will facilitate an effective audit in accordance with the Single Audit Act of 1984, as amended.

14.07 OVERCHARGE PROVISIONS

In the event the Contractor has overcharged the Owner, the Contractor will re-pay the Owner the amount of the overcharge, plus interest on the overcharge amount up to 12% per year from the date the overcharge occurred. In addition, if the Contractor has overcharged the Owner by more than 3% of the correct reimbursable amount, the Owner may assess and the Contractor will pay for the entire cost of the audit.

14.08 SUBCONTRACT AUDIT PROVISIONS

The Contractor will include in all subcontractor, subconsultant and supplier contracts a provision which provides the Owner the same rights to audit as provided in this Article.

14.09 OWNER'S RIGHT TO AUDIT

Approvals by Owner's staff for any services not included in this Contract do not act as a waiver or limitation of the Owner's right to audit.

14.10 NOTIFICATION TO OWNER

The Contractor will notify the Owner no later than seven days after receiving knowledge that it is subject to any other audit, inspection or attestation engagement related to this Contract and provide a copy of any audit documents so received.

14.11 COOPERATION

The Contractor agrees to comply with Section 20.055(5), Florida Statutes, and to incorporate in all subcontracts the obligation to comply with Section 20.055(5), Florida Statutes.

PART 15 – CIVIL RIGHTS

15.01 GENERAL REQUIREMENT FOR CONTRACTS

Subject to the applicability criteria noted in the specific Contract provisions, these Contract provisions apply to all work performed on the Contract. Failure to comply with the terms of these Contract provisions may be sufficient grounds to:

1. Withhold progress payments or final payment,

2. Terminate the Contract,

3. Seek suspension/debarment, or

4. Any other action determined to be appropriate by the Owner or the FAA.

15.02 CIVIL RIGHTS – GENERAL - 49 USC § 47123

A. The Contractor agrees that it will 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 handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance.

B. Duration:

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

2. This provision also obligates the Contractor or its transferee for the period during which Federal assistance is extended to the airport through the Airport Improvement Program, except where Federal assistance is to provide, or is in the form of personal property; real property or interest therein; structures or improvements

thereon. In these cases the provision obligates the Contractor for the longer of the following periods:

i. The period during which the property is used by the Owner or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits; or

ii. The period during which the Owner or any transferee retains ownership or possession of the property.

END OF SECTION

SECTION 00820 – WOMAN AND MINORITY OWNED BUSINESS ENTERPRISE (W/MBE)

PART 1 - GENERAL

1.01 DESCRIPTION

A. Woman and Minority Owned Business Enterprise (W/MBE) documents include:

1. Authority Non-Federally Funded Policy

2. Certified W/MBE Directory

3. W/MBE Application

4. Personal Statement of Net Worth

B. The above listed W/MBE documents are not included herein but can be obtained in Adobe Acrobat format by accessing the "Airport Business" section of the Owner's website, www.tampaairport.com.

END OF SECTION

SECTION 00850 - DRAWING INDEX

DRAWING NUMBER	SHEET NUMBER	TITLE
GENERAL		
G000	1	COVER SHEET & INDEX OF DRAWINGS
MECHANICAL		
M000	2	MECHANICAL LEGEND AND GENERAL NOTES
M001	3	MECHANCIAL GENERAL NOTES
M101	6	MECHANICAL OVERALL PENTHOUSE PLAN
M201	7	MECHANICAL ENLARGED PENTHOUSE PLANS
M202	8	MECHANICAL ENLARGED PENTHOUSE PLANS
M203	9	MECHANICAL ENLARGED PENTHOUSE PLANS
M204	10	MECHANICAL ENLARGED PENTHOUSE PLANS
M301	11	MECHANICAL SECTIONS
M501	12	MECHANICAL DETAILS
M502	13	MECHANICAL DETAILS
M601	14	MECHANICAL CONTROLS
M801	15	MECHANICAL SCHEDULES
ELECTRICAL		
E000	16	ELECTRICAL LEGENDS AND GENERAL NOTES
E101	17	ELECTRICAL OVERALL PENTHOUSE PLAN
E401	18	ELECTRICAL ENLARGED PLAN
E402	19	ELECTRICAL ENLARGED PLAN
E501	20	ELECTRICAL RISER PLAN
E601	21	ELECTRICAL DETAILS
E701	22	ELECTRICAL PICTURES

END OF SECTION

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Project/Work Identification:

1. The general overall description of the Work of the Contract for the:

LTPG Elevator Room Air Conditioning Replacement
Tampa International Airport
Tampa, Florida

can be summarized for purposes of administration and payment in the manner of project segments as follows:

Authority Project Number: 6930 22

Description:

The Owner has determined that the existing rooftop air handlers at the four (4) long term parking garage elevator penthouses have reached the end of their useful life and require replacement.

This Project will consist of the replacement four (4) roof top air handlers (one at each elevator penthouse), with DX split system fan coils. The elevator equipment was recently replaced under another contract and produces a less heat, resulting in a lower cooling load for the space. As a result, the existing 10-ton roof top units will be replaced with 5-ton DX split systems. Ductwork will also be reduced to allow use of the existing hoist beams in the space. Electrical circuits and equipment will also be updated to accommodate the new split systems. Each system is standalone and requires no Building Management System tie-in; however, the existing fire alarm relay will be maintained for the new equipment.

B. Contract Documents:

Requirements of the Work are contained in the Contract Documents. Cross-references in the Contract Documents to published information are not necessarily bound with the Contract Documents.

C. Intent:

The intent of the Contract is to provide for construction and completion in full compliance with the Contract requirements with all Work performed and completed in a first class workmanlike manner in every detail. It is further intended that the Contractor will furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the Work in a good workmanlike manner in accordance with the Contract Documents.

1.02 [RESERVED]

1.03 ARCHAEOLOGICAL AND HISTORICAL FINDINGS.

A. 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.

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

C. 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 will be covered by an appropriate Contract modification (change order or supplemental contract). If appropriate, the Contract modification will include an extension of Contract Time.

1.04 REMOVAL OF EXISTING STRUCTURES

A. All existing structures encountered within the established lines, grades, or grading sections will 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 will not be measured or paid for directly, but will be included in the Contract Sum.

B. Wherever existing structures interfere with Contractor’s Work, Contractor shall be responsible for all modifications, including removal if appropriate, to fit Contractor’s Work.

C. Should the Contractor encounter an existing structure that interferes with Contractor’s Work, the Owner will be notified prior to disturbing such structure. The disposition of existing structures so encountered will be determined by the Owner in accordance with the provisions of the Contract.

D. Where existing structures are determined to be removed, Contractor shall remove and dispose of the material. Where such structures are determined to remain and are integrated into Contractor’s Work, such materials and structures will remain the property of the Owner when so utilized in the Work.

1.05 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK

A. 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 either embankment or waste, Contractor may at its option either:

1. Use such material in another Contract item, providing such use is approved by

the Owner and is in conformance with the Contract Specifications applicable to such use; or

2. Remove such material from the Project site, upon written approval of the Owner; or

3. Use such material for Contractor's own temporary construction on the Project site; or

4. Use such material as intended by the terms of the Contract.

B. Should the Contractor wish to exercise option 1. 2., or 3., Contractor will request the Owner's approval in advance of such use.

C. Should the Owner approve the Contractor's request to exercise option 1., 2., or 3., the Contractor will be paid for the excavation or removal of such material at an agreed upon unit price. The Contractor will replace, at Contractor's own 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 Work. The Owner will not be charged for Contractor's use of such material so used in the Work or removed from the Project site.

D. It is understood and agreed that the Contractor will make no claim for delays by reason of Contractor's exercise of option 1., 2., or 3.

E. The Contractor will 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 Documents.

1.06 SCHEDULING

A. Refer to Section 01315.

1.07 LIST OF RELATED WORK

A. During performance of the Work under this Contract, the following other contracts will be under construction:

LTPG Moving Walkways

1.08 COOPERATION BETWEEN CONTRACTORS

A. When separate contracts are awarded for different portions of the Project, the Contractor in each case will be the person other than the Owner who signs each separate contract.

B. The Owner reserves the right to contract for and perform other or additional construction on or near the Work covered by this Contract.

C. When separate contracts are let within or near the limits of this Project, the Contractor will conduct its Work so as not to interfere with or hinder the progress of completion of the construction performed by other contractors. Contractors working near each other will cooperate with each other as directed by the Owner.

D. The Contractor will assume all liability, financial or otherwise, in connection with Contractor's Work and will protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays or loss experienced by the Contractor because of the presence and operations (or lack thereof) of other contractors working within or near the limits of this Project.

E. The Contractor will arrange the Work and will place and dispose of the materials as not to interfere with the operations of the other contractors within or near the limits of this Project. The Contractor will join the Work with that of the others in an acceptable manner and will perform it in proper sequence to that of the others.

F. The terms of this Section may not be waived by the Owner unless such waiver is in writing and makes specific reference to this Section.

1.09 [Reserved]

1.10 COORDINATION WITH CONTRACTS

A. The Contractor will be responsible for directly coordinating and reviewing all schedule dates with the contracts listed above in Item 1.07 LIST OF RELATED WORK, Paragraph A., and shall plan its Work accordingly to not cause any delays or hinder the progress of its Work or that of the Related Work.

B. It is the sole and full responsibility of the Contractor to coordinate the whole Work directly with the contracts listed above in Item 1.07 LIST OF RELATED WORK, Paragraph A.

C. The listing of contracts under 1.07 LIST OF RELATED WORK, Paragraph A., may not be inclusive of other related work performed at the Project site; however, the Contractor will be required to coordinate same as directed under Paragraphs A. and B. above.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01015 - MOBILIZATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:

The Work specified as Mobilization consists of preparatory work and operations in mobilizing for beginning work on the Project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies and incidentals to the Project site, building permit costs, and for the establishment of temporary offices, building facilities, utilities, safety equipment and first aid supplies, sanitary and other facilities, as required by these Contract Documents and State and local laws and regulations. The costs of bonds and all required insurance and other preconstruction expense necessary for the start of the Work, excluding the cost of construction materials, will also be included in Mobilization.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 BASIS OF PAYMENT

A. The Contractor will determine all costs in connection with providing Mobilization. Such costs will be incidental to the Project and will be included in the overall cost of the Contract Sum and will not exceed 3% of the total cost of the Work.

B. 90% of the Contractor's cost of Mobilization will be paid when Mobilization is complete. The remaining 10% will be retained for Demobilization and will be paid when all temporary facilities are removed.

END OF SECTION

SECTION 01020 - OWNER'S ALLOWANCES

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Owner's allowances in the amounts indicated and as described below have been established for certain types of work. The Contractor will perform such Work only upon receipt of written work orders from the Owner. For this purpose, a Work Order will have the same meaning for requirements pertaining to submittals, approvals, etc. as in Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, Paragraph 7.3 CONSTRUCTION CHANGE DIRECTIVES, as modified, except the Work Order is only signed by the Owner.

B. If the Work Order directs that the allowance work be performed, the provisions of Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified, will govern the conduct and payment for this Work.

C. Definitions and Explanations: All Work, including any allowance work if authorized, shall be performed in full compliance with the requirements of the Contract. All allowance work, if and when authorized, shall be performed by the Contractor in accordance with the Work Order.

1. Contractor shall coordinate allowance Work with related Work to ensure that each selection is completely integrated and interfaced with related Work, and shall include all aspects of Work to fully integrate the Work with all other Work and Related Work.

D. "Purchase and Installation" means the allowance covers both the purchase and installation of the indicated Work. The Contractor will bear the cost of coordinating the Work, providing the installer with access to the Work, temporary heat, ventilation, light, workspace, storage space, parking and toilet facilities, the cost of which will be included in the Contract Sum and not in the allowance.

E. Work Order Data: Where applicable, Contractor shall include in each Work Order proposal both the quantities of products being purchased and units requested, and furnish survey-of-requirements data to substantiate quantities. Indicate applicable taxes, delivery charges, and amounts of applicable trade discounts.

F. Upon issuance of a Work Order, the Work Order funds will be tracked separately on the Contractor's Schedule of Values by Work Order number and the amount of the Cost of Work. If multiple subcontractors are employed for the Work Order, each Subcontractor's Pay Requisition will include a separate line with the description Work Order number that will flow to the Contractor's Schedule of Values. Once work is complete on the Work Order, the Contractor has 30 days in which to reconcile the Work Order, as follows:

1. Provide Owner Project Management with a package containing cost support documents totaling the Cost of Work.

2. Calculate mark-ups and fee using the same formula/calculations used to create the original Work Order budget.

3. Any unused Work Order funds will be returned to the Owner's Allowance budget via a negative Work Order.

The Contractor will forfeit their fee on the Work Order for any Work Orders that have not been reconciled within 30 days of the completion of the work, following the process above.

G. Work Order Mark-Up: The amount of each Work Order resulting from final selection and installation of products and systems covered by an allowance will be the difference between the amount of installed Work and the allowance. This is a procedural clarification of Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 SCHEDULE OF OWNER'S ALLOWANCES

A. These allowances will cover the total cost of all Work authorized under a Work Order, including but not limited to design, cost of materials and equipment delivered and unloaded at the Project site, and all applicable taxes, permits, fees, labor, installation costs and integration as applicable. The Contractor's percentage, overhead and profit for the allowance will be included in the Work Order amount.

B. Should the aggregate of charges for all approved Work Orders issued by the Owner under the allowances be less than the amount of the allowance, the final Contract Sum will be decreased by the amount of the difference. No Work will be performed that would cause total charges under the allowances to exceed the authorized allowance amount. The authorized allowance amount may be increased by Change Order. Should the aggregate charge for an approved Work Order issued by the Owner under the Allowance be less than the amount of the Work Order, the Owner may issue another Work Order in a negative amount to reconcile the Work Order. Such reconciliation Work Orders do not require executive management approval.

C. The following allowance amounts will be included in the Contract Sum bid amount on the Bid Form:

OWNER'S ALLOWANCE: Allow an amount of $24,000 of the Contract Sum for:

1. Owner's Allowance may be used for repair, removal, relocation and/or replacement of utilities (sanitary system, storm system, potable water system, fire protection system, mechanical system, electrical system, communications, security system, etc.).

2. Owner's Allowance may be used for the resolution of unforeseen conditions with the existing airport property. This includes all elements associated with or discovered during the current contract scope including structural, sub surface, paving, lighting, signage, navigational aid, civil, irrigation, building envelope, or other elements associated with the contract scope.

3. Owner's Allowance may be used for relocation and adjustments of Work associated with the airport's tenants (airlines, rental car companies, concessions, TSA, CBP, FAA, Fed Ex, FBO, etc.) and other contracts. This Work shall include all disciplines: architectural, structural, mechanical, plumbing, electrical, communications, fire protection, civil, signage, etc.

4. Owner's Allowance may be used for resolution of modifications to the project work as required by the authority having jurisdiction (Building Office, Fire Marshall, City Inspector, etc.).

5. Owner's Allowance may be used for any Work not shown in the Contract Documents, but which is necessary to complete the Project, with approval of executive management.

D. Contract Time will not be extended as a result of the issuance of any Work Order under this Section 01020 – OWNER'S ALLOWANCES.

E. The Contract Sum will not be adjusted for any costs of acceleration resulting from the issuance of Work Orders under this Section 01020 – OWNER'S ALLOWANCES. In addition, the Contract Sum will not be adjusted for any costs of acceleration of the whole work resulting from the issuance of Work Orders under this Section 01020 – OWNER'S ALLOWANCES.

END OF SECTION

SECTION 01025 – FIELD OFFICES

PART 1 – GENERAL

1.01 REQUIREMENTS

For the purpose of prosecuting its Work, including but not limited to conducting onsite Project and Contract meetings, the Contractor will furnish, install and maintain temporary field offices for the Owner's representatives and the Contractor during the entire construction period and Contractor will furnish, install and maintain storage and work sheds needed for its on-site activities, including storage of equipment, materials and construction. Upon completion of the Work, the Contractor will remove field offices, sheds and contents, and restore site to original condition.

1.02 OTHER REQUIREMENTS

Prior to installation of offices, the Contractor will consult and coordinate with the Owner on location, access and related facilities. Contractor's field offices, staging and laydown areas, and Contractor's employee parking, will be located within *(insert airport)* Airport. Such areas will not be exclusive to the Contractor. Contractor shall coordinate its requirements with others having access to the areas through the Owner.

1.03 REQUIREMENTS FOR FACILITIES

A. Construction will:

1. Be structurally sound, weather tight, with floors raised above ground.

2. Have temperature transmission resistance compatible with occupancy and storage requirements.

3. At Contractor's option consist of portable or mobile buildings subject to the following:

a. Mobile trailers, when used, will be modified for office use.

b. Mobile trailers will not be used for living quarters.

B. Contractor's Office and Facilities shall:

1. Be sized as required for Contractor's general use. Will also provide separate office accommodations for Owner's staff and general use.

2. Have lighting and temperature control as follows:

a. Lighting: 50-foot candles at desk top height.

b. Exterior lighting at entrance door.

c. Automatic heating and mechanical cooling equipment sufficient to

maintain comfort conditions.

3. Have racks and files for Project Record Documents.

4. Have other furnishings at Contractor's option.

5. Have at least one copy machine with reduction and enlargement capabilities.

C. The Contractor will make all provisions and pay for all installations and other costs including maintenance and supplies in order to provide, high speed internet service, power service, exterior lights, copy machine and facsimile machine at the Project site available for the Owner's use. The Contractor will pay all monthly charges for the various services throughout the period of use and until 60 days after the Contractor has reached Final Completion of the Work (including "punch list" items), or until Contractor removes the facilities, whichever is later.

D. The Contractor will pay for the installation of all utilities required to support the Contractor's and Owner's temporary field offices.

PART 2 – PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

Materials, equipment and furnishings may be new or used, but must be serviceable, adequate for required purpose, and must comply with all applicable Laws and Regulations.

PART 3 – EXECUTION

3.01 PREPARATION

The Contractor will fill and grade sites for temporary structures to provide adequate surface drainage.

3.02 INSTALLATION

The Contractor will construct temporary field offices on proper foundations; provide connections for utility services; secure portable or mobile buildings when used; provide steps and landings at entrance doors; and provide hurricane or high wind tie-downs, all in accordance with all applicable Laws and Regulations.

3.03 MAINTENANCE AND CLEANING

The Contractor will provide regular maintenance and cleaning for temporary structures, furnishings, equipment and services to maintain such facilities in good hygienic condition compatible with their intended use.

3.04 REMOVAL

A. The Contractor will remove temporary field offices, contents and services at a time when no longer needed and as approved by the Owner.

B. The Contractor will remove foundations and debris and grade the site to required elevations and clean the areas.

3.05 LOCATION OF FIELD OFFICES

The Contractor will locate all temporary field offices on the Owner's property at the location(s) to be coordinated with the Owner per Paragraph 1.02 above or per agreement between the Contract parties if no on site space is available. No additional compensation will be provided to the Contractor for the offsite rental/purchase of space.

END OF SECTION

SECTION 01040 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

The minimum administration and supervisory requirements necessary for coordination of work on the Project include but are not necessarily limited to the following:

A. Preconstruction Conference.

B. Coordination and Progress Meetings.

C. Preinstallation Conferences.

D. Preconstruction and Progress Photographs.

E. Reporting and Schedules.

F. Special Reports.

G. Service Interruption Requests.

H. Drawing Log (updated weekly).

1.02 COVENANT OF GOOD FAITH AND FAIR DEALING

A. This Contract imposes an obligation of good faith and fair dealing in its performance and enforcement.

B. The Contractor and the Owner, with a positive commitment to honesty and integrity, agree to the following mutual duties:

1. Each will function within the laws and statutes applicable to their duties and responsibilities.

2. Each will assist in the other's performance.

3. Each will avoid hindering the other's performance.

4. Each will proceed to fulfill its obligations diligently.

5. Each will cooperate in the common endeavor of the Contract.

1.03 PRECONSTRUCTION CONFERENCE

A. Before beginning work at the Project site, the Contractor will attend a preconstruction conference and bring the Project Management Team, including but not limited to, the Project Manager and Superintendent employed for this Project. This conference will be requested by the Contractor and called by the Owner who will arrange for other

interested parties to be present.

B. The Contractor will also notify its major subcontractors and suppliers of this meeting if their attendance is required. At this time, all parties will discuss the Project under Contract and prepare a program of procedure in keeping with requirements of the Contract Documents. The Contractor's Project Management Team will make every effort to expeditiously coordinate all phases of the Work, including the required reporting procedure, to obtain the end result within the full purpose and intent of the Contract Documents for this Project.

1.04 COORDINATION AND PROGRESS MEETINGS

The Contractor will:

A. Prepare a written memorandum on required coordination activities. Included will be such items as required notices, reports, and attendance at meetings. This memorandum will be distributed to each entity performing construction at the Project site.

B. In addition to specific coordination and preinstallation meetings for each element of Work, and other regular project meetings for other purposes, hold general progress meeting each week with time coordinated with preparation of payment request. Require each party then involved in planning, coordination, or performance of Work to be properly represented at each meeting. Review present and future needs including interface requirements, time, sequences, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, change orders, and documentation of information for payment requests.

C. Discuss whether each element of current Work is ahead of schedule, on time, or behind schedule in relation with updated progress schedule. Determine how behind schedule Work will be expedited and secure commitments from parties involved. Discuss whether schedule revisions are required to ensure that current Work and subsequent Work will be completed within Contract Time.

D. Review everything of significance which could affect progress of Work or potential claims.

E. Prepare written minutes of the meeting and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting in format required by Owner.

1.05 PREINSTALLATION CONFERENCES

The Contractor will:

A. Well in advance of installation of every major unit of Work which requires coordination and interfacing with other Work, meet at Project site with installers and representatives of manufacturers and fabricators who are involved in or affected by unit of Work, and in coordination or integration with other Work which has preceded or will follow. Preinstallation and coordination meetings shall also occur prior to a new trade or new

scope of work starting. These meetings are also intended to review the approved submittals, means and methods, testing requirements, mock-up requirements, egress, MOT, and other relevant items.

The Contractor shall have a preinstallation and coordination meeting prior to starting work in a new area that could potentially impact the Authority. This pertains to multiple phased projects. Prior to transitioning to a new area of work, a preinstallation and coordination meeting shall occur to discuss impacts, schedule, temp signage, potential utility interruptions, MOT, delivery options, and other relevant items.

The Owner shall be invited to all preinstallation and coordination meetings. At the Owner's discretion, they may invite other parties that could include other contractors, engineers, department heads, or any other personnel that they deem necessary. These meeting should occur well in advance of any mobilization so as to allow the Owner to communicate to other team members and review the contract documents prior to the meetings. An agenda shall be distributed by the Contractor no later than 48 hours in advance.

B. Advise Owner of schedule meeting dates.

C. At each conference, review progress of other Work and preparations for particular Work under consideration, including requirements of Contract Documents, options, related change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedules, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements, required performance results, recording requirements, and protection.

D. Record significant discussions of each conference. Record agreements and disagreements. Record final plan of action. Distribute written minutes of conference promptly to everyone concerned, including Owner and others in attendance in format required by Owner.

1.06 PRECONSTRUCTION AND PROGRESS PHOTOGRAPHS

The Contractor will provide:

A. Preconstruction and progress photographs are required by the Contract. Contractor will promptly forward electronic copies to the Owner.

B. Photographs, videotape(s) or other video recording media will be labeled with the item and date and properly identified and categorized with the name of the person taking the photographs and/or video.

1.07 REPORTING AND SCHEDULES

A. Within 48 hours after each conference/meeting date, distribute copies of minutes-of-the-meeting in format required by the Owner to each entity present and to others who should have been present.

B. Include brief summary, in narrative form, of progress of the Work since previous conference/meeting and report.

C. Schedule Updating:

1. Immediately following each conference/meeting, where revisions to Progress Schedule have been made or recognized, revise Progress Schedule.

2. Reissue revised Project Schedule concurrently with report of each conference/meeting where appropriate but no later than five days after the conference/meeting.

1.08 SPECIAL REPORTS

A. Reporting Unusual Events: When an event of an unusual and significant nature, including, but not limited to an accident, injury, or criminal activity, occurs at the Project site, Contractor will prepare and submit a special report to the Owner. The special report will list chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. The Contractor will advise the Owner as soon as possible when such events are known. Time is of the essence.

B. The Contractor will submit special reports directly to the Owner no later than one day of occurrence. The Contractor will also submit a copy of the special reports to other entities that are affected by the occurrence no later than one day of the occurrence.

1.09 COORDINATION DURING CONSTRUCTION

The Contractor will:

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work.

Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation including, but not limited to:

1. Scheduling construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinating installation of different components to assure maximum accessibility for required maintenance, service, and repair.

3. Making provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination; include such items as required notices, reports, and attendance at conference/meeting; and prepare similar memoranda for

the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials and Owner's Sustainability Master Plan and salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.10 GENERAL COORDINATION PROVISIONS

The Contractor will:

A. Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

1.11 STAFF NAMES

The Contractor will:

A. At the Preconstruction and Preinstallation conferences, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their telephone numbers and email addresses. The Contractor will update the list as required. The list will be entered into the Owner's software management system. The Contractor will coordinate with the Owner's Document Control Manager to ensure that this information is up to date on a quarterly basis by providing this list and indicating all changes to the list each time.

END OF SECTION

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Cutting and patching includes cutting into existing construction to provide for installation or performance of other Work, subsequent fitting, and patching required to restore surfaces to original condition.

B. The Contractor will proceed with cutting and patching at earliest feasible time to complete the Work without delay.

C. The Contractor will execute cutting, fitting, and patching, including excavation and backfill, required to perform Work and to:

1. Make several parts fit together properly.

2. Uncover portions of Work to make provisions for installation of ill-timed Work.

3. Remove and replace defective Work.

4. Remove and replace Work not conforming to requirements of Contract Documents.

5. Remove samples of installed Work as required for testing.

6. Make routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

7. Uncover Work to allow for Owner's observation of covered Work, which has been covered prior to required observation of Owner.

D. Cutting and patching performed during manufacture of products or during initial fabrication, erection or installation processes is not considered to be cutting and patching. Drilling of holes to install fasteners and similar operations is also not considered to be cutting and patching.

E. Refer to other sections of Specifications for specified cutting and patching requirements and limitations applicable to individual units of Work. Do not cut and patch Work without Owner's written acceptance of procedures.

F. The Contractor will for new Work, retain original installer or fabricator or another recognized, experienced and specialized firm to perform cutting and patching.

G. The Contractor will locate all utilities and structural elements within a slab or deck.

1.02 BUILDING MODIFICATIONS

A. Modifications to the structure and its mechanical and electrical parts will be provided as indicated and as necessary to accomplish the Work of these Contract Documents.

B. Modifications will include the removal of existing structure or parts as applicable, relocation of materials and/or parts, termination and relocation of utilities, cutting, patching, cleaning, adjusting, and refinishing, and all incidental Work related to these tasks.

C. It is the Owner's intent to maintain daily occupancy functions during the progress of this Work. The Contractor will closely coordinate this Work to minimize inconvenience thereto.

D. No utilities will be interrupted without first notifying the Owner and obtaining concurrence with the interruption. Refer to Section 01545 - UTILITIES for requirements.

1.03 SUBMITTALS

A. Procedural Proposal for Cutting and Patching:

1. Where prior acceptance of cutting and patching is required, the Contractor will submit proposed procedures for Work well in advance of time Work will be performed.

2. The Contractor will include the following information, as applicable, in submittal:

a. Nature of Work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe the extent of the cutting and patching required and how it is to be performed.

b. Anticipated results of Work in terms of change to existing conditions including structural, operational and visual changes, as well as other significant elements.

c. List products to be used and firms that will perform Work.

d. Dates when cutting and patching are to be performed.

e. List utilities that will be disturbed or otherwise be affected by Work, including utilities that will be relocated and utilities that will be out-of-service temporarily.

f. Indicate how long utility service will be disrupted.

B. Where cutting and patching of structural Work involves addition of reinforcement, the Contractor will submit details and engineering calculations to show how reinforcement is integrated with original structure to satisfy requirements.

C. Review of procedural proposal by Owner does not waive Owner’s right to later require complete removal and replacement of Work found to be cut and patched in

unsatisfactory manner.

D. The Contractor will not cut or patch structural elements in a manner that would impact their load carrying capacity or load-deflection ratio.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The Contractor will use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to fullest extent possible with regard to visual effect.

B. The Contractor will use materials for cutting and patching that will result in equal-or-better performance characteristics.

C. The Contractor will comply with specifications and standards for each specific product involved.

D. Should conditions of Work or schedule indicate change of products from original installation, the Contractor will submit requirements for substitution with sufficient documentation to substantiate that the proposed substitution is equivalent in terms of performance to the original installation.

PART 3 – EXECUTION

3.01 EXAMINATION

The Contractor will:

A. Before cutting, examine surfaces and conditions under which Work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with Work.

B. Before the start of cutting Work, meet at Work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between various trades. Coordinate layout of Work and resolve potential conflict before proceeding with Work.

C. Slabs and walls shall be X-rayed for locations of any utilities and structural elements before coring or cutting begins. Due to the inability of GPR (ground penetrating radar) to properly locate PVC piping and conduit, GPR shall only be used with written approval by Owner.

3.02 PREPARATION

The Contractor will:

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

B. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of Project that may be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take precautions not to cut existing pipe, conduit, or duct serving building(s) scheduled to be relocated until provisions have been made to bypass them.

3.03 CUTTING

The Contractor will:

A. Cut Work using methods that are least likely to damage Work to be retained or adjoining Work.

B. Use handheld small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using cutting machine such as carborundum saw or core drill to ensure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent Work. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

C. Bypass utility services such as pipe and conduit before cutting, where such utility services are shown or required to be removed, relocated, or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After bypass and cutting, cap, valve, or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

D. Not cut and patch operational elements or safety related components in a manner that would result in reduction of capacity to perform in manner intended, including energy performance, or that would result in increased maintenance, decreased operational life or decreased safety.

E. Not cut and patch Work exposed on building's exterior or in occupied spaces, in a manner that would result in lessening building's aesthetic qualities. Do not cut and patch Work in a manner that would result in substantial visual evidence of cut and patch Work. Remove and replace Work judged by the Owner to be cut or patched in a visually unsatisfactory manner.

F. Where structural members and/or other construction elements penetrate smoke and fire rated assemblies and sound barriers, including walls around and floor below mechanical equipment rooms, provide acoustical fire rated sealant between such Work and barrier to maintain acoustical attenuation, as well as smoke and fire integrity of the barrier.

3.04 PATCHING

The Contractor will:

A. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for Work.

B. Where feasible, inspect and test patched areas to demonstrate integrity of Work.

C. Restore exposed finishes of patched areas and where necessary extend finished restoration into retained adjoining Work in a manner which will eliminate evidence of patching and refinishing.

D. Install new products to complete Work in accordance with requirements of Contract Documents.

E. Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in new space to provide an even surface or uniform color appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.

F. Where patch occurs in smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.

3.05 ADJUSTING

The Contractor will:

A. Restore damaged pipe covering to original conditions.

B. Remove and replace Work cut and patched in visually unsatisfactory manner.

3.06 CLEANING

The Contractor will:

Thoroughly clean areas and spaces where Work is performed or used as access to Work. Remove paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finish is applied.

END OF SECTION

SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Owner may furnish horizontal and vertical monuments, which may be outside the limits of the Project site. The Contractor will preserve all horizontal and vertical control points furnished by the Owner.

B. The Contractor will:

1. Furnish all lines, grades, and measurements necessary for the proper prosecution and control of the Work under these Contract Documents. The Work will include performing all calculations required and setting all controls needed such as offsets, reference points, and other reference marks or points necessary to provide lines and grades for construction. The Contractor is responsible to maintain these control points for use by subsequent contractors.

2. Establish the building grades, lines, levels, columns, walls and partition lines required.

3. Calculate and measure required dimensions indicated within recognized tolerances.

4. Not scale drawings to determine dimensions.

5. Advise subcontractors performing Work of marked lines and levels provided for use in layout of Work.

1.02 SURVEY

A. Surveyor:

The Contractor will retain a competent Professional Engineer or Land Surveyor, experienced and specialized in land survey work, registered and licensed by the State of Florida, and acceptable to the Owner, who will establish the exterior lines and required elevations of all buildings and structures to be erected on the Project site and will establish sufficient lines and grades for the construction of associated Work such as, but not limited to, roads, utilities, aircraft aprons, and site grading. The Professional Engineer or Land Surveyor will certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries.

B. Procedures:

The Contractor will:

1. Verify layout information indicated in relation to property survey and existing benchmarks before proceeding with layout of actual Work.

2. As Work proceeds, check major element for line, levels, and plumb.

3. Maintain accurate surveyor's log or record book of such checks, available for Owner's reference at reasonable times.

4. Record deviations from required lines and levels.

5. Advise Owner promptly upon detection of deviations exceeding indicated or recognized tolerances.

6. Record deviations which are accepted on Project Record Drawings.

1.03 RECORDS

The Contractor will:

A. Maintain complete accurate log of control and survey Work as it progresses, updated monthly and accessible to Owner for review on an as needed basis.

B. Upon completion of foundation walls and major Project site improvements, prepare certified survey showing dimensions, locations, angles, and elevations of construction.

C. Final Survey:

1. Immediately before time of Substantial Completion, prepare final survey showing significant features resulting from construction of Project.

2. Include on survey certification, signed by surveyor, to effect that principal lines and levels of Project are accurately positioned as shown on survey.

D. Survey Copies:
Furnish electronic copy and one hard copy, if requested by Owner, of the final survey.

E. Records of Actual Work:
Furnish electronic copy and one hard copy, if requested by Owner, one of which will be returned for inclusion in Project Record Documents as specified in Section 01700 - PROJECT CLOSEOUT.

1.04 UNDERGROUND OBSTRUCTIONS

A. The Contractor acknowledges that pipe lines, existing underground installation, and underground structures in vicinity of Work are shown on drawings according to best information available.

B. The Contractor will verify location of underground pipe lines, conduits, and structures by contacting owners of underground utilities and by prospecting in advance of excavation.

C. The Contractor will secure written permission from proper authority before initiating

new construction over existing utilities. The Contractor will submit copy or original written permission before commencing Work. Furnish release from proper authority before Final Acceptance of Work.

D. The Contractor will repair cuts to existing utilities made during construction process as part of Project Work to satisfaction of utility Owner, unless otherwise stated in the Contract Documents.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01095 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. General:

1. This section specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the Work. These requirements include the obtaining of permits, licenses, inspections, releases and similar requirements associated with regulations, codes and standards.

2. Regulations are defined to include laws, statutes, ordinances, and lawful orders issued by governing authorities, as well as those rules, codes, conventions and agreements within the construction industry which effectively control the performance of the Work, as well as applicable FAA Advisory Circulars, regardless of whether they are lawfully imposed by governing authority or not.

3. Codes, standards and requirements of the Owner are identified within the Contract Documents. Contractor must examine, determine and identify other codes, standards and requirements that may be applicable to the Contractor's Work, such that the intent of the Contract is fully realized.

B. Governing Regulations:

Refer to Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified, for requirements related to compliance with governing regulations.

1.02 DEFINITIONS

A. General Requirements:

The provisions or requirements of Division 01 sections apply to the entire Work of this Contract and supplement the requirements in the Contract Documents.

A substantial amount of specification language consists of definitions of terms found in the Contract Documents. Certain terms used in Contract Documents are defined in this section. Definitions and explanation contained in this section are not necessarily either complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents.

B. Whenever the following terms are used in the Contract Documents or any other documents or instruments pertaining to the construction of this Project, the intent and meaning will be interpreted as follows:

1. AASHTO. The American Association of State Highway and Transportation Officials.

2. ACCESS ROAD. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

3. ADVERTISEMENT. A public announcement, as required by local law, inviting bids for Work to be performed and materials to be furnished. Also referred to as "Invitation to Bid" or "Notice to Bidders."

4. AIR OPERATIONS AREA (AOA). For the purpose of these Specifications, the term AOA means any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An AOA includes 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.

5. AIRPORT. Airport means Peter O. Knight Airport.

6. AIRPORT IMPROVEMENT PROGRAM (AIP). The AIP means a grant-in-aid program administrated by the Federal Aviation Administration.

7. APPROVE. Where used in conjunction with Owner's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the term "approved" will be held to limitations of Owner's responsibilities and duties as specified in the Contract Documents. In no case will "approval" by Owner be interpreted as a release of Contractor from responsibilities to fulfill requirements of the Contract Documents.

8. APM: Automated People Mover. A guided transit mode with fully automated operation, featuring vehicles that operate on guideways with exclusive right-of-way.

9. APM SYSTEM: The vehicles, running surfaces or track, switches, other guideway equipment, active graphics, any platform barrier doors, power distribution, central control, communications, maintenance equipment, and all other equipment, which when integrated results in the operation of the APM trains.

10. APRON. Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

11. ASTM INTERNATIONAL (ASTM). Formerly known as the American Society for Testing and Materials (ASTM).

12. AWARD. The acceptance by the Owner of the successful Bidder's Bid.

13. BID. The written offer of the Bidder to perform the Work and furnish the necessary materials and labor in accordance with the provisions of the Contract Documents.

14. BID BOND. The security furnished with a Bid to guaranty that the Bidder will enter into a Contract if Bidder's Bid is accepted by the Owner.

15. BIDDER. Any individual, partnership, firm or corporation, acting directly or through a duly authorized representative, who submits a Bid for the Work contemplated.

16. BUILDING AREA. 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.

17. CERTIFICATE OF ANALYSIS (COA). The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.

18. CERTIFICATE OF COMPLIANCE (COC). 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.

19. CHANGE ORDER. 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.

20. CONSTRUCTION SCHEDULE. The Contractor-prepared schedule as adjusted from time to time in accordance with the Contract Documents showing planned and actual progress by items of the Work.

21. CONTRACT. 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.

22. CONTRACT ITEM (PAY ITEM). A specific unit of work for which a price is provided in the contract.

23. CONTRACT TIME. 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.

24. CONTRACTOR. 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.

25. CONTRACTORS QUALITY CONTROL (QC) FACILITIES. The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).

26. CONTRACTOR QUALITY CONTROL PROGRAM (CQCP). 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.

27. CONTROL STRIP. A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.

28. CONSTRUCTION SAFETY AND PHASING PLAN (CSPP). 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.

29. DAY. As used in the Contract Documents means calendar day unless otherwise specifically defined.

30. DESIGN PROFESSIONAL: The individual, partnership, firm or corporation duly authorized by the Owner (Sponsor) to be responsible for the architectural and engineering supervision of the contract work and acting directly or through an authorized representative.

31. CONTRACT DOCUMENTS. The Contract Documents consist of the executed Contract between the Owner and Contractor, the Contractor's GMP Proposal as accepted by the Owner, Bonds, Insurance Requirements, the Division 1 Documents, E-Verify Certification and any Contract Modifications issued after execution of the Contract.

32. DIRECTED, REQUESTED, ETC. Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "accepted", and "permitted" mean "directed by Owner or Design Professional", "requested by the Owner or Design Professional", and similar phrases. However, no such implied meaning will be interpreted to extend Owner's or Design Professional's responsibility into the Contractor's area of Contractor, including but not limited to construction supervision.

33. DRAINAGE SYSTEM. The system of pipes, ditches, ponds, and structures by which surface or subsurface waters are collected and conducted from the airport area.

34. DRAWINGS. The official Drawings or exact reproductions which show the location, character, dimensions and details of the airport and the Work to be done.

35. ENGINEER. 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.

36. EQUIPMENT. The articles, devices, software, control system, and other assets used to serve a function in the operation of the Project. Also, used to refer to all machinery, together with the necessary supplies for upkeep and maintenance, as well as all tools and apparatus, necessary for the proper construction and acceptable completion of Work.

37. EXPERIENCED. The term "experienced" when used with the term "Installer" means having previous projects similar in size and scope to the installation to be performed, being familiar with the procedures required, and having complied with requirements of the authority having jurisdiction.

38. EXTRA WORK. An item of Work not provided for in the awarded Contract as previously modified by work order or change order but which is found by the Owner to be necessary to complete the Work within the intended scope of the Contract as previously modified.

39. FAA (Federal Aviation Administration). When used to designate a person, FAA means the Administrator or its duly authorized representative.

40. FAA SUPPLEMENT. It is understood that federal grant funds may be used in the Project. In the event federal grant funds are used, the Contract Documents will be governed by all applicable rules and regulations of the FAA and U.S. Department of Transportation, as well as applicable requirements incorporated in any grant agreement between the Owner and the FAA with regard to said funding, which requirements are set forth in the attached "FAA Construction Contract Clauses, Airport Improvement Program," and which will be incorporated herein if federal grant funds are utilized.

41. FEDERAL SPECIFICATIONS. The Federal Specifications and Standards, and all supplements, amendments and indices thereto as prepared and issued by the General Services Administration of the Federal Government. They may be obtained from the Specifications Unit, 7th and D Street, SW, Washington, DC 20406, Tele: (202) 472-2205 or 472-2140.

42. FHWA (Federal Highway Administration). When used to designate a person, FHWA will mean the Administrator or its duly authorized representative.

43. FORCE ACCOUNT. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. Owner Force Account - Work performed for the project by the Owner's employees.

44. FURNISH. Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and delivery to Project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance for incorporation and installation into the Work.

45. INDICATED. The term "indicated" is a cross-reference to graphic representations, notes, or schedules on drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.

46. INSPECTOR. An authorized representative of the Owner assigned to make all necessary inspections and/or tests of the Work performed or being performed, or of the materials furnished or being furnished by the Contractor.

47. INSTALL. Except as otherwise defined in greater detail, the term "install" is used to describe operations at the Work site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable in each instance, to incorporate the element being installed into the Work.

48. INSTALLER. The term "installer" is the entity (person or firm) engaged by the Contractor, its Subcontractor or Sub-subcontractor for performance of a particular unit of Work at the Project site, including installation, erection, application, and similar required operations. It is a general requirement that such entities (installers) be expert in the operations they are engaged to perform.

49. INTENTION OF TERMS. Whenever, in the Contract Documents, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it will be understood that the direction, requirement, permission, order, designation, or prescription of the Design Professional is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import will mean approved by, acceptable to, or satisfactory to the Design Professional.

    a. Any reference to a specific requirement of a numbered paragraph of the Contract Document or a cited standard will be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

50. LABORATORY. The official testing laboratories of the Contractor or Owner or such other laboratories as may be designated by the Owner.

51. LIGHTING. 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.

52. MAJOR AND MINOR CONTRACT ITEMS. A major contract item will be any item that is listed in the Bid, the total cost of which is equal to or greater than 20% of the total amount of the awarded Contract. All other items will be considered

minor contract items.

53. MATERIALS. Any substance to be used in the Work.

54. MODIFICATION OF STANDARDS (MOS). Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.

55. NO EXCEPTIONS TAKEN. The term "No Exceptions Taken" where used in conjunction with the Design Professional's action on the Contractor's submittals, applications, and requests, is limited to the Design Professional's duties and responsibilities as stated in Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified.

    a. Refer to Section 01340 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for more specific information.

56. NOT APPROVED. Where used in conjunction with the Design Professional's response to submittals, requests, applications, inquires, reports, and claims by the Contractor, indicates that the item or material is unsatisfactory, and must be revised, new material prepared in accordance with notations, and the item or material resubmitted. Material marked in this manner will not be released for any Work.

57. NOTE MARKINGS. Where used in conjunction with the Owner's response to submittals, requests, applications, inquires, reports, and claims by the Contractor, “Note Markings” indicates that the item or material submitted is approved subject to corrections noted. Correction and re-submittal of the item is not required unless specifically called for in the notations. Approval of Contractor’s submitted item does not constitute approval of the design. Approval does not permit any deviation from the Contractor’s requirements and does not relieve the Contractor of the responsibility for errors or deficiencies in design, dimension, details, or for coordinating installation and/or construction with actual conditions at the Project site.

58. NOTICE TO PROCEED (NTP). A written notice to the Contractor to begin the actual Contract Work. If applicable, the NTP will state the date on which the Contract Time begins.

59. OWNER (SPONSOR). The term Owner or Sponsor will mean the party of the first part or the contracting agency signatory to the Contract. The Hillsborough County Aviation Authority is the Owner, and will include its agents, employees, representatives and contractors when acting at its direction or on its behalf. The Hillsborough County Aviation Authority is also referred to as the "Owner" in these Contract Documents. For AIP Contracts, the term Sponsor will have the same meaning as the term Owner.

60. PAVEMENT. The combined surface or friction course, structural course, base course, and sub-base course, if any, considered as a single unit.

61. PAYMENT BOND. The approved form of security furnished by the Contractor and Contractor's surety as a guaranty that the Contractor will pay in full all bills and accounts for material and labor used in the construction of the Work under the contract.

62. PERFORMANCE BOND. The approved form of security furnished by the Contractor and Contractor's surety as a guaranty that the Contractor will complete the Work in accordance with the terms of the Contract and will complete the guarantee of the Work specified therein.

63. PLANS. 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.'

64. PROJECT. The Work defined in the Contract Documents.

65. PROJECT SITE. The term "Project Site" is defined as the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other Work, as part of the Project. The extent of the Project Site may or may not be identical with the description of the land upon which the Project is to be built but it is within or near Tampa Executive Airport.

66. PROPOSAL. 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.

67. PROPOSAL GUARANTY. 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.

68. PROVIDE. Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete, and ready for intended use, as applicable in each instance.

69. QUALITY ASSURANCE (QA). Owner's responsibility to assure that construction work completed complies with specifications for payment.

70. QUALITY CONTROL (QC). Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.

71. QUALITY ASSURANCE (QA) INSPECTOR. 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.

72. QUALITY ASSURANCE (QA) LABORATORY. 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.

73. RESIDENT PROJECT REPRESENTATIVE (RPR). 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.

74. RETENTION. Retention (or Retainage) is the amount of compensation for Work accomplished by the Contractor which is retained by the Owner to be paid to the Contractor as specified herein.

75. RUNWAY. The area on the airport designated for the landing and takeoff of aircraft.

76. RUNWAY SAFETY AREA (RSA). 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.

77. SAFETY PLAN COMPLIANCE DOCUMENT (SPCD). Details how the Contractor will comply with the CSPP.

78. SHOP DRAWINGS. All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor and which illustrate the equipment, material or some portion of the Work.

79. SHUTTLE. A guided transit mode with fully automated operation, featuring vehicles that operate on guideways between the Main Terminal and Airsides

80. SPECIFICATIONS. A part of the Contract Documents 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 will have the same force and effect as if included in the Contract physically.

81. SPONSOR. See "Owner".

82. STRUCTURES. Airport facilities such as buildings, aprons, bridges, culverts, catch basins, inlets, retaining walls, cribbing, storm and sanitary sewer lines, waterlines, underdrains, electrical ducts, manholes, handholes, lighting fixtures and bases, transformers, flexible and rigid pavements, navigational aids, buildings, vaults, and other manmade features of the airport that may be encountered in the Work and not otherwise classified herein.

83. SUBGRADE. The soil which forms the pavement foundation.

84. SUPERINTENDENT. The Contractor's executive representative who is present on the Work during progress, authorized to receive and fulfill instructions from the Owner, and who will supervise and direct the construction.

85. SUPPLEMENTAL CONTRACT. A written agreement between the Contractor and the Owner covering (1) Work that would increase or decrease the total amount of the awarded Contract, or any major Contract item, by more than 25%, such increased or decreased work being within the scope of the originally awarded Contract; or (2) Work that is not within the scope of the originally awarded Contract.

86. SURETY. The corporation, partnership, or individual, other than the Contractor, executing Payment and Performance Bonds which are furnished to the Owner by the Contractor.

87. TAXILANE. A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.

88. TAXIWAY. The portion of the AOA of an airport that has been designated by the airport authority for movement of aircraft to and from the airport's runways or aircraft parking areas.

89. TAXIWAY/TAXILANE SAFETY AREA (TSA). A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.

90. TESTING LABORATORIES. An independent entity engaged to perform specific inspections or tests of the Work, either at the Project site or elsewhere, and to report and (if required) interpret results of those inspections or tests.

91. TRADES. Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

92. UNIT PRICE. Cost per unit of Work.

93. WORK. The construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

94. WORKING DAY. 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.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. General:

1. This article is provided to help the user of the Specifications to more readily understand the format, language, implied requirements and similar conventions of content. None of the following explanations will be interpreted to modify the substance of the Contract requirements.

B. Specification Content:

1. The Project Specifications and the Contract Documents have been produced employing certain conventions in the use of language as well as conventions regarding the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

a. In certain circumstances, the language of the Specifications and other Contract Documents is of the abbreviated type. It implies words and meanings that will be interpreted as plural. Plural words will be interpreted as singular where applicable and where the full context of the Contract Documents so indicates.

b. Imperative Language is used generally in the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor or by others when so noted.

1.04 INDUSTRY STANDARDS

A. Applicability of Standards:

Except where more explicit or stringent requirements are written into the Contract Documents, applicable industry standards have the same force and effect as if bound into or copied directly into the Contract Documents. Such industry standards are made a part of the Contract Documents by reference. Contractor shall keep available copies of all applicable codes and standards at locations where Work is being performed, including the Project Site.

B. Publication Dates:

Except as otherwise indicated, where compliance with an industry standard is required, comply

with standard in effect as of date of Contract Documents.

C. Conflicting Requirements:

Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements, the Contractor shall call the conflict to the Owner's attention and the most stringent requirement will be enforced as determined by the Owner.

D. Copies of Standards:

1. The Contract Documents require that each entity performing Work be experienced in that part of the Work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the Work. Copies of applicable industry standards are not bound with the Contract Documents.

    a. Where copies of industry standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

    b. Although certain copies of industry standards needed for enforcement of the requirements may be required submittals, the Owner reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of requirements.

E. Abbreviations and Names:

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

F. Comply with applicable standards for work promulgated by organizations, associations, institutes, societies, boards and generally recognized organizations including but not limited to:

Acoustical Materials Association……	AMA
Air Conditioning & Refrigeration Institute……	ARI
Air Moving & Conditioning Association……	AMCA
Aluminum Association……..	AA
American Association of State Highway and Transportation Officials	AASHTO
American Concrete Institute……	ACI
American Gas Association……	AGA
American Institute of Steel Construction……	AISC
American National Standards Institute……	ANSI
American Petroleum Institute……	API

American Plywood Association……..	APA
American Society for Testing and Materials……	ASTM
American Society of Heating, Refrigerating & Air Conditioning Engineers.	ASHRAE
American Water Works Association……	AWWA
American Welding Society……	AWS
American Wood Preservers Bureau……	AWPB
Architectural Precast Association……	APA
Architectural Woodworking Institute……	AWI
Cast Iron Pipe Research Association……	CIPRA
Concrete Reinforcing Steel Institute……	CRSI
Contracting Plasterers and Lathers International Association……	CPLIA
Factory Mutual Engineering Corporation……	FM
Federal Specifications……	FED. SPEC.
Flat Glass Jobbers Association……	FGJA
Gypsum Association……	GA
Industrial Power Cable Engineers Association……	IPCEA
Institute of Boiler & Refrigeration……	IBR
Institute of Electrical & Electronic Engineers……	IEEE
Joint Industry Council……	JIC
Metal Lath Manufacturers Association……	MLMA
Metal Lath/Steel Framing Association……	ML/SFA
Military Specifications……	MIL. SPEC.
National Association of Architectural Metal……..	NAAM
National Bureau for Lathing and Plastering……	NBLP
National Concrete Masonry Association……	NCMA
National Electric Code……	NEC
National Electrical Manufacturers Association……..	NEMA
National Fire Protection Association……..	NFPA
National Lumber Manufacturers Association……..	NLMA
National Roofing Contractors Association……..	NRCA
National Terrazzo & Mosaic Association……..	NTMA
National Woodwork Manufacturers Association……	NWMA
Portland Cement Association……..	PCA
Post-Tensioning Institute……	PTI
Precast Concrete Institute……..	PCI
Product Standards……..	PS
Research Council on Riveted and Bolted Structural Joints……	RCRBSJ
Rubber Manufacturer's Association……	RMA
Sealing and Waterproofers Institute……	SWI
Sheet Metal & Air Conditioning Contractors National Assoc……	SMACNA
Southern Pine Inspection Bureau……	SPIB
Steel Boiler Institute……..	SBI
Steel Door Institute……	SDI

Steel Joist Institute……	SJI
Steel Structures Painting Council……	SSPC
Stucco Manufacturer's Association……	SMA
Tile Council of America……	TCA
Tubular Exchange Manufacturers Association……..	TEMA
Underwriter's Laboratories……	UL
United States Department of Commerce - Commercial Standards……	CS
United States Department of Commerce – Products Standards	PS
United States Gypsum Company……	USG
United States Postal Service……..	USPS
Vermiculite Institute……	VI
Warnock Hersey……	WH
West Coast Lumber Inspection Bureau……..	WCLIB

G. Where more than one quality or requirement is set forth in such standards and reference is not made in these Specifications to which specific quality or requirement is intended, the conflict shall be brought to the attention of the Owner who will determine which one to follow. The Contractor will be deemed to have bid the most stringent and furnished the most stringent. Where under such standards options occur, the Owner will be called upon to designate which applies.

H. No provisions of any referenced standard, specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) will be effective to change the duties and responsibilities of the Owner, Contractor or any of their consultants, agents or employees, from those set forth in the Contract Documents, nor will it be effective to assign to the Owner any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of the Contract Documents.

1.05 CODES/MANUFACTURER'S RECOMMENDATIONS

A. Applicable code requirements are included herein by this reference. However, such are minimum criteria and no reduction from Drawings or Specifications will be permitted, even if allowed by applicable code.

B. Electrical and mechanical apparatus, fixtures and equipment will bear approved device label of Underwriter's Laboratories.

C. The local building code and the Florida Building Code (Latest Edition) apply to all Work. In the event a conflict occurs between the local and Florida Building Codes, the greater requirements will govern. The Contractor shall call to the attention of the Owner any conflict which may arise due to revisions to codes and regulations subsequent to the Contract Date.

D. Specifically, comply with following codes and regulations:

1. Florida Building Code, Latest Edition.

2. Florida Plumbing Code, Latest Edition.
3. Florida Mechanical Code, Latest Edition.
4. Florida Fire/Gas Code, Latest Edition.
5. Local Building Code.
6. Local Public Utility regulations.
7. City of Tampa Water Department "Developer-Install" Manual.
8. City of Tampa Department of Sanitary Sewer Developer Review Package.
9. National Standard Plumbing Code.
10. National Electric Code (NEC).
11. ASME Code for unfired pressure vessels.
12. Building exits code (life safety code), NFPA 101.
13. Standards of National Board of Fire Underwriters.
14. ASHRAE Safety Code for Mechanical Refrigeration.
15. National Fire Codes.
16. National Fire Protection Association.
17. Occupational Safety and Health Administration (OSHA).
18. International Council of Building officials.
19. Housing and Urban Development.
20. Council of American Building Officials.
21. ANSI A17.1-1987 Safety Code for Elevators and Escalators.
22. American National Standards Institute (ANSI).
23. Florida Department of Environmental Regulation.
24. United States Environmental Protection Agency.
25. Americans with Disabilities Act (ADA).
26. Hillsborough County Environmental Protection Commission.
27. Florida Department of Transportation (FDOT).
28. Federal Aviation Administration (FAA)(Including, but not limited to applicable Advisory Circulars.) applicable Advisory Circulars.)

E. Comply with recommendations of pertinent manufacturer to achieve first quality work.

1.06 ABBREVIATED SPECIFICATIONS

A. In order to shorten these Specifications, certain terminology and form common in specification writing is employed. The following words are often omitted when meaning remains clear without the same, i.e., "the," "the Contractor will," "of," "a," "will comply with," etc.

B. Uses of a period or colon after a general mention of a material lists means "will be," or "will comply with." Example:

"Portland Cement: ASTM C 150, Type 1."

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01110 - AIRPORT PROJECT PROCEDURES

PART 1 - GENERAL

1.01 AIRPORT OPERATIONS

Airport operations will be maintained throughout this Contract. The Contractor will in no way curtail or handicap normal operational characteristics of the airport facility except as specifically indicated and specified in these Contract Documents.

1.02 PERMITS, LICENSES AND TAXES

A. Contractor will be required to procure and pay for all permits, licenses, fees, duties and taxes and arrange for all inspections and similar procedural items as required by the authorities having jurisdiction.

B. The Contractor will procure all necessary and required permits and licenses, including batch plant permit(s), pay all charges, fees and taxes and give all notices necessary and incidental to the due and lawful prosecution of the Work so as not to delay the completion of the Project. No extensions of Contract for the foregoing will be granted. The Contractor's claim that insufficient Contract Time was specified will not be a valid reason for extension of Contract Time. No extensions of Contract Time for completion will be granted for failure to timely procure all necessary and required permits and licenses, including Cutting & Welding permits, batch plant permit(s), or failure to pay all charges, fees and taxes, or failure to give all notices timely.

1.03 VERIFICATION OF EXISTING CONDITIONS

Prior to bidding and commencing with construction, the Contractor will familiarize themselves with the existing conditions of the Project and requirements of the Contract Documents. Should the Contractor discover any inaccuracies, errors, or omissions between the actual existing conditions and the Contract Documents, Contractor will within 7 calendar days from the time it was discoverable notify the Owner in writing or otherwise Contractor will be deemed to have waived any claim arising therefrom. Submission of Bid by the Contractor will be held as an acceptance of the existing conditions and the requirements of the Contract Documents by the Contractor.

1.04 MAINTENANCE OF TRAFFIC

Not Used.

1.05 METHODS AND EQUIPMENT

A. All equipment which is proposed to be used on the Work will 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 will be such that no injury to previously completed Work, adjacent property, or existing Airport facilities will result from its use.

B. 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 Documents.

C. When the Contract specifies the use of certain methods and equipment, such methods and equipment will be used unless others are authorized by the Owner. If the Contractor desires to use a method or type of equipment other than specified in the Contract, Contractor may request approval from the Owner to do so. The request will be in writing and will include a full description of the methods and/or equipment proposed and 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 the Contract Documents. If, after trial use of the substituted methods or equipment, the Owner determines that the Work produced does not meet the Contract Documents, the Contractor will discontinue the use of the substitute method or equipment and will complete the remaining Work with the specified methods and equipment.

D. The Contractor will remove any deficient Work and replace it with Work of specified quality, or take such other corrective action as the Owner may direct. No change will be made in basis of payment for items in the Contract involved or in Contract Time as a result of authorizing a change in methods or equipment under this Section.

1.06 HOURS OF WORK

A. Work hours will comply with the Project Schedule requirements specified in Section 01315 - SCHEDULES, PHASING. In addition, the following limitations apply:

1. Work may proceed at any time (Business Hours, Monday through Friday) unless otherwise indicated on Drawings with the following exceptions (all hours subject to Owner approval).

2. Holiday blackout periods

a. FAA Moratorium at Thanksgiving: Saturday in November before Thanksgiving through 4th Monday in November following Thanksgiving. No work allowed near navigational aid critical areas and working in proximity to FAA cables. No runway closures.

b. FAA Moratorium at Christmas: 3rd Saturday in December until January 2. No work allowed near navigational aid critical areas and working in proximity to FAA cables. No runway closures.

c. Spring Break: Second week in March through mid-April. No runway closures.

d. All three blackout periods noted above will have limited or restricted work hours throughout the campus. Work shall not impact the normal operations of the airport. Close coordination and Owner approval will be required for all work activities during these time periods.

3. Disruptive Work will be defined as any activity (including excessive noise, air pollution [dust, etc.] and similar events) that adversely disrupts, hinders or impacts normal Airport operations. These activities will be conducted so as not to interfere with the normal operation of the Airport. Work which may be considered disruptive will be conducted by the Contractor during middle of the night hours as designated by the Owner. When directed by the Owner to cease Disruptive Work, the Contractor will immediately suspend and discontinue the Disruptive Work. Work will not be resumed until directed by the Owner. Contractor's claim for additional cost or additional Contract Time for suspending Disruptive Work will not be accepted.

1.07 DAILY CLEAN-UP AND TRASH REMOVAL

A. Debris from Work will be promptly removed from the Project site at least daily. Debris will not be allowed to become a hazard to the safety of the public. Areas occupied by the Owner and Building Tenants will be kept clean at all times.

B. The Contractor will be responsible for clean-up and trash removal. Accumulation of trash and debris will not be allowed and the Owner may at any time direct the Contractor to immediately remove its trash and debris from the site of the Work when, in the opinion of the Owner, such trash constitutes a nuisance or in any way hinders the Work or the Airport's operations. If the Contractor should fail to remove its trash and debris from the site of the Work in a timely manner, the Owner may have this Work performed and deduct the cost of such from Contractor's payment.

1.08 CLEANING AND PROTECTION

A. General: During all Work at the Project Site, clean and protect Work in progress and adjoining Work on the basis of continuous daily maintenance. Apply protective covering on installed Work to ensure freedom from damage or deterioration.

B. Clean and perform maintenance on installed Work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures of Work: To the extent possible through appropriate control and protection methods, supervise performance of the Work in such a manner and by such means which will ensure that none of the Work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Such exposures include, where applicable, but are not limited to, the following:

1. Excessive static or dynamic loading.

2. Excessive internal or external pressures.

3. Excessive electrical loading.

4. Solvents.

5. Chemicals.

6. Light.

7. Puncture.

8. Abrasion.

9. Heavy Traffic.

10. Soiling.

11. Combustion.

12. High speed operation, improper lubrication, unusual wear.

13. Improper shipping or handling.

14. Theft.

15. Vandalism.

D. Protection at Openings: Contractor will provide protection at all openings in structures and finishes to maintain the building weather and dust tight. All protection will be of solid material and substantial so that it will not be disturbed by wind and weather normal to the area and season, and will also be tight fitting to prevent noise infiltration.

E. Protection of Improvements:

1. Damage to Existing Facilities: Existing surfaces and materials of the Owner's property not requiring work by the Contract Documents that are damaged by the Contractor's operations will be immediately repaired. Repaired surfaces and materials will match existing adjacent undamaged surfaces and materials. Repair work will be coordinated with the Owner with regards to time and method.

2. All roads used by the Contractor during construction will be restored and/or replaced to their original condition.

3. Accidental Demolition: All structures or parts thereof that may become damaged due to accident or Contractor's error will be restored to their original condition at no cost to the Owner. Materials and equipment being used in the repair or replacement resulting from damage will be new and will perform at the manufacturer's published capacities. If the existing equipment or materials cannot be identified, or if unavailable, the selection of the replacement will be subject to approval by the Owner in writing.

4. Flooring: Where new carpeting, tile, terrazzo, or other flooring material has been installed, Contractor will fully protect such flooring from all damage and staining by Contractor’s forces and the Owner may deduct from the Contractor’s Contract

Sum such sums as may be necessary to cover the cost of repairing and replacing such new flooring.

F. Owner's - Standards of Construction:

1. Hazardous Materials:

a. Any product or material that contains asbestos material will not be permitted on this project.

b. Any paint containing lead will not be used on this project.

c. Any product or material that contains per- and polyfluoroalkyl substances (PFAS) will only be permitted on this project if the Contractor prepares an alternatives analysis to determine if a non-PFAS alternative product or material is viable. If a non-PFAS alternative is determined to be viable, it will be used pending Authority review and approval of the alternatives analysis. No additional costs will be considered for the alternatives analysis or the incorporation of the non-PFAS alternative. After October 4, 2021, construction products or material containing PFAS will not be permitted on this project.

2. Building:

a. Materials and finishes used in the Work will have a fire rating at least equal to the rating required for the type of space in which the Work is to be performed.

b. No work will be performed which, when complete, will result in the degradation of the fire rating for the space.

c. Any penetration of existing ceilings or walls which will break the fire rating of the ceiling or wall will be patched to obtain the same fire rating and to the satisfaction of the Owner.

d. Any ceiling access panel now existing will remain in its present location and cannot be covered in a manner to prevent access.

e. Any ceiling, other than Contractor’s own space, that must be accessed or crossed from above will be done only with prior permission of the Owner.

f. Wood framing is prohibited for partitioning.

G. Overhead Protection:

1. No cranes with or without loads or other construction equipment will cross over non-construction personnel, their travel ways which include but are not limited to, walkways, roadways, or passenger transfer system tracks.

2. The plan of operation of cranes and other hoisting equipment will be established in writing by the Contractor. This plan of operation will be subject to review by the Owner.

3. Specific areas affected by construction may require protective covering. These protection coverings will be adequate to insure the protection of life and property and the continuous operation of the Airport. The layout and location of the protective systems will be subject to review and rejection by the Owner. Structural integrity of protection systems will be the responsibility of the Contractor.

4. The use of helicopters to lift, place, or otherwise maneuver equipment is expressly prohibited.

1.09 CONSERVATION AND SALVAGE

A. General:

Contractor shall refer to the Owner's Sustainability Master Plan for Owner's conservation and salvage policies prior to the start of construction.

1. It is a requirement for supervision and administration of the Work that construction operations be carried out with the maximum possible consideration given to conservation of energy, water and materials. In addition, maximum consideration will be given to salvaging materials and equipment involved in performance of the Work but not incorporated therein.

2. Refer to other sections for required disposition of salvage materials which are the Owner's property.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01150 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 MEASUREMENT AND PAYMENT

A. Measurement of Quantities: The following requirements, in general, apply to those items listed by unit prices in the Contract Documents:

1. All "Unit Price" Work completed under the Contract will be measured by the Owner or Design Professional in conjunction with the Contractor, using United States Customary Units of Measurement. Any measurements made by the Contractor without the Owner or Design Professional present shall not be the basis for, or otherwise used for, payment.

2. 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.

3. 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 or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the Drawings or ordered in writing by the Design Professional.

4. Structures will be measured according to neat lines shown on the Drawings or as altered to fit field conditions.

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

6. In computing volumes of excavation, the average end area method or other acceptable methods as approved by Owner will be used.

7. The thickness of plates and galvanized sheets used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inches.

8. The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois. All materials which are measured or proportioned by weights will be weighed on a certified, approved scale by competent, qualified personnel. If material is shipped by rail, the car weight may be accepted, provided that only the actual weight of material be paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight will be weighed empty daily at such times as the Owner or

Design Professional directs, and each truck will bear a plainly legible identification mark.

9. Materials to be measured by volume in the hauling vehicle will be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Owner or Design Professional, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles will be loaded to at least their water level capacity and all loads will be leveled when the vehicles arrive at the point of delivery.

10. When requested by the Contractor and approved by the Owner in writing, material specified to be measured by the cubic yard may be weighed and such weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Owner or Design Professional and will be agreed to by the Owner and Contractor before such method of measurement of pay quantities is used.

11. Bituminous materials will be measured by the gallon or ton. When measured by volume, such volumes will be measured at 60-degrees F or will be corrected to the volume at 60-degrees F using ASTM D 1250 for asphalts or ASTM D 633 for tars.

12. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the Work.

13. When bituminous materials are shipped by rail or truck transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

14. Concrete will be measured by the yard.

15. Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thickness and the extreme length of each piece.

16. The term "Lump Sum" when used as an Unit Price Item of payment will mean complete payment for the Work described in the Contract. However, payment of a lump sum item may be paid over several or all pay applications.

17. 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.

18. When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc. and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be

nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

19. Scales for weighing materials which are required to be proportioned or measured and paid for by weight will be furnished, erected, and maintained by the Contractor, or by certified, permanently installed commercial scales.

20. Scales will be accurate within one-half percent of the correct weight throughout the range of use. The Contractor will have the scales checked under the observation of the Owner before beginning Work and at such other times as requested. The intervals will be uniform in spacing throughout the graduated or marked length of the beam or dial and will not exceed one-tenth of one percent of the nominal rated capacity of the scale, but not less than one pound. The use of spring balances will not be permitted.

21. Beams, dials, platforms, and other scale equipment will be so arranged that the operator and inspector can safely and conveniently view them.

    Scale installations will have available ten standard 5.0-pound (2.3 kilogram) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

22. Scales must be tested for accuracy and serviced before use at a new site. Platform scales will be installed and maintained with the platform level and rigid bulkheads at each end.

23. Scales "overweighing" (indicating more than correct weight) will not be permitted to operate and all materials received subsequent to the last previous correct weighing-accuracy test will be reduced by the percentage of error in excess of one-half of one percent.

24. In the event inspection reveals the scales have been "underweighing" (indicating less than correct weight) they will be adjusted and no additional payment to the Contractor will be allowed for materials previously weighed and recorded.

25. All costs in connection with furnishing, installing, certifying, testing and maintaining scales for furnishing check weights and scale house and for all other items specified in this section and for the weighing of materials for proportioning or payment will be included in the Unit Contract Prices for the various items of the Project.

26. When the estimated quantities for a specific portion of the Work are designated as the pay quantities in the Contract, they will be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portion of the Work shown on the Drawings are revised by the Design Professional. If revised dimensions result in an increase or decrease in the quantities of such Work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

27. The Contractor and Owner will meet and conduct a quantity-in-place meeting (QIP meeting) on a monthly basis to review and agree to the quantities prior to pencil copy pay application submission.

28. The Contractor will establish a written process for managing and tracking all unit rate scopes of work identified within their subcontracts. This process will be reviewed with Owner and shall be accepted by Owner or modified as agreed upon. Contractor will meet with subcontractor(s) and Owner on a routine basis to confirm and document agreed upon quantities. Meeting shall occur at a minimum of once per month and prior to the pencil copy pay application submission. More frequent meetings shall occur at Owner's request.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01315 - SCHEDULES, PHASING

PART 1 - GENERAL

1.01 DESCRIPTION

Scope includes construction scheduling and phasing/sequencing required for proper execution of the Work as described herein and indicated on the Drawings.

1.02 CONSTRUCTION SCHEDULE

A. Preliminary Schedule:

1. Within 15 days after the date of award of the Contract, Contractor will submit Contractor's preliminary network phasing diagram (preliminary schedule) indicating a comprehensive overview of the Project including an activity line for each of the work segments to be performed at the site.

a. Arrange schedule to indicate required phasing of Work as outlined below and in the Contract Documents and to indicate time allowances for submittals and material acquisitions including the scheduled dates for purchase orders or subcontract issuance or execution, inspections, and similar time margins.

b. The Contractor may submit suggestive modifications and revisions to Work sequencing and barricade arrangements indicated in the Drawings. All suggestions are dependent on Owner's approval.

c. Submitted schedule will be reviewed for comment by Owner and Design Professional for conformance to overall Project completion time criteria. Lack of this information will be cause for rejection of schedule.

B. Bar-Chart Schedule:

1. Subsequent to review and comment by the Owner of the preliminary schedule, the Contractor will submit a comprehensive bar-chart type construction schedule indicating a time bar for each significant category or unit of work to be performed. Arrange schedule to indicate required phasing of units and to show time allowances for submittals and material acquisitions including the scheduled dates for purchase orders or subcontract issuance or execution, inspections, and similar time margins.

a. Show critical submittal dates related to each time bar or prepare separate coordinated listing of critical submittal dates.

b. Superimpose an S-curve on schedule to show "estimated" total dollar-volume of work performed at any date during Contract Time, with a column of cost figures in left hand margin, ranging from zero to Contract Sum.

c. Submit updated schedule and S-curve with monthly pay request as herein specified.

2. This initial Construction Schedule, along with electronic media containing all activity data including but not limited to early start, early finish, late start, late finish and float, will be submitted to the Owner and Design Professional for review and comment within 30 days after the date of the Notice to Proceed but no later than seven days before the first Application for Payment request is submitted. Owner's review and recognition of this schedule will not relieve the Contractor of responsibility for scheduling of the Work and maintaining progress in accordance with the Contract Documents.

   The initial Construction Schedule will be recognized by the Owner and Design Professional when it is prepared in accordance with the Contract Documents.

C. Distribution:

After Owner's and Design Professional's review and recognition, the Contractor will print and distribute the Construction Schedule to entities with a need-to-know responsibility, including three copies each to the Owner and Design Professional. Contractor will also post the Construction Schedule in temporary office space. Revise at intervals matching payment requests and redistribute. Provide copies required with payment requests.

D. Maintenance of Schedule:

1. The Contractor's recognized Construction Schedule will be updated monthly, and three printed copies and electronic media will be submitted with each of the Contractor's Applications for Payment. The updated Construction Schedule will include copies of issued Purchase Orders and contracts (subcontracts) for materials and services scheduled to have been purchased during the period of time covered by the Application for Payment. The updated Construction Schedule will describe Work completed during the preceding month, Work in progress, major problems, schedule deviations, organizational changes, subcontractor progress and "Record Document" schedule progress dates. The updated Construction Schedule will also include a section detailing activities planned for the next month. Progress will be reported in comparison with the recognized Construction Schedule. A special section of the updated Construction Schedule will address any activities that are behind schedule, describing the reason therefore, any impact on the overall Contract Completion Dates and the Contractor's plans for overcoming any delays. Updates will also be made any time that changes in the design, construction, procurement and installation cause any major change in the overall Construction Schedule.

2. The Owner will review the updated Construction Schedule and provide comment with regard to the Construction Schedule's compliance with the provisions of the Contract Documents. The updated Construction Schedule will be recognized by the Owner when it is prepared in accordance with the Contract Documents. The Owner will not approve the Contractor's Application for Payment without the Contractor's monthly submission of a recognized Construction Schedule. Each monthly Construction Schedule will show all Work substantially complete by the

Contract Completion Dates.

3. If the Contractor's monthly schedule update reflects or Owner or Design Professional determines that the Contractor is at least 10% behind the original Construction Schedule or 21 or more days behind the original Construction Schedule for:

   a. the Work as a whole;

   b. a major Contract item;

   c. an major item of Work; or

   d. an item of Work not on the original critical path that, because of the delay or anticipated delay, becomes a critical path item;

   then such may constitute a material breach of the Contract. The Contractor will submit with the monthly update of the Construction Schedule, Contractor's proposed plan for bringing the Work back on schedule and completing the Work by the Contract Completion Dates.

4. The Construction Schedule will be coordinated by the Owner and Design Professional with the overall schedule for the total Project as a whole. The Contractor will revise the Construction Schedule promptly in accordance with the conditions of the Work, subject to approval by the Owner and Design Professional.

5. The Contractor will comply fully with all time and other requirements of the Contract Documents. Recommendation of an Application for Payment by the Design Professional and payment thereon by the Owner, without the submission of a recognized monthly schedule update of the Construction Schedule, will not constitute a waiver of the requirements for such updates, nor will it relieve the Contractor from the obligation to complete the Work within the Contract Time(s).

6. Should a review indicate the Work has fallen behind the recognized Construction Schedule, at the option of the Owner or Design Professional, funds equal to the established liquidated damages for the number of days behind schedule will be withheld until the Work is brought back on schedule.

7. If the Work is determined to be unsatisfactory for any reason and requires removal and replacement, rework, or any action that will affect the operation of the Airport, it will be considered part of the Construction Schedule and if the time period exceeds that specified, liquidated damages will be assessed.

8. If the Owner or Design Professional has determined that the Contractor should be permitted to extend the time for completion as provided in Section 00700, Paragraph 8.03 of GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified, the date(s) in the Construction Schedule will be adjusted accordingly to retain their same relationship to the adjusted date of

Substantial Completion, and the dollar value of Work to be completed as of the first of each month will be adjusted pro rata.

1.03 GENERAL

A. The following phasing constraints will universally apply to all phases and elements of this Work.

1. No existing crosswalks and curb cuts will be obstructed at any time during the Work.

2. Not Used.

3. Not Used.

4. Not Used.

5. Not Used.

6. Not Used.

7. Not Used.

8. Not Used.

9. Not Used.

10. Not Used.

11. The Contractor will arrange the Work so that pedestrians have unrestricted access at all times to the escalators, elevators, stairs, kiosks, bathrooms, automatic sliding doors, restaurants, merchandise shops, offices, fire exits, shuttle cars, and elevator equipment rooms.

12. The Contractor will submit a detailed Phasing Plan for review and approval prior to beginning Work on-site.

13. Not Used.

14. Not Used.

15. Not Used.

16. Not Used.

17. Not Used.

1.04 MAINTENANCE OF OPERATIONS

A. Not Used.

B. Not Used.

1. Elevator Lobbies:

   Not Used.

2. Escalators:

   Not Used.

3. Public Circulation Areas:

   Not Used.

4. Overhead Work in areas without Work Platforms:

   Not Used.

5. Tenant and Office Areas:

   Not Used.

6. Apron Level:

   Not Used.

C. This Project will require the interruption of the building systems during the Work. The Contractor will arrange the Work so that impact of these interruptions is minimized and, where needed, temporary systems will be installed before interruptions occur. The following are requirements related to temporary building systems and interruptions. (Also refer to Section 01505 - TEMPORARY FACILITIES.)

1. Not Used.

2. Not Used.

3. Some of the Work will require that all or some of the building power and building systems be disconnected. Power outages and building systems shutdowns or interruptions will only occur between the hours of 1:30 a.m. and 5:00 a.m. local time. Any power outage involving power to or from the Communication Center UPS will only occur between the hours of 2:00 a.m. and 3:00 a.m. local time. The Contractor will provide a minimum two weeks advance notice to the Owner for all power and building systems interruptions. The Contractor will confirm each outage a minimum of 48 hours in advance with the Owner. The Contractor will closely coordinate the Work of this Project with the work of separate contractors.

4. Schedules for power outages and building system interruptions will be subject to change based on flight delays, airline schedule changes or unscheduled airline

operations. There will be no claim for added cost or time extensions due to flight delays, airline schedule changes or unscheduled airline operations.

5. The Contractor will provide a trained, knowledgeable technician to monitor and respond to alarms of the Simplex Alarm System any time the main Simplex Terminal in the Communication Center is out of service. The Contractor will closely coordinate any shutdown of the Simplex Alarm System with the Owner at least 48 hours in advance of a shutdown.

6. Not Used.

7. Not Used.

8. The Contractor will minimize the length of time that any fire protection lines and airline baggage belts are out of service on any given night. All shutdowns or interruptions of fire protection lines and airline baggage belts will be closely coordinated with the tenant and Owner prior to the shutdown or interruption. All fire protection lines will be returned to service by 6:00 a.m. each day and all airline baggage belts will be returned to service each day at least one hour prior to the arrival of the airline personnel assigned to the respective airlines baggage make-up area.

1.05 PHASING/SEQUENCING

A. General:

1. The Work of this Contract for LTPG Elevator Air Conditioning Replacement will be performed in a phased construction schedule which will include all requirements for submittals, material and equipment procurement, material stockpiling, setting up Contractor's staging area, surveying of existing conditions and preparation of necessary schedules to meet the rigid requirements for Project completion according to the specific phases herein outlined and for the project Substantial Completion, in accordance with Contract Documents. Where clock times are specified for specific Work elements, these times will be local times.

2. THE CONTRACTOR WILL NOTIFY THE OWNER, IN WRITING, AT LEAST 48 HOURS PRIOR TO THE DATE OF COMMENCEMENT OF ANY ON-SITE WORK, INCLUDING TEMPORARY FACILITIES, MOBILIZATION AND MATERIAL AND EQUIPMENT DELIVERIES.

3. The Contractor will coordinate with Owner and tenant and adjust Project Schedule so as not to interfere with the on-going operations of the airport.

4. PHASE 1 - Procurement - 30 Days

5. PHASE 2 - Construction - 117 Days

6. So that the Work of this Contract may be coordinated with the Work of other contracts, portions of the Work of this Contract will be completed by prescribed Milestones. The time schedule for these Milestones is critical.

7. If the Work related to any prescribed Milestone is determined to be unsatisfactory for any reason and requires removal, replacement, or rework, it must still be completed within the Milestone.

B. Work Sequence of Construction:

The sequence of construction illustrated on the Drawings and in this Section is provided solely for the purpose of indicating the general overview of the progressive steps to the Work so that existing airport operations and functions and other contracts will be maintained in accordance with the requirements of the Owner. The descriptions of construction sequence will not be considered as definitive explanations of all the Work which may be required during each sequence.

END OF SECTION

SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Requirements of the Contract Documents, including Division 01. The Contractor will be required to follow the Submittal Management Process for the development of a Submittal Register Log and submission of Submittal Packet.

1.2 SUMMARY:

This Section specifies administrative and procedural requirements for submittal of Shop Drawings, Product Data and Samples to verify that products, materials and systems proposed for use comply with provisions of the Contract Documents.

A. Shop Drawings include, but are not limited to, the following:

1. Fabrication Drawings.
2. Installation Drawings.
3. Setting diagrams.
4. Shop-work manufacturing instructions.
5. Templates and patterns.
6. Schedules.
7. Design mix formulas.
8. Coordination Drawings.

B. Product Data include, but are not limited to, the following:

1. Manufacturer's product specifications.
2. Manufacturer's installation instructions.
3. Standard color charts.
4. Catalog cuts.
5. Roughing-in diagrams and templates.
6. Standard wiring diagrams.
7. Printed performance curves.
8. Operational range diagrams.
9. Mill reports.
10. Standard product operating and maintenance manuals.
11. Material Safety Data Sheets (MSDS).

C. Samples include, but are not limited to, the following:

1. Partial Sections of manufactured or fabricated components.
2. Small cuts or containers of materials.
3. Complete units of repetitively-used materials.
4. Swatches showing color, texture and pattern.
5. Color range sets.

6. Components used for independent inspection and testing.

D. Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Schedule of Submittals.
2. Permits.
3. Applications for payment.
4. Performance and payment bonds.
5. Insurance certificates and endorsements.
6. Listing of subcontractors, subcontracts and purchase orders.
7. Design-Builder's construction schedule.
8. Progress Schedules.
9. Progress reports.

1.3 SUBMITTAL PROCEDURES:

A. Coordination: Coordinate preparation and processing of submittals with performance of the Work.

1. At the beginning of the Work, the Contractor will prepare and submit a Submittal Register based on all of the submittal requirements in the specifications. Each item called out shall have an individual record (line) in the Submittal Register and this will be submitted for Owner approval and comment. The Owner will indicate on the Submittal Register those submittals that will be reviewed by the Owner.

2. The Contractor shall review submittals before submitting to the Owner. Transmit each submittal to the Owner sufficiently in advance of scheduled performance of related construction activities to avoid delay. If any submittals will be delayed, inform the Owner in writing giving reasons for the delay and a revised submittal schedule. Delays will be subject to Owner's approval. No extension of time will be authorized because of a Contractor's failure to transmit submittals to the Owner sufficiently in advance of the Work to permit processing.

3. The Owner will review submittals for general conformance with the Contract Documents. The review of the submittals by the Owner will not constitute any release or discharge of Contractor's sole liability and responsibility for all such submittals.

4. Request for payment of stored materials will not be considered until submittals have been received and approved by the Owner.

5. Transmit submittals to the Owner to prevent delays. The Contractor is responsible for delays accruing directly or indirectly from submission or resubmission of submittal date.

6. The Contractor shall coordinate each submittal with other submittals and

related activities that require sequential activity including:

a. Testing.
b. Purchasing.
c. Fabrication.
d. Delivery.

7. The Contractor shall coordinate transmittal of different types of submittals for the same element of the Work and different elements of related parts of the Work so that processing will not be delayed by the Owner's need to review submittals concurrently for coordination.

   a. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are delivered to the Owner.

8. Processing: The Contractor shall allow sufficient review time so that Work will not be delayed as a result of the time required to process submittals, including time for re-submittals.

   a. The Contractor shall allow for time for the Owner's initial review of each submittal. The standard time for Owner review will be three weeks unless a different duration has been agreed to by Owner and Contractor. Where processing must be delayed to permit coordination with subsequent submittals, additional time is allowed. The Owner will advise the Contractor promptly when a submittal being processed must be delayed for coordination.

   b. The Contractor shall where necessary to provide an intermediate submittal between the initial and final submittals, process the intermediate submittal in the same manner as the initial submittal.

   c. The Contractor shall allow time for reprocessing of each submittal to meet the schedule.

   d. No extension of time will be authorized because of a Contractor's failure to transmit submittals to the Owner sufficiently in advance of the Work to permit processing.

B. All submittals shall be submitted electronically through the Owner's Management Software and use the Packages to pull register items in for review. Close-out submittals, including O&M Manuals shall be submitted through the Close-out Register for review and tracking purposes.

1. The Contractor shall place a permanent label or title block on each submittal for information.

2. The Contractor shall indicate the name of the firm or entity that prepared each

submittal on the label or title block.

3. The Contractor shall provide a space approximately 4 inches by 5 inches on the label or adjacent to the title block to record the Contractor's review and approval markings and the action taken by the Owner.

4. The Contractor shall include the following information on the label for processing and recording action taken.

   a. Project name.
   b. Project Number.
   c. Date.
   d. Name and address of Owner.
   e. Name and address of Contractor.
   f. Name and address of subcontractor.
   g. Name and address of supplier.
   h. Name of manufacturer.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Similar definitive information as necessary.

5. The Contractor shall include on each page (sheet) of the submittal with the Contractor's certification statement, or other approval statement, as follows:

   "Contractor hereby certifies that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated in the work, is in compliance with the Contract Documents, can be installed in the allocated spaces, and is submitted for review by the Owner. Contractor acknowledges that Owner may rely on the information contained in this submittal.

   Certified by Submittal Reviewer_____. Date:_____"

C. Submittal Transmittal: The Contractor shall package each submittal appropriately for electronic transmittal and handling. The Contractor shall transmit each submittal from Contractor to Owner, as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender without action. Submittal descriptions shall follow the Owner's naming conventions. Electronic transmittals must have descriptive subject lines for ease of retrieval. The transmittal form should be the first page in the attached PDF.

1. The Contractor shall record relevant information and requests for data on the transmittal form. On the form, or an attached separate sheet, the Contractor shall call attention to deviations from requirements of the Contract Documents, including minor variations and limitations.

2. The Contractor shall include the Contractor's signed certification stating that information submitted complies with requirements of the Contract Documents.

3. The Contractor shall prepare a draft of a transmittal form and submit it to the Owner's review and acceptance. The Contractor shall provide places on the form for the following information:

    a. Project name.
    b. Project Number.
    c. Date.
    d. Destination (To:).
    e. Source (From:).
    f. Names of subcontractor, manufacturer and supplier.
    g. Category and type of submittal.
    h. Submittal purpose and description.
    i. Submittal and transmittal distribution record.
    j. Remarks.
    k. Signature of transmitter.

1.4 SPECIFIC SUBMITTAL REQUIREMENTS:

A. Shop Drawings: The Contractor shall submit newly prepared information, drawn to accurate scale. THE CONTRACTOR SHALL NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD PRINTED INFORMATION AS THE BASIS OF SHOP DRAWINGS.

1. The Contractor shall include the following information on Shop Drawings:

    a. Dimensions.
    b. Identification of products and materials included.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.

2. The Contractor shall submit Coordination Drawings where required for integration of different construction elements. The Contractor shall show construction sequences and relationships of separate components where necessary to avoid conflicts in utilization of the space available.

3. The Contractor shall encircle, identify with arrow, or otherwise indicate deviations from the Contract Documents on the Shop Drawings.

    a. THE CONTRACTOR SHALL NOT USE COLORED HIGHLIGHTERS TO INDICATE SELECTIONS.

4. The Contractor shall not allow Shop Drawing copies which do not have an appropriate final stamp or other marking indicating action taken by the Owner to be used for construction.

B. Product Data: The Contractor shall collect Product Data into a single submittal for each element of construction or system.

1. The Contractor shall encircle and identify with an arrow, each copy to show which choices and options are applicable to the Project.

    a. The Contractor shall not use colored highlights to indicate selection.

2. Where Product Data has included information on several similar products, some of which are not required for use on the Project, or are not included in this submittal, the Contractor shall mark copies to clearly indicate which information is applicable.

3. Where Product Data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, the Contractor shall submit as "Shop Drawings" not “Product Data."

4. The Contractor shall include the following information in Product Data:

    a. Manufacturer's printed recommendations.
    b. Compliance with recognized trade association standards.
    c. Compliance with recognized testing agency standards.
    d. Application of testing agency labels and seals.
    e. Notation of dimensions verified by field measurement.
    f. Notation of coordination requirements.

5. The Contractor shall not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

6. The Contractor shall furnish copies of final Product Data submittal to manufacturers, subcontractors, suppliers, fabricators, installers, governing authorities and others as required for performance of the construction activities. The Contractor shall show distribution on transmittal forms.

    a. The Contractor shall not proceed with installation of materials, products and systems until a copy of Product Data applicable to the installation is in the installer's possession.

    b. The Contractor shall not permit use of unmarked copies of Product Data in connection with construction.

C. Samples: The Contractor shall submit Samples physically identical with the material or product proposed for use; submit full-size, fully fabricated Samples, cured and finished in the manner specified.

1. The Contractor shall mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. The Contractor shall prepare Samples to match Designers' Sample where so indicated and include the following information:

a. Generic description of the Sample.
b. Size limitations.
c. Sample source.
d. Product name or name of manufacturer.
e. Compliance with recognized standards.
f. Compliance with governing regulations.
g. Availability.
h. Delivery time.

2. The Contractor shall submit a Sample log at the beginning of the project to the Owner based on the required samples per the submittals.
3. In-place samples are only allowed with written approval by Owner.

D. Operating and Maintenance Manuals: Operating and Maintenance Manuals shall be initially submitted for review at the appropriate 30 percent completion stage of Work per requirements under these Sections. The Manuals will be reviewed and comments returned to the Contractor. Corrections shall be made before submittal of the Manuals at subsequent completion levels for Owner review and at Project Close-out.

E. In order to facilitate review of product data and shop drawings, they shall be noted, indicating by cross reference the contract drawing sheet number, note, and specification paragraph numbers, where and what item(s) are used for and where item(s) occur in the contract documents.

1.5 OWNER ACTION:

A. Except for submittals for the record, for information and similar purposes, where action and return on submittals is required or requested, the Owner will review each submittal, mark with appropriate "action," and where possible return within the time period allotted for Owner review. Where the submittal must be held for coordination, the Owner will so advise the Contractor without delay.

1. Compliance with specified characteristics is the Contractor's responsibility, and not considered part of the Owner’s review and indication of action taken.

B. The Owner will mark each submittal to be returned with a uniform, self-explanatory action stamp appropriately marked and executed to indicate whether the submittal returned is for unrestricted use (no exceptions taken), final-but-restricted use (as marked), must be revised and resubmitted (use not permitted), or without action (as explained on the transmittal form), or other similar type wording.

C. The Owner’s review of submittals is for design conformity and general conformance of the Contract Documents only and does not relieve the Contractor from responsibility for any deviations from the requirements of the Contract Documents. The Owner’s review shall not be construed as a complete check nor shall it relieve the Contractor from responsibility for errors of any sort in shop drawings or schedules, of from the necessity of furnishing any work required by the Contract Documents which may have been omitted on the shop drawings. The Owner’s review of a separate item shall not indicate

review of the complete assembly in which it functions.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.5 SCHEDULE OF SUBMITTALS DESCRIPTION AND SUBMITTAL REGISTER

A. General: The following is a description of each submittal type, specified in other Sections, required for the Contract. Contractor shall include each submittal description in the Submittal Register included as part of this Section.

1. Product Data means submittals that provide calculations, descriptions or other documentation regarding the work.

2. Manufacturer's Catalog Data (Product Data) means data composed of information sheets, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the Contract Documents.

3. Manufacturer's Standard Color Charts (Product Data) means preprinted illustrations displaying choices of color and finish for a material or product.

4. Shop Drawings means graphic representations illustrating the relationship of various components of the work, schematic diagrams of systems, details of fabrications, layout of particular elements, connections, and other relational aspects of the work.

5. Design Data (Shop Drawings) means design calculations, mix designs, analyses, or other data written and pertaining to a part of the work.

6. Instructions (Product Data) means preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedance, hazards, and safety precautions.

7. Schedules (Shop Drawings) means a tabular list of data or a tabular listing of locations, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

8. Statements (Shop Drawings) means documents, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality.

9. Reports (Product Data) mean reports of inspection and laboratory tests,

including analysis, an interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

10. Test Reports (Product Data) mean reports signed by an authorized official of a testing laboratory that a material, product, or system identical to the material, product or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. Testing must have been within three years of the date of award of this Contract.

11. Factory Test Reports (Shop Drawings) mean written reports which include the findings of a test required to be performed by the Contractor or an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test.

12. Field Test Reports (Shop Drawings) mean written reports which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test.

13. Certificates (Shop Drawings) mean statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified requirements. The statements must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

14. Warranties (Product Data) include but are not limited to statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material will perform its specific function over a specified duration of time. The statement must be dated, and include the name of the project, the Owner's name, and other pertinent data relating to the warranty.

15. Samples (Samples) include both fabricated and non-fabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

16. Color Selection Samples (Samples) mean samples of the available choice of colors, textures, and finishes of a product or material, presented over substrates

identical in texture to that proposed for the work.

17. Sample Panels (Samples) mean assemblies constructed at the project site in a location acceptable to the Owner and using materials and methods to be employed in the work; completely finished; maintained during construction; and removed at the conclusion of the work or when authorized by the Owner.

18. Sample Installations (Samples) mean portions of an assembly or material constructed where directed and, if approved, retained as a part of the work.

19. Record means documentation to ensure compliance with an administrative requirement or to establish an administrative mechanism.

20. Operating and Maintenance Manuals (Records) mean data intended to be incorporated in an Operating and Maintenance Manual.

21. Test Reports of Existing Conditions mean documents describing existing conditions and operations of systems and components prior to the start of any work. Testing shall be held in the presence of the Owner. Provide copies of the test reports to the Owner.

22. Demonstration means physical operation of equipment and systems by factory authorized representatives to demonstrate to the Owner's facility personnel proper operation of systems. Provide all required documentation that certified completed demonstration.

23. As-Built Drawings means delineated documentation accurately depicting final installation location of components and systems of the building.

24. Shop Drawings in Electronic format mean that when drawings are required all materials shall be provided in AUTOCAD latest release and PDF and/or BIM on a CD/DVD.

25. Coordination Drawings mean the special type of Shop Drawings that show the relationship and integration of different construction elements that require close and careful coordination during fabrication or during installation to fit in the restricted space provided or to function as intended.

26. Certification of Approved Disposal of Hazardous Materials means the certification signed by the Contractor indicating legal disposal of hazardous materials.

27. CD/DVD Training Video means the recorded training instructions to be used by the Owner's personnel.

28. Spare Parts Memo means the listing of spare parts required; refer to Section 01700.

29. UL Letter of Finding means a document from Underwriters Laboratories Inc., attesting compliance with UL's standard for connection to an existing lightning protection system; a document from Underwriters Laboratories Inc., attesting compliance with UL's standard for UL Master Label.

30. Equipment Check-Out Memos mean documents signed by the manufacturer's authorized representative stating that equipment has been installed and is operating in accordance with the manufacturer's specifications; refer to Section 01700 B.

B. Submittal Register: The Contractor is to maintain an accurate updated Submittal Register and will bring this register to each scheduled OAC meeting with the Owner. The Submittal Register should include the following items:

1. Submittal-Description and Number assigned.
2. Date to Owner.
3. Date to Designer as appropriate.
4. Date returned to Owner.
5. Date returned to Contractor from Owner.
6. Submittal Status.
7. Date of Re-submittal and Return (as applicable).
8. Date material released (for fabrication).
9. Projected date of fabrication.
10. Projected date of delivery to site.
11. Status of submittal.
12. Specification Section Number.
13. Specification Paragraph Number.
14. Owner Reviewer.
15. Designer Reviewer.
16. Transmittal Control Number.
17. Planned Submittal Date.
18. Action Code.
19. Date of Action.
20. Remarks.

END OF SECTION

SECTION 01370 - SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes requirements for preparation and submission of "Schedule of Values."

B. Related work specified elsewhere:

1. SCHEDULES, PHASING: Section 01315.

2. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: Section 01340.

3. PRODUCTS AND SUBSTITUTIONS: Section 01605.

C. Time Coordination: In coordination of initial submittals and other administrative start-up activities, the Contractor shall submit Schedule of Values to the Owner at earliest feasible date, but in no case later than 14 days before initial payment request is to be submitted.

D. Upon request by the Owner, the Contractor shall support values given with data that will substantiate their correctness.

E. The Contractor shall use Schedule of Values only as a basis for the Contractor's Applications for Payment.

1.02 FORM OF SUBMITTAL

A. The Contractor shall submit the Schedule of Values using a modified AIA Document G-703 "Continuation Sheet". Modifications to the Template Microsoft Excel Schedule of Values will be required per Owner's direction. The basic format structure for the Schedule of Values will be governed by the following elements. Changes or clarification to the format will be at the sole approval of the Owner.

1. No negative line items without Owner approval.
2. Should a negative line item be allowed, it shall be billed out 100% during the first month that the negative line item appears.
3. Any approved negative line items shall have all retainage dropped to 0% by the second pay application following the initial item appearing on the Schedule of Values.
4. Schedule of Values shall be crafted using Excel. Monthly adjustments shall be made using a tracking mechanism. This tracking mechanism will be dictated by the Owner.
5. Each Schedule of Values line item must be specific to one subcontractor once bought out.
6. Once the SOV has been established, the Contractor may not add additional line items to the Schedule of Values without Owner approval unless new work is add by Owner Change Order or by Work Order. .
7. Changes to existing work shall not have a new line added to the Schedule of

Values but shall be adjusted using a tracking method approved by the owner.

8. A column will be added to track funding source if required by Owner.
9. Columns will be included to track status of retainage and release of retainage.

1.03 PREPARING SCHEDULE OF VALUES

A. The Contractor shall prepare Schedule of Values in coordination with preparation of Progress Schedule.

B. The Contractor shall provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports. The Contractor shall breakdown principal separate Contract amounts based on the Work Break Down Structure approved through the Baseline schedule review process.

C. The Contractor shall submit copies of Schedule of Values to the Owner through the Owner's management software.

D. Listing: The Contractor shall arrange Schedule with columns to indicate generic name of item; related Specifications Sections; subcontractor, supplier, manufacturer, or fabricator; change orders which have affected value; dollar value of item; and percentage of Contract Sum to nearest 1/100% and adjusted to total 100%.

E. Margins of Cost:

1. Major cost items which are not directly cost of actual work-in-place, such as distinct temporary facilities, shall be either shown as line items in Schedule of Values as General Conditions or General Requirements.

F. The Contractor shall itemize separate line item cost for Work required by each Section of this Specification including conditions of the Contract.

G. For each line item, the installed value should not exceed more than $20,000.00, this value can be raised as needed with Owner approval.

H. The Contractor shall make sum of total costs of all items listed in schedule equal to total Contract Sum.

1.04 REVIEW AND RESUBMITTAL

A. After review by the Owner and Design Professional, revise and re-submit Schedule (and Schedule of Material Value) as required.

B. The Contractor shall re-submit revised schedule in same manner.

C. Schedule Updating: The Contractor shall update and resubmit the Schedule of Values when Change Orders affect the listing and when actual performance of Work involves necessary changes of substance to values previously listed.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01390 - CONTROL OF WORK

PART 1 - GENERAL

1.01 AUTHORITY OF THE OWNER

The Owner will decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and/or the manner of performance and rate of progress of the Work. The Owner will decide all questions which may arise as to the interpretation of the Contract Documents relating to the Work, the fulfillment of the Contract on the part of the Contractor, and the rights of different Contractors on the Project. The Owner will determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for the under the Contract.

1.02 CONFORMITY WITH DRAWINGS AND SPECIFICATIONS

A. All Work and all materials furnished will 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 Documents.

B. If the Owner finds the materials furnished, Work performed, or the finished product not within reasonably close conformity with the Contract Documents but that the portion of the Work affected will, in Owner’s opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the affected Work may be accepted and remain in place at the Owner’s sole discretion. In this event, the Owner will document its determination and provide for an adjustment in the Contract Sum for the affected portion of the Work. The Owner's determination and Contract Sum adjustments will be based on good engineering judgment and such tests or retests of the affected Work as are, in Owner’s opinion, needed. Changes in the Contract Sum will be covered by Contract modifications as applicable.

C. If the Owner finds the materials furnished, Work performed, or the finished product are not in reasonably close conformity with the Contract Documents and have resulted in an unacceptable finished product, the affected Work or materials will be removed and replaced or otherwise corrected by, and at the expense of, the Contractor in accordance with the Owner's written orders.

D. For the purpose of this section, the term "reasonably close conformity" will not be construed as waiving the Contractor's responsibility to complete the Work in accordance with the Contract Documents. The term will not be construed as waiving the Owner's right to insist on strict compliance with the Contract Documents during the Contractor's prosecution of the Work, when, in the Owner's opinion, such compliance is essential to provide an acceptable finished portion of the Work.

E. For the purpose of this section, the term "reasonably close conformity" is also intended to provide the Owner with the authority to use good architectural and engineering judgment in his/her determinations as to acceptance of Work that is not in strict conformity but will provide a finished product equal to or better than that intended by

the requirements of the Contract Documents.

1.03 COORDINATION OF CONTRACT DOCUMENTS

A. The Contract Documents and all referenced standards cited are essential parts of the Contract requirements. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide the complete Work. In case of discrepancy, figured dimensions, unless obviously incorrect, will govern over scaled dimensions. Cited standards for materials or testing and cited FAA advisory circulars will be considered as Standard Specifications.

B. Any table, gradation, size, dimension, rate, mix, method, nomenclature, pay item number, basis of payment or method of measurement shown on the Drawings, which is in variance with the Standard Specifications, will be considered an amendment or supplement to the applicable Specification.

C. The Contractor shall not take advantage of any apparent error or omission on the various Contract Documents. In the event the Contractor discovers any apparent conflict, error or discrepancy, Contractor shall immediately call upon the Owner for the Owner's interpretation and decision, and such decision shall be final.

D. From time to time, discrepancies within cited standards for testing occur due to the timing of changing, editing, and replacing of standards. In the event the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately call upon the Owner for interpretation and decision, and such decision shall be final.

1.04 DESIGN PROFESSIONAL'S DRAWINGS

A. The Drawings furnished by the Design Professional consist of general drawings showing such details as are necessary to give a comprehensive idea of the Work. Roadway Drawings will show, in general, alignment, profile grades, typical cross sections and general cross sections. Structure Drawings, in general, will show in detail all dimensions of the Work contemplated.

B. When the Structure Drawings do not show dimensions in detail, they will show general features and such details as necessary to give a comprehensive idea of the structure.

C. Not all conflicts are known within the Project area. Not all conflicts are shown on the Drawings. The Contractor is solely responsible for the location and protection of all equipment and facilities which are to remain in service and in place during and after all Project Work.

D. No changes (additions, deletions, or substitutions) to the drawings or specifications shall occur without the express written approval of the Owner.

1.05 FIELD NOTES

Adequate field notes and records will be kept as layout work is accomplished. These field notes and records will be available for review by the Owner and Design Professional as the Work

progresses and copies will be furnished to the Owner and Design Professional at the time of completion of the Project. An inspection or checking of the Contractor's field notes or layout work by the Owner or Design Professional, and the acceptance of all or any part thereof will not relieve the Contractor of its responsibility to achieve the lines, grades, and dimensions shown in the Drawings and Specifications.

1.06 AUTHORITY AND DUTIES OF INSPECTORS

A. Inspectors employed by the Owner will be authorized to inspect all Work done and all materials furnished. Such inspection may extend to all or any part of the Work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the Contract. Inspectors are not authorized to issue instructions contrary to the Drawings and Specifications or to act as foreman for the Contractor.

B. Inspectors employed by the Owner are authorized to notify the Contractor or their representatives of any failure of the Work or materials to conform to the requirements of the Contract, Drawings, or Specifications and to reject such nonconforming materials until such issues can be referred to the Design Professional for recommendation and Owner’s approval.

C. Inspectors have the authority to immediately suspend the Work upon observation of any condition that could adversely impact or interfere with the safety or protection of persons or property.

1.07 INSPECTION OF THE WORK

A. All materials and each part or detail of the Work will be subject to inspection by the Owner or Design Professional. The Owner or Design Professional will be allowed access to all parts of the Work and will be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection. Required assistance from the Contractor might include use of qualified personnel and equipment to gain access to the area, safety or personal protection equipment, and other resources to provide safe egress to and from the area to be inspected.

B. If the Owner or Design Professional requests it, the Contractor, at any time before acceptance of the Work, will remove or uncover such portions of the finished Work as may be directed. After examination, the Contractor will 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. 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.

C. Any Work done or materials used without supervision or inspection by the Owner or Design Professional may be ordered removed and replaced at the Contractor's expense unless the Owner or Design Professional failed to inspect after having been given reasonable notice in writing that the Work was to be performed.

D. Should the Contract Work include relocation, adjustment, or any other modification to

existing facilities not the property of the Owner, authorized representatives of the owners of such facilities will have the right to inspect such Work. Such inspection will in no way make any facility owner a party to the Contract, and will in no way interfere with the rights of the parties to this Contract. Inspection and/or approval of the Work or any portion thereof will not relieve the Contractor of responsibility for faulty materials or workmanship.

1.08 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

A. All Work which does not conform to the requirements of the Contract Documents will be considered unacceptable, unless otherwise determined acceptable by the Owner as provided in Item 1.02 CONFORMITY WITH DRAWINGS AND SPECIFICATIONS of this Section.

B. 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 Completion of the Work, will be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, PART 11, UNCOVERING AND CORRECTION OF WORK, as modified.

C. Work done contrary to the instructions of the Owner, work done beyond the lines shown on the Drawings or as given, 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.

D. Upon failure on the part of the Contractor to comply with any order of the Owner made under the provisions of this Section, the Owner will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs (incurred by the Owner) from any monies due or to become due the Contractor.

1.09 MAINTENANCE DURING CONSTRUCTION

The Contractor will maintain the Work during construction and until the Work is accepted. This maintenance will 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. All Work will be protected during any delay between phases or sub-phases of construction required to complete the Work.

1.10 FAILURE TO MAINTAIN THE WORK

A. Should the Contractor at any time fail to maintain the Work as provided in Item 1.09 MAINTENANCE DURING CONSTRUCTION of this Section, the Owner or Design Professional will immediately notify the Contractor of such noncompliance. Such notification will specify a reasonable time within which the Contractor will be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the urgency that exists.

B. Should the Contractor fail to respond to the Owner's or Design Professional's notification,

the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the urgency that exists. Any maintenance cost incurred by the Owner will be deducted from monies due or to become due the Contractor.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01400 - QUALITY CONTROL SERVICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Contract Documents: drawings, contract articles, special provisions, supplementary conditions, and all Division 01 specification sections attached to the project contract.

B. Contractor issued specifications: Division 02 through 34 as they pertain to the tasks and requirements of carrying out the quality control program including commissioning.

2.01 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced within the contract documents. The publications are referred to in the text by the basic designation only.

1. FEDERAL AVIATION ADMINISTRATION (FAA).

a. FAA Advisory Circular (AC) 150/5370-2 (latest edition).

2. HILLSBOROUGH COUNTY AVIATION AUTHORITY (Owner).

a. Owner Construction Safety and Health Guidelines Manual.

b. Owner Design Criteria Manual.

c. Tampa International Airport Sustainable Management Plan.

3.01 DEFINITIONS

A. Commissioning (Cx) - a systematic process of ensuring that all building systems meet the requirements and perform interactively according to the contract documents.

B. Commissioning Agent or Commissioning Authority (CA) – an individual who meets the qualification requirements and is experienced in leading the commissioning effort.

C. Control – to guide and have influence over.

D. Definable Feature of Work (DFOW) - a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. For example, excavation, electrical, concrete, roofing, mechanical, HVAC, etc. are all definable features of work.

E. Experienced – a minimum of five (5) years' experience.

F. Hillsborough County Aviation Authority (Owner) – An agent or approved representative having authority to act on behalf of the airport.

G. Project Management Software (PMS) – software utilized for the purpose of submitting required information, correspondence, etc.; organizing and archiving project information; and managing and recalling project information.

H. Quality – conformance to the requirements established by the contract documents, specification, and drawings.

4.01 SUBMITTALS

A. The following submittals shall be submitted for Owner review and acceptance prior to start of construction:

1. Construction Quality Control (QC) Plan.

2. Indoor Air Quality (IAQ) Management Plan.

3. Commissioning Authority's Resume.

B. Submit the following to Owner during construction by entering each of the items below into the approved project management software (PMS) database within the various timeframes indicated:

1. QC Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.

2. Contractor Production Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every three consecutive calendar days of no-work.

3. Preparatory Phase Meeting Minutes: Submit meeting minutes for each Preparatory Phase Meeting held by the end of the next working day following the meeting date.
4. Initial Phase Inspection Meeting Minutes and Checklist(s): Submit meeting minutes and all checklists for each Initial Phase Inspection Meeting held by the end of the next working day following the meeting date.

5. QC Specialist Reports: Submit the report electronically by 10:00 AM the next working day after each day that work is performed.

6. Field Test Reports: Field test reports that do not require an engineer's or other third-party review, stamp, and certification, shall be submitted within two working days after the test is performed. Test reports requiring an engineer's or other third-party review, stamp, and certification, shall be submitted within five working days

after the test is performed.

7. Monthly Status Report of Tests: Submit the updated test register at the end of each month. The test register shall clearly indicate which tests have been completed and which tests have not been completed for the various systems requiring testing.

8. Testing Plan and Test Register: Provide a copy of the final Testing Plan and Test Register to the Commissioning Authority for inclusion into the final commissioning documentation.

9. Rework Items List: As follow-up inspections, third-party inspections, AHJ inspections, engineer and architect field inspections, etc. occur, submit lists containing new rework items daily.

10. QC Meeting Minutes: Submit QC meeting minutes within two working days after the meeting is held.

11. QC Certifications: Submit QC Certifications as required by the paragraph entitled "QC Certifications."

12. Special Inspection Reports: Submit Special Inspection reports within five working days of the inspection date.

5.01 QC PROGRAM REQUIREMENTS

A. Establish and maintain a QC program as described in this specification section.

B. Establish and maintain an effective QC program which produces a product that complies with the Contract Documents. A QC program comprises plans, procedures, and an organization that supports project design, construction, and commissioning. The QC program must cover all design, construction, and commissioning operations, both onsite and offsite, and be keyed to the contract design and construction sequence schedule.

C. The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, submittal review and approval, periodic QC meetings, three phases of control, material receipt and storage inspections, testing, inspections, QC certifications, independent Special Inspections, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction, and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the project schedule. No construction work or testing may be performed unless the QC Manager, QC Assistant, or the QC Alternate Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent, and Project Manager must interact and work together efficiently and effectively. Although the QC Manager is the primary individual responsible for the coordination of QC efforts and tasks, all individuals will be held responsible for the quality of work on the job.

6.01 COMMISSIONING

A. Commissioning (Cx) is a systematic process of ensuring that all building systems meet the requirements and perform interactively according to the Contract. The QC Program is a key to this process by coordinating, verifying, and documenting measures to achieve the following objectives:

1. Verify and document that the applicable equipment and systems are installed in accordance with the design intent as expressed through the Contract Documents, according to the manufacturer's recommendations, and industry accepted standards.

2. Verify and document that equipment and systems receive complete operational checkout by the installing contractors.

3. Verify and document proper performance of equipment and systems.

4. Verify and document that the interaction between associated equipment and systems performs per the sequences of operation outlined in the contract documents.

5. Verify that Operation and Maintenance (O&M) documentation is complete.

6. Verify the Training Plan and training materials are accurate, and provide correct instruction and documentation on the critical elements of the products, materials, and systems in the constructed facility. Verify that all identified Owner operating and maintenance personnel are trained.

B. Additional information and requirements for commissioning are specified in the HCAA Design Criteria Manual.

7.01 QC ORGANIZATION

A. Project Manager:

1. The project manager shall be intimately involved in the management and enforcement of the QC program. The project manager shall be familiar with the project QC requirements and take an active role in developing the QC plan, resolving QC issues, ensuring documentation of QC efforts and tasks, and other oversight of the QC program necessary to deliver the project per the contract documents.

B. Project Superintendent:

1. The project superintendent is the highest-level manager responsible for the overall construction activities at the site, including quality and production. The project superintendent will be held responsible for the quality of work and is subject to

removal by Owner for non-compliance with the quality requirements specified in the contract. The project superintendent must maintain a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to Owner.

C. QC Manager:

1. Duties:

a. Provide a QC Manager at the work site to implement and manage the QC program. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager is required to attend the QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct periodic QC meetings, perform the three phases of control except for those phases of control designated to be performed by QC Specialists or other Special Inspectors as outlined in the QC Plan, perform submittal reviews, ensure testing is performed and provide QC certifications and documentation required in the Contract Documents. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC Specialists, testing laboratory personnel, and any other inspection and testing personnel required by the Contract Documents. The QC Manager is the manager of all QC activities. The QC manager is responsible for notifying the Special Inspector or Special Inspector of Record of activities which require their review. The QC manager is responsible for coordinating Special Inspection activities.

2. Qualifications:

a. An individual with a minimum of 5 years combined experience in the following positions: QC Manager, Project Manager, Project Superintendent, Project Engineer, or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have at least two years of experience as a QC Manager. The individual must be familiar with the safety requirements of this Contract, and have experience in the areas of hazard identification, safety compliance, and sustainability.

D. Commissioning Authority:

1. Duties:

a. Provide a Commissioning Authority (CA) to conduct and document the commissioning requirements of this project per the specification section 019100 - COMMISSIONING. The CA shall be subordinate to the QC Manager. The CA directs and coordinates commissioning activities and submits commissioning reports to Owner to meet the submittal and reporting requirements of the commissioning plan. The CA coordinates the actions of

the QC Specialists, Testing Laboratory personnel, O&M Preparer, and other inspection and testing personnel to complete the required commissioning for this Contract.

2. Qualifications:

   a. The CA must be certified as a commissioning professional by the Associated Air Balance Council (AABC) Commissioning Group (ACG), the Association of Energy Engineers (AEE), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), the Commissioning Process Management Professional (CPMP), the Building Commissioning Association (BCA), the National Environmental Balancing Bureau (NEBB), or the University of Wisconsin - Madison (UWM). The CA is required to submit a resume providing education, experience, and management capabilities on at least two similar size and type contracts. The CA may not have a role as part of the construction management or supervision, and must be with a third-party firm that is not affiliated with the design team.

E. Alternate QC Manager Duties and Qualifications:

1. Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

F. Assistant QC Manager Duties and Qualifications:

1. Provide an assistant to the QC Manager at the work site to perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation as required by this Contract. The Assistant QC Manager must be on the work site during supplemental work shifts beyond the regular shift and perform the duties of the QC Manager during such supplemental shift work. The Assistant QC Manager must have a minimum of one year of experience in the following positions: QC Assistant Manager, Project Superintendent, Project Engineer, or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must be familiar with the safety requirements of this Contract, and have experience in the areas of hazard identification, safety compliance, and sustainability.

G. QC Specialists Duties and Qualifications

1. Provide a separate QC Specialist at the work site for each of the areas of responsibilities as specified within the QC Plan who must assist and report to the QC Manager. The QC Specialist must have no duties other than their assigned QC duties. QC Specialists are required to attend the Coordination and Mutual

Understanding Meeting, QC meetings, and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in their area of responsibility.

2. The QC Specialist shall be competent and have acceptable education, experience, training, certification, and/or licensing in their designated discipline.

H. Special Inspectors or Special Inspectors of Record:

1. The Special Inspector (SI) or Special Inspector of Record (SIOR) must be an independent third party hired directly by the Prime Contractor. The SI or SIOR must not be a company employee of the Contractor or any Sub-Contractor performing the work to be inspected. The SI or SIOR shall be qualified, certified, and/or licensed as required per their specialty.

I. Submittal Reviewer(s) Duties and Qualifications:

1. Provide a Submittal Reviewer(s), other than the QC Manager or CA, qualified in the discipline(s) being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification or approval by the QC Manager.

2. Each submittal must be reviewed by a registered architect or professional engineer prior to review by the Submittal Reviewer(s).

J. QC Administrative Assistant:

1. Provide an Administrative Assistant at the work site until the work has been accepted. The primary duty is to assist the QC Manager in processing and maintaining files for submittals, preparing and publishing reports and meeting minutes. After primary duties are accomplished, other duties may be assigned provided the duties do not interfere with primary duties.

K. Acceptance of QC Personnel:

1. Owner reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. Owner may require the removal of any individual for non-compliance with quality requirements specified in the Contract Documents.

8.01 QUALITY CONTROL (QC) PLAN

A. Acceptance of the Construction QC Plan:

1. Acceptance of the QC Plan is required prior to the start of construction. Once construction begins, Owner reserves the right to require changes in the QC Plan as necessary to conform to changes and developments in the project.

2. The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.

B. Requirements of the QC Plan:

1. Provide, for acceptance by Owner, a Construction QC Plan submitted electronically that includes a table of contents, with major sections identified and bookmarked, with pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing QC and commissioning activities during the construction of the project. At a minimum, the plan shall contain the following:

a. QC ORGANIZATION:

1) A chart showing the QC organizational structure.

b. NAMES AND QUALIFICATIONS:

1) Provide the names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications."

c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL:

1) Identify the project specific duties, responsibilities, deliverables, and authorities of each person in the QC organization.

d. OUTSIDE ORGANIZATIONS:

1) Provide a listing of outside organizations, such as architectural, consulting engineering firms, and subcontractors that will be employed by the Contractor and a description of the services these firms will provide. All major definable features of work shall be covered by this listing of organizations. Identify company names, addresses, points of contact, contact information, etc.

e. APPOINTMENT LETTERS:

1) Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work which is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to the Assistant QC

Manager and all other QC Specialists outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

f. SUBMITTAL PROCEDURES AND SUBMITTAL REGISTER:

1) Provide a description of the procedures and processes for reviewing, approving, and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to overall approval by the Contractor. Provide the initial Submittal Register. This register shall list all required submittals per the contract documents. The register shall be maintained as required submittals are submitted, added, or not required due to changes or modifications in the project. The submittal register shall be kept up-to-date and readily accessible for review by the project team.

g. TESTING LABORATORY INFORMATION:

1) Provide testing laboratory information as required by the Contract Documents. Identify testing laboratory company names, addresses, points of contact, contact information, and the definable features of work they are responsible for on this project. Include company and/or personnel licenses, certifications, qualifications, affiliations, etc. as required by the various specifications.

h. TESTING PLAN AND TESTING REGISTER:

1) Provide a Testing Plan and Test Register that identify the various tests required by the Contract Documents. The Test Plan shall reference the specification paragraph number requiring the test, the frequency, and the entity and/or person responsible for each test. The Test Register shall break down each definable feature of work (by area, floor, system, etc.) and be able to track which tests have been completed as well as which tests have not been completed. The Test Register shall be used to provide an overall status on the progress of testing.

i. INSPECTION PLAN AND INSPECTION REGISTER:

1) Provide an Inspection Plan and Inspection Register that identify the various inspections required by the Contract Documents. The Inspection Plan shall reference the specification paragraph number requiring the inspection, the frequency, and the entity and/or person responsible for each inspection. The Inspection Register shall break down each definable feature of work (by area, floor, system, etc.) and be able to track which inspections have been completed as well as which inspections have not been completed. The Inspection Register shall be used to provide an overall status on the progress of inspections.

j. PROCEDURES TO COMPLETE REWORK ITEMS:

1) Provide a description of the procedures that will be employed to identify, record, track, and complete rework items. These procedures shall cover rework items identified during various stages of the project including initial and follow-up phase inspections, close-in/concealment inspections, code and special inspector inspections, punchlist inspections, etc. The procedures shall include how rework items will be communicated to the respective responsible parties. The rework items list shall be readily available to all project team members.

k. DOCUMENTATION PROCEDURES:

1) Provide a description of how project QC documentation will be recorded, tracked, reported, and stored. If hardcopies are required, describe the procedures for receiving and filing hardcopies and provide the location of where hardcopy files are kept. If electronic copies are required, describe the procedures; format of various deliverables; software used to enter, track, status, and store deliverables; and the location of where the files are stored. All project QC documentation shall be readily available to all project team members.

l. LIST OF DEFINABLE FEATURES:

1) A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. Include in the list of DFOWs, but not be limited to, all critical path activities. Include all activities for which this specification requires QC Specialists or specialty inspection and testing personnel.

m. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL:

1) State the procedures used to ensure the three phases of control to manage the project. Conduct the preparatory and initial phase meetings with the goal of obtaining quality construction by planning ahead and identifying potential problems for each DFOW. Perform follow-up inspections to assure that standards are continually met throughout the rest of construction.

2) Special inspections shall be identified, scheduled, and tracked as part of the QC plan.

n. PERSONNEL MATRIX:

1) A personnel matrix showing for each section of the specification who will review and approve submittals, who will perform and document the three phases of control, and who will perform and document the testing.

o. PROCEDURES FOR COMPLETION INSPECTIONS:

1) Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for close-in/concealment inspections, punch out inspection, pre-final inspection, and final acceptance inspection.

p. TRAINING PROCEDURES AND TRAINING REGISTER:

1) Describe the procedures for coordinating and documenting the training of personnel required by the Contract Documents. The training procedures shall clearly identify the prerequisites prior to training, who will receive training, the duration of training, any deliverables required prior to, or at the time of, training. Provide a Training Register that lists all of the required training and update the register as training is completed. The training register shall be used to provide an update on which training has been complete and what training is still outstanding.

q. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG:

1) Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

C. Notification of Changes:

1. Notify Owner, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 work days prior to a proposed change. Proposed changes are subject to acceptance by Owner.

9.01 COORDINATION AND MUTUAL UNDERSTANDING MEETING

A. After submission of the QC Plan, and prior to Owner approval and the start of construction, the QC Manager will meet with Owner to present the QC program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting must be repeated.

B. The purpose of this meeting is to develop a mutual understanding of the QC details,

including documentation, administration for on-site and off-site work, design intent, commissioning, environmental requirements and procedures, coordination of activities to be performed, Special Inspections, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to explain in detail how the three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

1. Waste Management Plan.

2. IAQ Management Plan.

3. Procedures for noise and acoustics management.

4. Environmental Protection Plan.

5. Environmental regulatory requirements.

6. Cx Plan.

7. Special Inspections.

8. Coordination of Activities.

    a. Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan. Coordinate pre-functional tests and startup testing with the commissioning CA.

9. Describe how the QC team will involve, interact, and support the project superintendents and managers. This interaction is key so approved equipment and materials are installed correctly; rework items are identified, tracked, and corrected in a timely manner to minimize project disruption; and construction activities are properly sequenced to accommodate inspections and testing.

C. Attendees:

1. As a minimum, the Contractor's personnel required to attend include the Project Principal, the Project Manager, Project Superintendent, QC Manager, (and other QC Specialists as appropriate to the size and complexity of the Project), Special Inspector or Special Inspector of Record, Commissioning Authority, Environmental Manager, and, to the extent assigned QC responsibilities, subcontractor project manager, superintendent and QC representative(s). Minutes of the meeting will be prepared and signed by the

Contractor.

10.01 QC MEETINGS

A. After the start of construction, conduct weekly QC meetings by the QC Manager at the work site with the Project Superintendent, the QC Specialists, the Special Inspector, the Special Inspector of Record, the CA, and the foremen who are performing the work of the DFOWs. Owner shall be invited to participate in these meetings, but is not required to be present to conduct the meeting. The QC Manager is to prepare the minutes of the meeting and enter them into the approved PMS database within two working days after the meeting. As applicable, accomplish the following at each meeting:

1. Review the minutes of the previous meeting.
2. Review the project schedule and the status of work and rework.
3. Review the work to be accomplished in the next two weeks and the documentation required to support the work.
4. Review the status of submittals.
5. Identify and schedule when equipment and materials will be delivered to the site for inspection, offloading, and storage.
6. Identify and schedule tests and inspections required to support construction.
7. Resolve or provide steps to resolve QC and production problems (RFI, schedule modifications, elevate issue to higher authorities, etc.).
8. Address items that may require revising the QC Plan.
9. Review Accident Prevention Plan (APP).
10. Review environmental requirements and procedures.
11. Review Waste Management Plan.
12. Review IAQ Management Plan.
13. Review Environmental Management Plan.
14. Review the status of training completion.
15. Review Cx Plan and progress.

11.01 THREE PHASES OF CONTROL

A. Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFOW.

B. Preparatory Phase Meetings

1. Notify Owner at least two work days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the QC Specialists, the Project Superintendent, the CA, the Special Inspector, the Special Inspector of Record, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. Prepare minutes of the meeting and enter them into the Owner PMS database within two working days after the meeting.

2. As applicable, perform the following prior to beginning work on each DFOW:

a. Review each paragraph of applicable specification sections.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders.

d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and register to ensure that provisions have been made to provide the required testing.

f. Review the inspections register to identify all required inspections. Add inspection activities or inspection hold points to the project schedule as a precursor prior to concealment, approval, acceptance, or further construction.

g. Review special inspections required by Section 014535 SPECIAL INSPECTION, the statement of special inspections and the schedule of special inspections.

h. Discuss site investigations and examinations of the work area to ensure that the required preliminary work has been completed.

i. Coordinate and schedule equipment and product deliveries to designated offloading and storage areas for inspection.

j. Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to

provide quality construction by planning ahead and identifying potential problems for each DFOW.

k. Review the Job Hazard Analysis (JHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

l. Review the Cx Plan and ensure all preliminary work items have been completed and documented.

C. Initial Phase Inspections:

1. Notify Owner at least two work days in advance of each initial phase inspection. When construction crews are ready to start work on a DFOW, conduct the initial phase with the QC Specialists, the Project Superintendent, the Special Inspector, the Special Inspector of Record, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase inspection including any checklists or other field documentation and enter them into the Owner PMS database within two working days after the inspection. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met.

2. As applicable, perform the following for each DFOW:

a. Establish level of workmanship and verify that it meets the minimum acceptable workmanship standards. Compare with samples and mock-ups as appropriate.

b. Verify field test equipment has been calibrated and is within the calibration date.

c. Resolve any workmanship issues.

d. Ensure that testing is performed by the approved laboratory.

e. Check work procedures for compliance with the appropriate SPA to ensure that applicable safety requirements are met.

f. Review project specific work plans (i.e. Cx, HAZMAT Abatement, Stormwater Management) to ensure all preparatory work items have been completed and documented.

g. Coordinate scheduled work with special inspections required by Section 014535 SPECIAL INSPECTIONS, the statement of special inspections and the schedule of special inspections.

D. Follow-Up Phase Inspections:

1. Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily QC Report:

   a. Ensure the work is in compliance with Contract requirements.

   b. Maintain the quality of workmanship required.

   c. Ensure that testing is performed by the approved testing agency or laboratory.

   d. Continue to verify that field test equipment has been calibrated and is within the calibration date.

   e. Ensure that rework items are being corrected.

   f. Conduct equipment and material receipt inspections.

   g. Examine the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data and are properly stored.

   h. Assure manufacturers' representatives have performed necessary inspections if required and perform safety inspections.

   i. Review the Cx Plan and ensure all work items, testing, and documentation has been completed.

   j. Coordinate scheduled work with special inspections required by Section 014535 SPECIAL INSPECTIONS, the statement of special inspections and the schedule of special inspections.

E. Additional Preparatory and Initial Phases:

1. Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

F. Notification of Three Phases of Control for Off-Site Work:

1. Notify Owner at least two weeks prior to the start of the preparatory and initial phases for off-site work.

12.01 SUBMITTAL REVIEW AND APPROVAL

A. Procedures for submission, review and approval of submittals are described in Section 013300 SUBMITTAL PROCEDURES.

13.01 MATERIAL RECEIPT AND STORAGE INSPECTIONS

A. All equipment and material delivered to the project site shall be inspected and verified to the approved project submittal. If material does not meet the requirements of the submittal, the material shall not be received or offloaded and shall be returned to the sender.

B. Material shall be delivered in new condition. Packing shall not show signs of damage or mishandling.

C. Equipment and material shall be delivered to designate receiving/storage areas for inspection, offloading, and storage.

D. Handle and store equipment and materials in a manner as to prevent loss from theft, weather, and damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with other material or conditions that may cause corrosion, discoloration, or staining. Protect all material from damage by the activities of other trades.

E. A material receipt inspection report shall be generated and submitted along with the daily QC report stating that material meets the requirements in this section. Attach any checklist used to inspect and receive the equipment and material.

14.01 TESTING

A. Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements.

B. Upon request, furnish to Owner duplicate samples of test specimens for possible testing by Owner.

C. Testing includes operation and/or acceptance tests when specified.

D. Procure the services of an approved testing laboratory or establish an approved testing laboratory at the project site.

E. Perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with contract requirements

2. Verify that facilities and testing equipment are available and comply with testing

standards

3. Check test instrument calibration data against certified calibration standards

4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared

5. Record results of all tests taken, both passing and failing on the QC report for the date taken. Identify the specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by Owner, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to Owner. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract

F. Accreditation Requirements:

1. Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate standards (e.g. ASTM E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

2. Owner retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in the Contract.

G. Test Results:

1. Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify Owner immediately.

2. Conspicuously stamp the cover sheet or first page of each test report in large letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports.

H. Test Reports and Monthly Summary Report of Tests:

1. Furnish the signed reports, certifications, and a summary report of field tests at

the end of each month to Owner. Attach a copy of the summary report to the last daily Contractor QC Report of each month. Provide a copy of the signed test reports and certifications to the CA for inclusion into the final commissioning documentation.

15.01 QC CERTIFICATIONS

A. QC Report Certifications:

1. Contain the following statement within the QC Reports: "On behalf of the Contractor, I certify that this report is complete, correct, and equipment and material used along with the work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report."

B. Invoice Certifications:

1. Furnish a certificate to Owner with each payment request, signed by the QC Manager, attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements and that redline and as-built drawings are current and coordinated.

C. Redline and As-built Drawings Certifications:

1. The QC Manager shall provide a certification along with the redline and as-built drawing submissions stating that the drawings have been reviewed and provide an accurate depiction of the actual field installed condition.

D. Completion Certifications:

1. Upon completion of work under this Contract, or a portion thereof in the case of phased completion, the QC Manager must furnish a certificate to Owner attesting that "the work has been completed, inspected, tested, and is in compliance with the Contract."

16.01 CONCEALMENT INSPECTIONS

A. Underground concealment inspections:

1. Prior to concealing underground work, the Contractor shall conduct concealment inspections to ensure that all construction below grade is complete and meets all contract document requirements.

B. Wall concealment inspections:

1. Prior to the completion of walls, the Contractor shall conduct concealment inspections to ensure that all construction within the wall is complete and meets all

contract document requirements.

C. Ceiling concealment inspections:

1. Prior to the completion of ceilings, the Contractor shall conduct concealment inspections to ensure that all construction above the ceiling is complete and meets all contract document requirements.

D. Concealment inspection reports:

1. A report shall be generated by the contractor stating that the required inspections have been performed by all parties and that the space is approved for concealment. Attach any checklists used during the inspection.

17.01 COMPLETION INSPECTIONS

A. Punch-Out Inspection:

1. Near the completion of all work or any phased increment thereof, the QC Manager and the CA must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to Owner per Article 6 and Division 1 specification section 01700 - PROJECT CLOSEOUT of the contract. The QC Manager must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify Owner that the facility, or portion thereof, is ready for Owner's Pre-Final Inspection.

B. Pre-Final Inspection:

1. Owner and the QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. An Owner "Pre-Final Punch List" will be documented by the contractor's QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying Owner that a "Final" inspection can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any particular increment thereof, if the project is divided into increments by separate completion dates.

C. Final Acceptance Inspection:

1. Notify Owner at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along

with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for Owner will include the Project Manager, other Owner personnel, and personnel representing clients or tenants. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for Owner to bill the Contractor for additional inspection costs in accordance with the Contract.

18.01 DOCUMENTATION

A. Maintain current and complete records of on-site and off-site QC program operations and activities. Establish and maintain QC documentation in an electronic format within an approved PMS database, organized, bookmarked, searchable, and readily accessible to Owner 24-hours a day, 7-days a week.

B. Construction Documentation:

1. Reports are required for each day that work is performed and must be attached to the Contractor QC Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. Account for each calendar day throughout the life of the Contract. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and QC Reports, respectively.

C. Reports from the QC Specialist(s):

1. Reports are required for each day that work is performed in their area of responsibility. QC Specialist reports must include the same documentation requirements as the QC Report for their area of responsibility. QC Specialist reports are to be prepared, signed, and dated by the QC Specialists and must be attached to the CQC Report prepared for the same day.

D. Testing Plan and Registers:

1. As tests are performed, the CA and the QC Manager will record on the "Testing Plan and Register" the date the test was performed and the date the test results were forwarded to Owner. Attach a copy of the updated "Testing Plan and Log" to the last daily QC Report of each month. Provide a copy of the final "Testing Plan and Register" to the CA for inclusion into the final commissioning documentation.

E. Rework Items List:

1. The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected

the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily QC Report of each month. The Contractor is responsible for including those items identified by Owner.

F. Redline and As-Built Drawings:

1. The QC Manager is required to ensure the redline and as-built drawings, required by Section 01700 closeout submittals are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation (e.g. Change Order, Request for Information (RFI), etc.). The QC Manager or QC Specialist assigned to an area of responsibility must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of redline and as-built drawings prior to submission to Owner.

19.01 NOTIFICATION ON NON-COMPLIANCE

A. Owner will notify the Contractor of any detected non-compliance with the Contract Documents. The Contractor shall take corrective action after receipt of such notice per the Contract requirements. Such notice, when delivered to the Contractor at the work site, is deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time for excess costs or damages by the Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

End of Section

SECTION 01410 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 PROCEDURE

A. Contractor's Testing Laboratory:

The Contractor will provide the services of an independent testing laboratory acceptable to the Owner to inspect and test the materials and methods of construction as hereinafter specified for compliance with the requirements of the Contract Documents and to perform such other specialized technical services as may be required by the Contractor or Owner to demonstrate compliance. Inspections or testing performed as part of the Contractor's operations will be included as part of the Work. Employment of a testing laboratory will in no way relieve the Contractor of its obligation to perform the Work in accordance with the Contract Documents.

B. Test Register:

The Contractor shall provide a Test Register identifying all required testing in accordance with the contract documents. Register shall be kept updated and used to track test information including, but not limited to, date, time and location of tests.

1.02 QUALIFICATIONS OF CONTRACTOR'S TESTING LABORATORY

A. The Testing Laboratory:

1. The Testing Laboratory selected will meet the basic requirements of ASTM E329 "Standard of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction." The Testing Laboratory will submit to the Owner a copy of the report of inspection of their facilities made by the Materials Reference Laboratory of the National Bureau of Standards during the most recent tour of such inspections and will submit a memorandum stating steps taken to remedy all deficiencies reported by this inspection.

2. The Testing Laboratory selected will meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, as published by the American Council of Independent Laboratories.

B. Testing Machines:

Must be calibrated at intervals not exceeding 12 months by devices of accuracy traceable to the National Bureau of Standards or accepted values of natural physical constants.

C. Tests and Inspections:

Must be conducted in accordance with specified requirements, and if not specified, in accordance with the applicable standards of the American Society for Testing and Materials or other recognized and accepted authorities in the field.

1.03 AUTHORITIES AND DUTIES OF THE LABORATORY:

A. Attending Preconstruction Conferences:

The Testing Laboratory will obtain and review the Project plans and specifications with the Contractor as soon as possible prior to the start of construction. The Testing Laboratory will attend preconstruction conferences as required to coordinate materials inspection and testing requirements with the planned construction schedule. The Testing Laboratory will participate in such conferences throughout the course of the Project.

B. Outline Testing Program:

The Testing Laboratory will be responsible for outlining a written detailed testing program conforming to the requirements as specified in the Contract Documents and in consultation with the Owner and Design Professional. The testing program will contain an outline of inspections and tests to be performed with reference to applicable sections of the Contract Documents and the design drawings and specifications.

C. Cooperation with Design Team:

The Testing Laboratory will cooperate with the Owner, Design Professional, and Contractor and provide qualified personnel promptly on notice.

D. Inspections, Sampling, Testing, Reports and Certifications:

1. The Testing Laboratory will perform the required inspections, sampling, and testing of materials as specified under each Section of the Contract Documents and observe methods of construction for compliance with the requirements of the Contract Documents.

2. The Testing Laboratory will perform all inspections and submit all reports and certifications as required by all governing authorities.

E. Notification of Deficiencies in the Work:

The Testing Laboratory will notify the Owner and Contractor first by email of observed irregularities and deficiencies in the Work and other conditions not in compliance with the requirements of the Contract Documents.

F. Reports:

1. Information on Reports:

a. The Testing Laboratory will submit copies of all reports of inspections and tests promptly and directly to the parties named below. All reports will contain at least the following information:

(1) Project Name.
(2) Project Number.
(3) Date report issued.
(4) Testing Laboratory name and address.

(5) Name and signature of inspector.
(6) Date of inspection and sampling.
(7) Date of test.
(8) Identification of product and Specification Section.
(9) Location in the Project.
(10) Identification of inspection or test.
(11) Record of weather conditions and temperature (if applicable).
(12) Results of test regarding compliance with Contract Documents.
(13) Deficiency log, including deficiencies from previous reports.

2. Copies:

a. The Testing Laboratory will submit certified copies of all test and inspection reports promptly and directly to the following parties through the Owners Project Management Software Inspections and Tests modules:

(1) Owner.
(2) Contractor
(3) Designer of Record.
(4) supplier of the material tested.

3. Certification by Notary Public:

Upon completion of the job, the Testing Laboratory will furnish to the Owner a statement, under oath and notarized by a Notary Public, that all required tests and inspections were made in accordance with the requirements of the Contract Documents.

4. Accounting:

The Testing Laboratory will be responsible for separating and billing costs attributed to the Owner and costs attributed to the Contractor where appropriate, in accordance with the Contract Documents.

5. Obtaining Product and Material Certifications:

The Testing Laboratory will be responsible for obtaining all product and material certifications from manufacturers and suppliers as specified in the Specifications.

6. Limitations of Authority:

The Testing Laboratory is not authorized to revoke, alter, relax, enlarge upon or release any requirements of the Specifications or to approve or accept any portion of the Work or to perform any duties of the Contractor and its Subcontractors.

1.04 CONTRACTOR'S RESPONSIBILITY

A. Cooperation:

The Contractor will cooperate with laboratory personnel and provide access to the Work and manufacturer's operations.

B. Furnishing Samples:

The Contractor will provide to the laboratory representative samples of materials proposed for use in the Work in quantities sufficient for accurate testing as specified.

C. Furnishing Labor, Equipment and Facilities:

The Contractor will furnish labor, equipment, and facilities as required for sampling and testing by the laboratory and otherwise facilitate all required inspections and tests.

D. Advance Notice:

The Contractor will be responsible for notifying the Testing Laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Payment for Substitution Testing:

The Contractor will arrange with the Testing Laboratory and pay for any additional samples and tests above those required by the Contract Documents as requested by the Contractor for its convenience in performing the Work.

F. Notification of Source Change:

The Contractor will be responsible for notifying the Owner and Testing Laboratory when the source of any material is changed after the original tests or inspections have been made.

G. Tests for Suspected Deficient Work:

If, in the opinion of the Owner, any of the Work of the Contractor is not satisfactory, the Contractor will make all tests that the Owner deems advisable to determine its proper construction. The Owner will pay all costs if the tests prove the questioned work to be satisfactory.

H. Associated Services: The Contractor shall cooperate with the Owner and with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. The Contractor shall notify the Owner and the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required of the Contractor include but are not limited to the following:

1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Security and protection of samples and test equipment at the Project site.

1.05 PAYMENT OF TESTING LABORATORY

The Contractor will pay for the initial Testing Laboratory services for testing of materials for compliance with the requirements of the Contract Documents. The Contractor will pay for testing and retesting of materials that do not comply with the requirements of the Contract Documents and all other items as specified in these Specifications.

PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 SCOPE OF WORK

The work to be performed by the Testing Laboratory will be as specified in this Section and as determined in meetings with the Owner and Contractor. These are the Owner's minimum requirements; more stringent requirements may be required by the technical specifications.

3.02 EARTHWORK

A. Tests of Proposed Fill Material (if applicable):

The Testing Laboratory will conduct a survey of the Contractor's proposed location of borrow soil materials and will establish the suitability of any proposed fill material by determining the required engineering properties. Soil tests will include soil classification by the Atterberg Limit Tests ASTM D 4318, and grain size determination by ASTM D 422 "Particle Size Analysis of Soils."

B. Moisture Density Relationship for Natural and Fill Materials:

The Testing Laboratory will provide one optimum moisture density curve for each type of soil, natural fill, imported fill, or on-site fill encountered in subgrade and fills under building slabs and paved areas. Curves will be generated in accordance with ASTM D 1557 "Test Methods for Moisture Density Relationships of Soils and Soil Aggregate Mixtures."

C. Quality Control Testing Required During Construction:

1. Inspection of Subgrade and Fill: The Testing Laboratory will inspect and approve the following subgrades and fill layers before further construction work is performed thereon:

a. Paved Areas and Building Slab Subgrade: Make at least one field density test of the natural subgrade for every 2,500 square feet of paved area or building slab but in no case less than three tests. In each compacted fill

layer or lift, make one field density test for every 2,500 square feet of building slab or paved area but in no case less than three tests.

b. Foundation Wall Backfill: Make at least one field density test for each 200 lineal feet of wall with a minimum of four tests for each basement wall around the perimeter of the building and a minimum of one test for every other type of foundation wall on the Project site. Tests will be at random locations and elevations for each wall.

2. Field Density Tests:

Field Density Tests will be run according to ASTM D 1556 "Density of Soil in Place by the Sand Core Method," ASTM D 2167 "Density of Soil in Place by the Rubber Balloon Method" or ASTM D 2922 "Density of Soil and Soil Aggregate in Place by Nuclear Methods" as applicable.

3. Report Copies:

The Testing Laboratory will submit all moisture density curves and results of field density tests to the parties specified at Paragraph 1.03.F.2.a.of this section Additional Testing:

If reports by the Testing Laboratory indicate field densities lower than specified above, additional tests will be run by the Testing Laboratory with at least the frequencies scheduled above on recompacted fill and/or natural subgrade. The Testing Laboratory will notify the Contractor on a timely basis for any required retesting so as not to delay the Work. The costs of such tests will be borne by the Contractor.

Foundation:

a. Mat and Dug Footing Subgrade Inspection: The Contractor's Geotechnical Engineer will provide inspection service of each mat and dug footing subgrade prior to placing foundation concrete. Such inspection will verify that field conditions are consistent with soil report test results and that the foundation is being installed in the proper soil strata at the proper elevation. The Design Professional will submit written field inspection reports promptly after inspection to all parties listed at Paragraph 1.03.F.2.a of this Section and report its findings after each inspection by telephone to the Owner and Design Professional.

b. Field Inspection: The Design Professional may provide inspection of drilled pier installation.

c. Pier Load Test: The Design Professional may supervise the test pier program and submit a written report of its findings to all parties listed at Paragraph 1.03.F.2.1.

3.03 CONCRETE MATERIALS AND POURED IN PLACE CONCRETE, OTHER THAN P-501 CONCRETE PAVING

A. Tests of Portland Cement:

1. Mill certificates certifying that the cement has been tested and meets the requirements of the Specification will be acceptable as test results, provided the cement proposed for use can be identified with test lots. Mill certificates will be submitted by the Contractor prior to use of any such material.

2. Retesting of cement will be required if:

   a. In the opinion of the Testing Laboratory the cement has been damaged in storage or transit or is in any way defective.

   b. The cement has been in storage at the mixing site for over 30 days.

3. Compressive strength cube specimens will be made at the start of the job and at a frequency of one set per 250-tons of cement or whenever the source or brand of cement changes so that the quality of cement can be observed throughout the Project. Each set of two-inch cubes will consist of four cubes tested according to ASTM C 109 at 28-day strengths.

B. Tests of Aggregates:

1. The Testing Laboratory will verify that concrete aggregates proposed for use conform to the following specifications:

   a. ASTM C 33 "Specification for Concrete Aggregates"

   b. ASTM C 330 "Specification for Lightweight Aggregates for Structural Concrete"

2. Tests of aggregates by the Testing Laboratory will be made before the concrete mix is established and thereafter as the character of the aggregate changes and whenever the service of materials is changed. The following tests will be required:

   a. Sampling: The Testing Laboratory will secure samples of aggregate in accordance with ASTM D 75 from the concrete supplier. The proposed aggregate will not be used until the pit source has been approved by the Testing Laboratory and the plant capacity and ability to produce products has been verified.

   b. Sieve Analysis: ASTM C 136.

   c. Organic Impurities: ASTM C 40.

   d. Soundness: ASTM C 88.

   e. Abrasion of Concrete Aggregate: ASTM C 131.

   f. Specific Gravity: ASTM C 127 (coarse aggregate), ASTM C 128 (fine aggregate).

g. Deleterious Materials: ASTM C 33.

h. Materials Passing No. 200 Sieve: ASTM C 177.

3. Suppliers records of such tests run on the proposed material will be adequate provided a written affidavit is furnished as a shop drawing submittal.

C. Concrete Mix Designs:

1. The Contractor will submit for approval by the Owner and Design Professional, at least 15 days prior to the start of construction, concrete mix designs for each class of concrete indicated on the Structural Drawings and in the Specifications. The Contractor will not begin work until the applicable mix design has been approved.

2. The Contractor acting in conjunction with Contractor's concrete supplier and Testing Laboratory will submit in writing the mix designs, indicating whether the concrete is to be proportioned by either of the following methods as outlined in ACI 318:

a. Field Experience Method

b. Laboratory Trial Batch Method

3. When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301 and ACI 211. When Testing Laboratory trial batches are used to select concrete proportions, the procedure as outlined in ACI 318 will be followed. Prepare test specimens in accordance with ASTM C192 and conduct strength tests in accordance with ASTM C39.

4. Required types of concrete and compressive strengths as specified in the various sections of the Specifications.

5. All mix design will state the following information:

a. Mix design number or code designation by which the Contractor will order the concrete from the supplier.

b. Structural member for whom the concrete is designed (i.e. columns, walls footings, etc.).

c. Type of concrete (whether normal weight or lightweight).

d. 28 day compressive strength.

e. Aggregate type, source, size, gradation, fineness modulus.

f. Cement type and brand.

g. Fly ash type and brand (if any).

h. Admixtures including air entrainment, water reducers, accelerators, and retarders.

i. Slump.

j. Proportions of each material used.

k. Water cement ratio and maximum allowable water content.

l. Method by which the concrete is intended to be placed (bucket, chute, or pump).

D. Concrete Supplier’s Record of Quality Control:

The concrete supplier's past record of quality control will be used in the design of the concrete mixes to determine the amount by which the average concrete strength f'c should exceed the specified f'c as outlined in ACI 318. If a suitable record of test results is not available, the average strength must exceed the design strength by 1200 PSI as specified in ACI 318. After sufficient data becomes available from the job, the statistical methods of ACI 214 may be used to reduce the amount by which the average strength must exceed f'c as outlined in ACI 318.

E. Admixtures:

1. Admixtures to be used in concrete will be subject to the approval of the Testing Laboratory.

2. Quantities of admixtures to be used will be in strict accordance with the manufacturer's instructions.

3. Admixtures containing chloride ions will not be used.

4. Air entraining admixtures will conform to "Specification for Air Entraining Admixtures for Concrete" ASTM C260.

5. Water reducing admixtures, retarding admixtures, accelerating admixtures, water reducing and retarding admixtures and water reducing and accelerating admixtures will conform to "Specification for Chemical Admixtures for Concrete" ASTM C494.

6. Fly ash or other Pozzolons used as admixtures will conform to "Specification for Fly Ash and Raw or Calcined Natural Pozzolons for use in Portland Cement Concrete" ASTM C618. Obtain mill test reports for approval.

7. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities of admixtures as required to maintain quality control.

F. Lightweight Structural Concrete:

1. Comply with requirements of ACI 211 and ACI 301.

2. Lightweight concrete aggregate will conform to ASTM C 330 "Specification for Lightweight Aggregates for Structural Concrete."

3. Provide concrete with a dry unit weight of not more than 116-pounds per cubic foot and not less than 95-pounds per cubic foot. Design mix to produce strengths as indicated on the Drawings with a split cylinder strength factor (fct/(f'c) 0.5) of not less than 5.3 (Mpa) and a drying shrinkage limit of 0.03% at 28 days.

G. Slump Limits:

Refer to Drawings and Specifications for slump limits.

H. Adjustments of Concrete Mixes:

Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Such mix design adjustments will be provided at no additional cost to the Owner. Any adjustments in approved mix designs, including changes in admixtures, will be submitted in writing to the Testing Laboratory for approval prior to field use.

I. Shrinkage:

All concrete will be proportioned for maximum allowable unit shrinkage of 0.03% at 28 days as determined by ASTM C157.

J. Chloride Ion Content:

A written submittal will be made with each mix design proposed for use on the Project that no soluble chloride ion exist in the concrete mixes.

K. Concrete Test Cylinders by the Testing Laboratory:

Molding and Testing: Cylinders for strength tests will be molded and Testing Laboratory cured in accordance with ASTM C31 "Method of Making and Curing Concrete Test Cylinders in the Field" and testing in accordance with ASTM C39 "Method of Testing for Compressive Strength of Cylindrical Concrete Specimens".

L. Field Samples:

Field Samples for strength tests will be taken in accordance with ASTM C172 "Method of Sampling Fresh Concrete".

M. Frequency of Testing:

Each set of test cylinders will consist of a minimum of four standard test cylinders. A set of test cylinders will be made according to the following frequency guidelines:

1. One set for each class of concrete taken not less than once a day.

2. Piers: One set for each 50 cubic yards or fraction thereof.

3. Spread Footings: One set for each 50 cubic yards or fraction thereof.

4. Foundation Walls: One set for each 150 cubic yards.

5. Pier Caps and Spread Footings: One set for each 50 cubic yards or fraction thereof.

6. Floors: One set for each 150 cubic yards or fraction thereof but not less than one set for each 5000 square feet of floor area.

7. Columns: One set for each 50 cubic yards or fraction thereof with a minimum of two sets per floor.

8. All Other Concrete: A minimum of one set for each 150 cubic yards or fraction thereof.

9. No more than one set of cylinders at a time will be made from any single truck.

10. The above frequencies assume that one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above will apply for each plant used.

11. The cylinders will be numbered, dated, and the point of concrete placement in the building recorded. Of the four cylinders per set, break one at seven days, two at 28 days, and one automatically at 56 days, only if either 28 day cylinder break is below required strength.

N. Additional Cylinder for Floor Form Stripping:

One additional cylinder per set will be required for formed slab and pan joist floors for the purpose of evaluating the concrete strength at the time of form stripping. This cylinder will be stored on the floor where form removal is to occur under the same exposure conditions as the floor concrete. The cylinder will be cured under field conditions in accordance with ASTM C31 "Method of Making and Curing Concrete Test Specimens in the Field". Field cured test cylinders will be molded at the same time and from the same samples as Testing Laboratory cured test specimens. The cylinder will be broken at the time of form removal as directed by the Contractor.

O. Cylinder Storage Box:

The Contractor will be responsible for providing a protected concrete cylinder storage curing box at a point on the Project site mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Testing Laboratory. Cylinder storage curing box must meet ACI guidelines.

P. Transporting Cylinders:

The Testing Laboratory will be responsible for transporting the cylinders to the Testing Laboratory in a protected environment such that no damage or ill effect will occur to the

concrete cylinders until they are transported to the Testing Laboratory.

Q. Information on Concrete Test Reports:

1. The Testing Laboratory will make and distribute concrete test reports after each job cylinder is broken. Such reports will contain the following information:

   a. Truck number and ticket number.

   b. Concrete Batch Plant.

   c. Mix design number.

   d. Accurate location of pour in the structure.

   e. Strength requirement.

   f. Date cylinders made and broken.

   g. Technician making cylinders.

   h. Concrete temperature at placing.

   i. Air temperature at point of placement in the structure.

   j. Amount of water added to the truck at the batch plant and at the Project site and whether it exceeds the amount allowed by the mix design.

   k. Slump.

   l. Unit weight.

   m. Air content.

   n. Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be flagged if either cylinder fails to meet Specification requirements.

2. Other Required Tests of Concrete by the Testing Laboratory (unless noted otherwise):

   a. Slump Tests: (ASTM C143) will be made at the beginning of concrete placement for each batch plant and for each set of test cylinders made.

   b. Air Entrainment: (ASTM C233) tests will be made at the same time slump tests are made as cited above.

   c. Concrete Temperature: Will be measured at the same time slump tests are made as cited above.

d. Chloride Ions: If calcium ions are not approved, the following will not apply. If calcium ions are permitted per requirements of Concrete Section(s) of the Specifications, comply with the following.

(1) The Contractor will have Testing Laboratory verify in a written submittal with the mix designs that the chloride ion concentration will not exceed the limits specified.

(2) Tests will be run for each class of concrete according to AASHTO Designation T260-82 "Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials" to determine that the maximum chloride ion content does not exceed the limits stated in the Concrete Section(s) of the Specifications. One set of tests will be run at the beginning of the Project for each class of concrete.

R. Evaluation and Acceptance of Concrete:

1. Strength Test: Will be defined as the average strength of two 28 day cylinder breaks from each set of cylinders.

2. Quality Control Charts and Logs: The Testing Laboratory will keep the following quality control logs and charts for each class of concrete containing more than 2,000 cubic yards. The records will be kept for each batch plant and submitted on a weekly basis with cylinder test reports:

a. Number of 28 day strength tests made to date.

b. 28 day strength test results containing the average of all strength tests to date, the high test result, the low test result, the standard deviation, and the coefficient of variation.

c. Number of tests under specified 28 day strength.

d. A histogram plotting the number of 28 day cylinders versus compressive strength.

e. Quality control chart plotting compressive strength test results for each test.

f. Quality control chart plotting moving average for strength where each point plotted is the average strength of three previous test results.

g. Quality control charge plotting moving average for range where each point plotted is the average of ten previous ranges.

S. Acceptance Criteria:

1. The strength level of an individual class of concrete will be considered satisfactory if both of the following requirements are met:

a. The average of all sets of three consecutive strength tests equal or exceed the required f'c.

b. No individual strength test (average of two 28 day cylinder breaks) falls below the required f'c by more than 500 PSI.

2. If either of the above requirements is not met, the Testing Laboratory will immediately notify the Contractor and Owner by telephone. Steps will immediately be taken to increase the average of subsequent strength tests.

T. Investigation of Low Strength Concrete Test Results:

1. Contractor Responsibility for Low Strength Concrete:

If any strength test of Testing Laboratory cured cylinders falls below the required f'c by more than 500 PSI, the Contractor will take steps immediately to assure that the load carrying capacity of the structure is not jeopardized.

2. Nondestructive Field Tests:

The Testing Laboratory will, under the direction of the Owner or Design Professional, perform nondestructive field tests of the concrete in question using Swiss Hammer, Windsor Probe, or other appropriate methods as approved by the Owner or Design Professional and report the results in the same manner as for cylinder test reports.

3. Core Tests:

a. If the likelihood of low strength concrete is confirmed and computations indicate that the load carrying capacity of the structure has been significantly reduced, tests of cores by the Testing Laboratory, drilled from the area in question under the direction of the Owner or Design Professional, will be required in accordance with ASTM C42 "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete". In such case, three cores will be taken for each strength test more than 500 PSI below required f'c.

b. If concrete in the structure will be dry under service conditions, cores will be air dried (temperature 60° to 80°F, relative humidity less than 60 %) for seven days before test and will be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores will be immersed in water for at least 48 hours and tested wet. The Contractor will fill all holes made by drilling cores with an approved drypack concrete.

4. Acceptance Criteria for Core Tests:

Concrete in an area represented by core tests will be considered structurally adequate if the average of three cores is equal to at least 85% of f'c and if no single core is less than 75% of f'c. If approved by the Owner and Design Professional, locations of erratic core strengths may be retested to check testing

accuracy.

5. Cost of Investigations for Low Strength Concrete:

The costs of all investigations of low strength concrete will be borne by the Contractor.

U. Concrete Inspection by the Testing Laboratory:

1. The following types of concrete inspection will be provided by the Testing Laboratory for the classes of concrete described in each type of inspection:

a. Continuous concrete inspection at the batch plant and point of discharge at the Project site. This type of inspection will be followed for the following classes of concrete:

(1) Mat Foundations or any other foundation types where more than two columns are supported on a common foundation unit.
(2) All architectural concrete.
(3) Columns.

The Testing Laboratory will assign the required number of technicians with the necessary equipment for each scheduled concrete placement to provide continuous concrete inspection at both the batch plant and the point of discharge at the Project site.

b. Initial concrete inspection at the batch plant for first pour and travel to the Project site with the first truckloadings to inspect concrete placement at the point of discharge. This type of inspection will be followed for all structural concrete for foundation and floors not specified above.

c. The Testing Laboratory will assign a technician with the necessary equipment to each scheduled concrete placement. The technician will initiate concrete mix inspection at the batch plant, then will proceed to the Project site with the first truckloadings to continue to inspect the mix at the point of discharge. The technician will remain at the Project site to inspect the mix for the required consistency for the duration of the concrete placement.

V. Batch Plant Inspection by the Testing Laboratory:

1. The scope of Batch Plant inspection by the Testing Laboratory will include the following:

a. Prior to start of Concrete Work, the Testing Laboratory will inspect batch plant facilities proposed for use in the Work and report, in writing, inspection results to the Contractor, Owner, and Design Professional for approval before the start of the Work. The inspection will follow that outlined in ASTM C 94 and as recommended by the National Concrete Ready Mix Association. Inspection will include:

(1) Batch plant operations and equipment.
(2) Truck mixers.
(3) Scales.
(4) Stockpile Placement.
(5) Material storage.
(6) Admixture dispensers.

b. The duties of the batch plant inspector will include the following:

(1) Perform initial inspection of batch plant facilities as specified above.
(2) Secure samples of aggregates for testing.
(3) Perform visual inspection of aggregate stockpiles to determine uniformity, cleanliness, and moisture variation.
(4) Adjust design weights for moisture in aggregates.
(5) Inspect aggregate conveying system for possible segregation to be performed at each visit.
(6) Observe batching procedure. Verify that concrete mix design number is being batched and randomly monitor weighing operation for correct weights of each mix ingredient, including admixture dosages.
(7) Prior to loading the truck at the batch plant, verify that the drum is free of water, fresh concrete, or aggregates. Check conditions and cleanliness of drum, fins, and blades.
(8) During loading, observe loading procedures.
(9) After loading, hold the truck for proper mix time and inspect concrete for thorough mix and consistency prior to leaving the batch plant.
(10) Check size of batch for rated truck capacity.

W. Job Site Inspection:

1. The scope of the work to be performed by the inspection on the Project site will be as follows:

a. Verify that air temperatures at the point of placement in the structure are within acceptable limits defined above prior to ordering of concrete by the Contractor.

b. Inspect concrete upon arrival to verify that the proper concrete mix number, type of concrete, and concrete strength is being placed at the proper location.

c. Inspect plastic concrete upon arrival at the Project site to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in mix designs. Record the amount of water added and note if it exceeds that allowed in the mix design. The responsibility for adding water to trucks at the Project site will rest only with the Contractor's designated representative. The Contractor is responsible for verifying that all concrete placed in the field is in

conformance to the Contract Documents.

d. Obtain concrete test cylinders.

e. Perform slump tests and air entrainment tests.

f. Record information for concrete test reports.

g. Verify that all concrete being placed meets Specifications. Report concrete not meeting the specified requirements and immediately notify the Contractor, batch plant inspector, and Owner.

h. Pick up and transport to Testing Laboratory cylinders cast the previous day.

i. Check concrete placing techniques to determine that concrete deposited is uniform and that vertical drop does not exceed six feet.

j. The Project site laboratory inspector will report and irregularities that occur in the concrete at the Project site or test results to the Contractor, Owner, and Design Professional.

2. Cause for Rejection of Concrete:

a. The Contractor will reject all concrete delivered to the Project site for any of the following reasons:

(1) Wrong class of concrete (incorrect mix design number).

(2) Air temperature: Air temperature limits will be as follows:

(a) Cold Weather: Air temperature must be 40°F and r ising.

(b) Hot Weather: Air temperature must be cooler than 100°F.

(c) Concrete may be placed at other air temperature ranges only with approval of the job inspector for the Testing Laboratory or other duly appointed representative.

(3) Concrete with temperatures exceeding 95°F may not be placed in the structure.

(4) Air contents outside the limits specified in the mix designs.

(5) Water added outside the limits specified in the mix designs.

(6) Slumps outside the limits specified in the mix designs.

(7) Excessive Age: Concrete will be discharged within 90 minutes of

plant departure or before it begins to set if sooner the 90 minutes unless approved by the Testing Laboratory job inspector or Owner representative.

b. The Contractor will be responsible for verifying that all concrete placed in the field is in conformance with the Contract Documents.

c. Concrete Batch Trip Tickets: All concrete batch trip tickets will be collected and retained by the Contractor. Compressive strength, slump, air, and temperature tests will be identified by reference to a particular trip ticket. All tickets will contain the information specified in ASTM C 94. Each ticket will also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ration for the design mix. The Testing Laboratory will immediately notify the Contractor, Owner, and Design Professional of tickets not meeting the criteria specified.

X. Extent of Services for Reinforcing Steel for Concrete:

1. When the Contractor or reinforcing steel fabricator notifies the Testing Laboratory that a shipment of reinforcing steel is in the final stages of fabrication and ready for shipment, the Testing Laboratory will inspect the shipment to determine the following:

a. The bars will be free from injurious defects and will have a workmanlike finish.

b. Deformations will be of the proper sizes, shapes, and spacing as detailed in ASTM A 615.

c. The bars will not have excessive rust and/or pelting.

d. The bars will not have any unusual twists or bends.

2. Identified Stock:

Where job material is taken from bundles as delivered from the mill, is properly identified as to heat number and is accompanied by mill and analysis test reports, such material will be used without further local tests provided an affidavit is given from the supplier to the Testing Laboratory that the materials conform with the requirements of the ASTM Specification listed on the Structural Drawings. In case of controversy, the procedure as stipulated below for unidentified stock will be followed.

3. Unidentified Stock:

a. For all unidentified stock, the Testing Laboratory will secure samples of the reinforcing steel bars at the time of inspection. The samples will conform to the following:

(1) The sample will include two bars for each ten tons or fraction

thereof of each bar size, heat number, and manufacturer being shipped.

(2) The sample bars will be a minimum of 24-inches in length and will be identical to the material being shipped.

(3) The Testing Laboratory will tag each of the steel bundles with the laboratory identification tag and appropriately mark the samples corresponding to the steel being inspected and shipped. The fabricator will supply shipping lists showing the weight of each bar to the Testing Laboratory for tensile strength tests and bend tests according to ASTM A 615.

3.04 STRUCTURAL STEEL

A. Contract Obligations:

1. The Contractor will pay for all initial shop and field inspections and tests as required during the fabrication and erection of the structural steel.

2. The Contractor will pay for and arrange with the Testing Laboratory for the certification of all shop and field welders. Each bolting crew and welder will be assigned an identifying symbol or mark and all shop and field connections will be so identified so that the inspector can refer back to the person or crew performing the work. The costs of all retesting of material or workmanship not in conformance with the Contract Documents will be borne by the Contractor. The fabricator and erector will provide the Testing Laboratory inspector with access to all places where work is being done. A minimum of 24 hours notification will be given prior to commencement of work.

3. The Contractor will provide the Testing Laboratory with the following:

a. A complete set of Contractor's and Design Professional's approved shop and erection drawings including all revisions and addenda.

b. Cutting lists, order sheets, material bills, shipping bills and mill test reports.

c. Information as to time and place of all rollings and shipment of material to shops.

d. Representative sample pieces requested for testing.

e. Full and ample means and assistance for testing all material.

f. Proper facilities, including scaffolding, temporary work platforms, hoisting facilities, etc., for inspection of the work in the mills, shop and field.

B. Testing Laboratory Responsibility:

1. The inspection of shop work by the Testing Laboratory will be performed in the fabricator's shop to the fullest extent possible. Such inspections will be in sequence, timely, and performed in such a manner as to minimize disruptions in operations and to permit the repair of all nonconforming work while the material is in process in the fabricating shop. Inspection of field work will be completed promptly so that corrections can be made without delaying the progress of the work.

2. Inspections will be performed by qualified technicians with a minimum of two years experience in structural steel testing and inspection. All inspection personnel will be certified in accordance with AWS QC-1. The Testing Laboratory will provide tests reports of all shop and field inspections. Shop test reports will include shop welders certifications. All test reports will indicate types and locations of all defects found during inspection, the measures required and performed to correct such defects, and statements of final approval of all welding and bolting of shop and field connections and other fabrication and erection data pertinent to the safe and proper welding and bolting of ship and field connections. In addition to the parties listed in this Specification, the fabricator and erector will receive copies of all test reports.

C. Rejection of Material or Workmanship:

The Owner, Contractor, and Testing Laboratory reserve the right to reject any material or workmanship not in conformance with the Contract Documents at any time during the progress of the Work. However, this provision does not allow waiving the obligation for timely, in sequence inspections.

D. Mill Tests of Structural Steel:

Mill Order Steel: The fabricator will furnish certified mill test reports and an affidavit stating that the structural steel furnished meets the requirements of the grade specified on the structural drawings for all mill order steel. In case of controversy, tests of the material according to ASTM A6 or A568, as applicable, made by the Testing Laboratory with certified test reports paid for by the Contractor will be made to verify conformity with ASTM standards. Tests will be made for each 10 tons of material used, unless approved otherwise by the Owner.

E. Local Stock Steel:

1. Materials taken from stock by a fabricator for use for structural purposes must be of a quality at least equal to that required by the ASTM specifications applicable to the classification covering the intended use. Certified mill test reports will be accepted as sufficient record of the quality of materials carried in stock by the fabricator provided the stock steel can be identified by heat or melt numbers. In case of controversy, tests by the Testing Laboratory with certified reports as specified for mill order steel will be required.

2. If tests are required, test specimens will be taken by the Contractor under the direction of its Testing Laboratory and will be machined by the Testing Laboratory to dimensions as required by the applicable ASTM standards.

F. Shop Inspections and Tests:

1. The Testing Laboratory will provide inspection at the designated fabrication shops for the designated periods of time to perform shop inspection and tests. The designated fabrication shops and time periods of inspection will be determined in consultation with the Owner prior to the start of fabrication in a timely manner so as to not delay the fabrication process. The following tests and inspections will be performed:

a. Review shop drawings and shop procedures with fabricator's supervisory personnel.

b. Request and obtain necessary mill certifications of steel and verify proper material throughout the duration of the Project.

c. Verify welding qualifications either by prequalification or by witnessing qualification tests.

d. Verify welder qualifications either by certification and/or by retesting. Obtain welder certificates.

e. Check layout and dimensions of jigs and fixtures for multiple fabrication, joint preparation, and fit up of members.

f. Verify welding electrodes to be used and other welding consumables as the Project progresses.

g. Check preheating procedures for uniformity and thoroughness through the full thickness of the material. Inspect preheating and interpass temperatures for conformance to AWS D1.1, Table 4.2. Verify procedure for control of distortion and shrinkage stresses.

h. Verify procedures for welding in accordance with applicable portions of Section 4, "Technique", AWS D1.1.

i. Inspect welding equipment for capacity, maintenance, and working condition.

j. Perform random dimensional checks of completed members.

k. Provide inspection of surface preparation for coating and coating operations.

l. Check shipping preparation schedules and obtain copies of shipping lists.

m. Check bolted connections according to inspection procedures outlined in the "Specification for Structural Joints" using ASTM A325 or A490 Bolts.

n. Make visual inspection of welding in progress for size, length, and quality.

o. Perform nondestructive examination services for various weldments of

shop fabrication determined in consultation with the Contractor and Owner prior to the start of fabrication. The testing agency will submit recommendations to the Owner for approval as to the type of nondestructive inspection methods best suited to the member being tested. Specifically, the Testing Laboratory will provide a qualified technician with the necessary equipment to perform the following:

(1) Nondestructive examination conduct in accordance with the specific requirements for the item being examined including radiographic, ultrasonic, magnetic particle, or dye penetrate inspection. All nondestructive inspection procedures will conform to Section 6 of AWS D1.1.

(2) Interpret, record, and report all results of the nondestructive tests.

(3) Mark for repair any area not meeting Specifications requirements. Correction of rejected welds will be made in accordance with Paragraph 3.7, "Corrections," AWS D1.1.

(4) Re-examine all repair areas and interpret, record, and report the results of examinations of repair welds.

p. Verify that quality of welds meet the requirements of Paragraph B.15, "Quality of Welds," AWS D1.1.

q. Unless otherwise specified, test all partial and complete penetration welds in connections of beams, girders, columns, trusses, and braces. Test a minimum of 10% of connections with fillet welds. Increase the testing rate for welders having a high rejection rate as required to ensure acceptable welds. Visual inspection is required for all welds. The costs of repairing all defective welds and the costs of retesting by the Testing Laboratory will be borne by the Contractor. If removal of a backing strip is required by the Testing Laboratory to investigate a suspected weld defect, such cost will be borne by the Contractor.

G. Field Inspections and Tests:

1. The Testing Laboratory will provide inspection in the field in a timely manner for a period of time as determined in consultation with the Owner prior to the start of erection so as to not delay the start of erection. The following tests and inspections will be made:

a. Obtain the planned erection procedure and review with the erector's supervisory personnel.

b. Check the installation of base plates for proper leveling, grout type, and grout application.

c. Verify field welding procedures and obtain welder certificates.

d. Check steel as received in the field for possible shipping damage, workmanship, and piece marking.

e. Check plumbness and frame alignment as erection progresses.

f. Check required camber of floor beams.

g. Check joint preparation and fit up, backing strips, and runout plates for welded moment connections and column splices.

h. Check preheating to assure proper temperature, uniformity, and thoroughness through the full material thickness.

i. Review welding sequence.

j. Visually inspect all field welding for size, length, and quality.

k. Perform nondestructive examination services for various weldments of field erection determined in consultation with the Contractor and Owner prior to the start of erection. The Testing Laboratory will furnish a qualified technician with the necessary equipment to perform radiographic, ultrasonic, magnetic particle, or dye penetrant inspection as required for the item being tested and other duties as outlined for shop inspection in the previous Section. Unless specified otherwise, check all partial and complete penetration welds in connections of beams, girders, columns, and braces. Check 10% of connections with fillet welds. Visual inspection is required for all welds.

l. Check calibration of impact wrenches used in field bolted connections.

m. Check high strength friction field bolted connections according to inspection procedures outlined in the "Specification for Structural Joints Using ASTM A3256 or A490 Bolts". Unless specified otherwise, test 10% of the bolts, but not less than two bolts, selected at random in each connection. If any bolt is found to be improperly tightened, test all bolts in the connection. Visually inspect all bearing type bolts to verify that the bolts are snug tight.

n. Visually inspect the welding of metal deck to the structure.

o. Perform field tests on 10% of completed shear connectors in each beam according to inspection procedures outlined in AWS D1.1.

2. The costs of repairing all defective welds and the costs of retesting by the Testing Laboratory will be borne by the Contractor. If removal of a backing strip is required by the Testing Laboratory to investigate a suspected weld defect, such cost will be borne by the Contractor.

H. Tests and Inspection of Sprayed-On Fireproofing:

1. The Testing Laboratory will confirm that sprayed-on fireproofing conforms to all

performance criteria as specified in the Project Specifications by obtaining and reviewing manufacturer's certification or test reports.

2. The Testing Laboratory will sample sprayed-on fireproofing at each floor for each day's operations and verify oven dry density and compression strength as specified on the Drawings.

3. The Testing Laboratory will verify proper installation method, proper material, and proper material thickness for each day's operation.

4. The Testing Laboratory will randomly inspect the thickness of the sprayed-on fireproofing as specified in the UL designation numbers on the Drawings.

3.05 NON-SHRINK GROUT FOR BASE PLATES AND BEARING PLATES AND PRECAST PAVERS

A. Compressive Strength Tests (by the Testing Laboratory):

1. Compressive strength of grout will be determined by testing four cubes two inches in dimension according to the requirements of ASTM C109 "Compressive Strength of Hydraulic Cement Mortars." Each strength test will be the average of two 28 day strengths. Test one cube at seven days, two at 28 days, and one at 56 days, only if either 28 day test is low.

2. Frequency of Testing: One set of cubes (four cubes) will be made for every ten base plates and bearing plates or fraction thereof cut not less than one set for each day's operation. One set of cubes will be made for each day's operation of grouting wall panels.

3.06 OPEN WEB STEEL JOISTS

A. Scope: The Testing Laboratory will perform inspection of open web steel joists in the field as herein described.

1. Obtaining Manufacturer's Product Certification: The Testing Laboratory will obtain product certification for open web steel joists and joist girders as required by the Specifications.

2. The Testing Laboratory will perform the following field inspections:

a. Inspect joists for damage during shipment.

b. Verify proper bearing of joists supports.

c. Verify camber requirements of joists arriving in the field.

d. Confirm bridging size and location.

e. Confirm attachment of joists to supports (welding or bolting).

f. Confirm bolting of joists to supports at column lines as required by OSHA requirements.

g. Verify that no joists have been damaged during erection.

END OF SECTION

SECTION 01540 - CONSTRUCTION SAFETY AND SECURITY REQUIREMENTS

PART 1 – GENERAL

1.01 PURPOSE AND OBJECTIVE

A. The purpose of this section is to set forth guidelines concerning safety and security during construction of the Project. The following methods, procedures, rules and authorities must be adhered to during project construction., The Hillsborough County Aviation Authority (HCAA) Construction Safety & Security Guidelines Manual applies to the project, and the Contractor will also comply with all safety requirements described below, unless in direct conflict with the HCAA Construction Safety & Security Guidelines Manual. In such case, the more stringent requirements will govern, as determined by Owner.

B. The following are the general safety objectives that must be achieved in order to maximize safety and to minimize time and economic loss to the aviation community, construction contractors and others directly affected by the Project.

1. Keep the Airport safe for all users.
2. Keep the Airport operational for all users.
3. Maintain safety of Airport operations.
4. Minimize delays to Airport operations.
5. Minimize delays to construction operations.
6. Minimize Airport-operation/construction-activity conflicts.
7. Minimize impacts to tenants and passengers.

1.02 OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION

A. All of Contractor’s operations will be conducted in accordance with this Section. If the operations include work within the AOA or impacts the AOA or aircraft flight surfaces, the operations will be conducted in accordance with the current version of Advisory Circular 150/5370-2. The Contractor will prepare and submit a site specific safety plan (safety plan) that details how it proposes to comply with the requirements when working.

B. The Contractor will implement all necessary measures required by the safety plan prior to commencement of any work activity. The Contractor will conduct routine checks of the safety plan measures to assure compliance with the safety plan.

C. The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the Project. The Contractor will assure that all subcontractors are made aware of the requirements of the safety plan and that they implement and maintain all necessary measures.

D. No deviation or modifications may be made to the approved safety plan unless approved in writing by the Owner.

E. This Contract is intended to provide for the optimum degree of safety to aircraft, both parked and operating; Airport personnel, passengers and general public, equipment,

and associated facilities; and to the Contractor's operations consistent with minimum interference to the movement of aircraft, vehicles, and/or personnel engaged in the day-to-day operation of the Airport. To this end, the Contractor will observe all Airport rules and regulations and all other operational limitations which may be imposed from time to time. Contractor will provide marking, lighting, barricades, signs, or other measures which are required to properly identify Contractor's construction areas, Work sites, equipment, vehicles, storage areas, and/or conditions which may be hazardous to Airport operations.

F. If the Contractor fails to maintain the marking, lighting barricades, signs, etc., as required, the Owner will cause appropriate safety measures to be installed by others and all costs thereof will be charged to the Contractor and deducted by the Owner from monies due to the Contractor.

G. The Contractor's responsibility for safety and security will begin on the day the Contractor starts Work or on the date of the Notice To Proceed and will continue until Contractor is complete.

H. The Contractor is fully and solely responsible for all project safety as it pertains to the Contractor's Work. This includes complying with the Hillsborough County Aviation Authority Construction Safety & Health Guidelines Manual, if applicable, implementing and enforcing its safety plan and procedures. Owner's acceptance, directives, approval, comments or any such action regarding Contractor's safety plan or Work shall not relieve the Contractor of its obligations.

1.03 SAFETY PROCEDURES

A. In as much as each Work area will be accessible to and used by the public, the Owner, airlines, and other companies doing business at the Airport during the construction period, it is the Contractor's responsibility to maintain each Work area in a safe, hazard free condition at all times. This will include barricades, fencing, taping up sharp corners or any other precautions necessary to protect the public. Should the Owner find an area unsafe at any time, Owner will notify the Contractor and the Contractor will take whatever steps necessary to remedy the unsafe condition. Should the Contractor not be immediately available for corrective action, the Owner will cause appropriate safety measures to be installed by others and all costs thereof will be charged to the Contractor and deducted by the Owner from monies due to the Contractor.

B. Fire Control: Open flame torch cutting or welding is prohibited unless adequate safety precautions have been taken and approved by the Owner via Owner's cutting and welding permit process. Flame cutting will be permitted only on steel parts that cannot be removed in any other manner and only when at least one person is standing by exclusively with a fire extinguisher within ten feet of the Work and within full view of the area. The fire extinguisher will have been inspected, tagged and ready for use. The Contractor will submit a fire protection plan for approval prior to conducting the Work requiring said protection plan.

C. Work Near Fire Alarm: Caution will be exercised as necessary when working near fire alarms so as not to accidentally activate fire alarms, doors or barriers.

D. Protection of Property: Fixed structures, equipment, paving, landscaping, vehicles

(automobiles, trucks, etc.) and aircraft will be protected with drop cloths, shielding and other appropriate measures to assure maximum protection.

E. Use of explosively operated fastening devices within the confines of any Owner facilities or within Tampa International Airport is strictly prohibited, unless Owner provides prior written approval and Design-Builder provides safety plan.

1.04 GENERAL SAFETY REQUIREMENTS

A. An initial construction/safety meeting will be coordinated with the Owner after the award of the Contract, and prior to commencing construction, during which the Contractor will become aware of and assume responsibility for all safety issues. Additional construction/safety meetings may be scheduled as deemed necessary by the Owner throughout the Contract. Representatives from the Owner, Contractor, Design Professional, and any others deemed necessary by the Contractor may attend.

B. The Contractor will inform its supervisors and workers of the Airport activity and operations that are inherent to this Airport, the safety regulations of the Airport, and the prohibition of driving or walking on any area of the AOA without clearance. The Contractor will conduct its construction activities to conform to both routine and emergency requirements. The Contractor will provide initial and continuing instructions to all supervisors, employees, subcontractors, and suppliers to enable them to conduct their Work in a manner that will provide the maximum safety with the least hindrance to air and ground traffic, the general public, Airport employees, and to the workers employed on the Project site.

C. Work may be stopped/suspended by the Owner anytime the Owner considers that the intent of this Section is being violated or that a hazardous condition has been/was created. This decision to suspend the Work will be final and will only be rescinded by the Owner when satisfied that the Contractor has taken action to prevent recurrence. Delays/work stoppage as a result of the suspension of Work will be considered the fault of the Contractor and will not stop the Contract Time for assessing liquidated damages.

D. All Contractor vehicles authorized to operate on the Airport outside of the Construction Area Limits as defined herein and to cross active runways, safety areas, taxiways, aprons, instrument or approach clear zones or any area within the AOA will do so only under the direct control of a trained, qualified flagman who is monitoring (two-way) radio communication with the ground controller of the Air Traffic Control Tower or UNICOM. All aircraft have priority over ground vehicles.

1. When necessary, the Contractor will provide a radio to monitor communications from the Air Traffic Control Tower or UNICOM. This operator will be familiar with aircraft/ground controller communications and will be on duty whenever vehicles are operating in areas referenced above.

2. All vehicles operating in the AOA will be equipped with an operating yellow flashing beacon.

E. All Contractor vehicles and equipment that are authorized to operate on or near the AOA or the Airport outside of the designated Construction Area Limits or haul routes as

defined herein will display 3-foot by 3-foot flags or larger, orange and white checkerboard pattern, each checkerboard color being 1-foot square.

F. Any construction activity within 250-feet of an active runway centerline or 107-feet from an active taxiway centerline requires the closure of the affected runway or taxiway, unless otherwise approved by the Owner. No runway, taxiway or apron area will be closed without approval of the Owner. This will enable "Notices to Airmen" or other advisory communications to be issued. A minimum of 48 hour notice of requested closing will be directed to the Owner who will coordinate the request with Authority Operations.

1. Debris, waste and loose material capable of causing damage to aircraft landing gears, propellers or being ingested in jet engines will be removed from the active portion of the AOA, placed in protected areas or otherwise secured to prevent dispersal into active portions of the AOA. The AOA is defined as all areas used or intended to be used for aircraft operations including active runways, aprons, taxiways, taxi lanes, etc. Debris will be promptly removed from the AOA. The Contractor will exercise care in the transportation of materials within the AOA. Materials tracked or spilled in the AOA will be removed immediately.

2. When hauling, loading, grading, or when any of the Contractor's activities are likely to cause the deposit of loose materials in the AOA, powered vacuum sweepers will patrol the affected areas continuously to remove such deposits. The sweepers will be supplemented by hand sweepers, loaders, trucks, etc., as necessary.

3. Closures:

   a. Prior to the commencement of any demolition or other Work which will cause an interruption or modification to existing aircraft operations, the Contractor will confer with and obtain authorization from the Owner.

   b. If the Contractor requires access to operational areas not delineated on the Drawing(s), the Contractor will participate in discussions leading to the imposition of restrictions on Airport operations in the affected areas. Contractor will strictly abide by all conditions imposed by the Owner relating to Contractor's entry and use of such areas and Contractor will not enter these areas until granted temporary, conditional entry clearance by the Owner.

   c. Unless otherwise described in the Contract Documents, trenching, excavation and other work requiring temporary runway or taxiway closure will be limited by the Contractor to that amount of work that can be completed within the hours of minimal operation. All ditches, excavations, etc., will be restored prior to the end of the Work period and affected pavements returned to service. This Work will be scheduled during hours of minimal operations. Hours of minimal operation will be the hours between 10:00 p.m. and 6:00 a.m. All other hours will be hours of normal operation.

d. The Contractor may be required to pursue affected portions of the Work on a continuous 24-hour per day basis during construction of the various phases and sub phases shown on the Drawings and described in the Contract Documents (such as when runways or taxiways, aprons, service or access roadways, or service gates are closed for operations or when hazards of any kind arise).

e. The Owner will arrange for inspection prior to opening for aircraft use any taxiway that has been closed for Work, on or adjacent thereto, or that has been used for a crossing point or haul route by the Contractor.

4. Operations Safety Inspections:

a. The entire Project site will be inspected once per work shift and more frequently if construction activities are of a nature that debris may accumulate on AOA pavements. Special inspections will be conducted for each Work area prior to return to service for aircraft operation. The purpose of these inspections is to ascertain that areas returned to aircraft service are in satisfactory condition and that the overall Project site and its activities are within the safety criteria set forth in these Contract Documents. Inspections will be conducted jointly by representatives of the Contractor and the Owner.

b. Any violations of safety criteria found during these inspections will be rectified immediately. If a violation cannot be corrected on an immediate basis by the Contractor, the Contractor will immediately notify the Owner. No areas will be approved for operations with violations occurring unless specifically authorized by the Owner.

G. The Contractor will preserve and/or protect existing and new pavements plus other facilities from damage due to construction operations. Existing pavements and facilities which are damaged will be replaced or reconstructed to original strength at the Contractor's expense. The Contractor will take immediate action to reconstruct any damaged area which is to remain in service. Unless indicated on the Drawings, existing pavements will not be cut for the installation of any utilities. Jack and bore or directional bore method will be required.

H. Construction Area Limits:

1. Contractor will be required to conform to safety requirements contained in FAA Advisory Circular 150/5370-2. Construction within the safety areas or Obstacle Free Zone (OFZ), as defined in FAA Advisory Circular 150/5300-13, latest edition is prohibited for both runways and taxiways. For Aircraft Group V pavements, this is 250 feet from the runway centerline and 107 feet from the taxiway centerline. The activity limits will be adequately signed and marked by the Contractor to preclude violation of this restriction. The area will be well identified by warning signs and lights at night. The Contractor will install lighting, marking, barricades, signs and other measures to delineate closed and hazardous areas during construction. The guidance and procedures provided by

FAA Advisory Circular AC 150/5340-1, “Standards for Airport Markings,” will be utilized as depicted on the Drawings. Barricades will be weighted or otherwise secured to sufficiently prevent displacement by aircraft engine and propeller blast and ambient winds. Steady burning red obstruction lights may be required in certain instances to supplement lighted barricades or highlight hazardous or potentially dangerous objects. The location of these lights will be as requested in the field by the Owner. Obstruction lights and barricades will not be located within runway, taxiway and/or taxi lane obstacle clearance areas.

2. The limits of construction, material storage area, plant site, equipment storage area, parking area and other areas defined as required for the Contractor's exclusive use during construction will be marked by the Contractor. The Contractor will erect and maintain around the perimeter of these areas suitable marking and warning devices visible for day/night use. Temporary fencing, barricades, flagging and/or flashing warning lights will be required at critical access points. Type of marking and warning devices will be approved by Owner. Open trenches, excavations and stockpiled materials will be permanently marked with flags and lighted by approved light units during hours of reduced visibility and darkness. No separate pay item is included for this Work and all costs must be included in the Contract Sum.

I. The Contractor will erect and maintain throughout the Contract, at Contractor’s expense, a 6-foot high chain link opaque green fabric fence or barricade, with no advertising or writing visible, around the perimeter of the Construction Area as required. The Contractor will also install vehicular and pedestrian gates/doors as necessary to provide ingress/egress. Additionally, the perimeter of any fenced area which abuts an active operation pavement will be marked with red flashing barricades no more than 50-feet apart. The Contractor will be solely responsible for access control through any access gate leading to the AOA. This access control will be for all personnel using the gate/door for access to the AOA. This gate/door will be manned by the Contractor whenever unlocked. The Contractor is solely responsible for all security within the Construction Area from the date of the Notice to Proceed until the date of Final Acceptance. Equipment not in use during construction, nights and/or holidays will be parked in the Construction Area. The Contractor will at all times conduct all operations under the Contract in a manner to avoid or minimize the risk of loss, theft or damage by vandalism, sabotage or other means to any property. The Contractor will promptly take all reasonable precautions which are necessary and adequate to correct all conditions which threaten a risk of loss, theft, or damage to property.

J. During construction, the Contractor will maintain these areas in a neat condition. Upon completion of the Work, the staging and storage areas will be cleaned-up and returned to their original condition to the satisfaction of the Owner. Remove all construction fencing and barricades from the Project site. No special payment will be made for clean-up and restoration of the storage area. Personal vehicles will not be permitted beyond Contractor's Construction Area. Drivers of personal vehicles being operated beyond this Contractor's Construction Area will be subject to loss of permission to enter the construction site.

K. Intermittent Construction Operations:

1. Construction activity may require closing of certain areas by the Owner, including the AOA. However, some Work may be done on an intermittent basis. The Contractor will maintain constant communication with the Owner when working and immediately obey all instructions from the Owner. Failure to so obey instructions or maintain constant communications with the Owner will be cause to suspend the Contractor's operations in the areas until satisfactory conditions are assured.

2. When directed to cease Work and move from the area, the Contractor will immediately respond and move all material, equipment and personnel outside areas. Operations will not be resumed until directed by the Owner. Every reasonable effort will be made by the Owner to cause minimum disturbance to the Contractor's operations. However, no guarantee can be made as to the extent to which disturbance can be avoided. Contractor's claim for additional Contract Time or Contract Sum for any such disruption will not be accepted.

3. Open trenches or excavations exceeding 3-inches in depth and 3-inches in width will not be permitted within 250-feet of the centerline of an active runway or within 100-feet of the centerline of active taxiways and taxi lanes. If an area is to be opened to aircraft movement, either at night or during the day, the Contractor will decrease the drop off to 3-inches by placing compacted fill. This fill will taper away from the paved area at a 5% maximum slope to existing grade. There is no separate payment for this temporary construction.

4. Disruptive Work will be defined as any activity, including excessive noise, air pollution, dust, and similar events that adversely disrupts, hinders or impacts normal Airport operations. These activities will be conducted so as not to interfere with the normal operation of the Airport. Work which may be considered disruptive will be conducted by the Contractor during the middle of the night hours as designated by the Owner. When directed by the Owner to cease Disruptive Work, the Contractor will immediately suspend and discontinue the Disruptive Work. Work will not be resumed until directed by the Owner. Contractor's claim for additional cost or additional Contract Time for suspending of Disruptive Work will not be accepted.

L. Limitation of Operations:

1. When the Work requires the Contractor to operate on or adjacent to any public area, the operation will be coordinated with the Owner at least 72-hours prior to commencement of the Work. At no time will the Contractor close a public area until authorization to do so is granted by the Owner.

2. When the Contract Work requires the Contractor to operate on or adjacent to the apron or taxiway AOA, the operation will be coordinated with the Owner at least 72-hours prior to commencement of the Work. At no time will the Contractor close an AOA until authorization to do so is granted by the Owner and until temporary marking and associated lighting is provided and in place as specified in FAA Advisory Circular 150/5340-1, “Marking of Paved Area on Airports” and/or the Drawings and Specifications.

3. The Contractor will be responsible for controlling its operations and those of its subcontractors so as to provide for the free and unobstructed movement of all passengers and private vehicles on the Airport.

4. The Contractor will be responsible for controlling its operations and those of its subcontractors so as to provide for the free and unobstructed movement of aircraft in the apron and taxiway areas of the Airport AOA.

M. Obstructions to Navigation:

1. Penetrations of the imaginary surfaces defined in FAR Part 77 will not be permitted without advance notification of and approval by the Owner and the FAA Tower Chief. It may be necessary to file a Temporary Permit Application with the Owner to obtain approval prior to operation of exceptionally tall equipment. This includes any penetrations whatsoever by the Contractor, including but not limited to vehicles, cranes, other construction equipment, structures, stockpiled materials, excavated earth, etc.

2. When penetrations are unavoidable they will be brought to the attention of the Owner and the FAA as far in advance as is practical to allow Notices to Airmen (NOTAMS) to be prepared and distributed to appropriate FAA divisions for publication and dissemination.

3. Appropriate sketches will be prepared by the Contractor with precise locations shown on the Airport Layout Plan along with elevations depicting the obstruction object's relationship to the imaginary surfaces.

4. The maximum height allowed on the Airport is subject to review by the Owner unless, in special instances, this requirement is waived by the Owner and the FAA. During times when the safety of flight operations could be impaired, particularly during Instrument Flight Rules (IFR) weather, or when the equipment is idle, all booms, towers and other movable appendages will be lowered to the maximum extent.

N. Emergency Procedures:

1. The Contractor will familiarize itself with Airport emergency procedures and will endeavor to conduct its operations so as not to conflict with them. Clear routes for crash/fire/rescue equipment will be maintained in operable condition at all times.

2. Emergency Procedure: In case of an emergency caused by an accident, fire, or personal injury or illness, Airport Police are to be immediately notified by Page Phone found throughout the Terminal buildings or by calling them at 911 or Airport Police Emergency Phone No. (813) 870-3911. The caller must accurately report the location and type of emergency. Airport Police will then coordinate with Owner and/or other outside emergency agencies as necessary.

O. Access to the Construction Site:

1. The Contractor's access to the site will be defined by the Owner. This access route may also be used by Airport employees or others. **No other access routes will be allowed unless approved by the Owner. At Tampa International Airport, the vertical clearance in the Short Term Parking Garage is 6'-8". No vehicle taller than 6'-8" will be allowed to operate in the Short Term Parking Garage structure. The vertical clearance in the Long Term Parking Garage is 7'-10". No vehicle taller than 7'-10" will be allowed to operate in the Long Term Parking Garage structure. No vehicle taller than 13'-6" will be allowed to operate on the first floor of the Economy Parking Garage structure or 8'-0" on all levels above the first floor.** All Contractor traffic authorized to enter the site will be experienced in the route or guided by the Contractor's personnel. The Contractor will be responsible for traffic control to and from the various construction areas on the site. The Contractor will be responsible to verify and coordinate with all vertical clearances for the George J. Bean Parkway, Bessie Coleman Service Road, Red and Blue Side Arrivals, Departure and Crossover Drives, as well as all other ramps, roads, drives and overpasses over and along or otherwise a component of the Contractor's access route.

2. The Contractor will familiarize its employees with the route. Material and equipment delivery trucks will be accompanied by an employee of the Contractor familiar with the route. The Contractor will be responsible for access control through any AOA access gate for the duration of this Contract. This access control will be for all personnel. Any AOA access gate will be manned, whenever unlocked, by a licensed, bonded security agency guard, contracted by the Contractor. Contractor personnel are not acceptable substitutes for the licensed, bonded security agency guard.

3. The Contractor will monitor and coordinate all Contractor traffic with the Owner. The Contractor will not permit any unauthorized construction personnel or traffic on the site, including food and beverage vendors or caterers. If breaches of security occur, the Owner may, at the Owner's option, close the AOA gates until adequate actions have been taken to prevent further breaches of security.

4. The Contractor will provide and operate an escort vehicle to lead other vehicles when operating within the site.

5. The following procedure will be used for access to site by AOA unauthorized persons:

    a. The unauthorized person will inform the gate guard of their reason for entrance to the site and which Contractor they intend to visit.

    b. Guard will notify the Contractor by telephone.

    c. Contractor will go to gate and escort visitor to Contractor facility.

    The Contractor will provide and operate an escort vehicle to lead other vehicles when operating within the AOA.

6. The Contractor is responsible for immediate cleanup of any debris deposited along the access route as a result of Contractor's construction traffic. The entire access route and construction site will be kept free and clean of all debris at all times, will be maintained in good repair by the Contractor or its agents, and will be immediately repaired to the satisfaction of the Owner. Directional signing along the delivery route to the storage area or work site will be as directed by the Owner.

P. Load Restrictions:

1. The Contractor will 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 which may result from the moving of material or equipment.

2. 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 will 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 will be responsible for all damage done by Contractor's hauling equipment and will correct such damage at Contractor's own expense.

3. It is especially noted that the existing Airport pavements may not be capable of supporting certain types of construction equipment. Prior to submitting the Bid, the Contractor will fully satisfy itself as to the ability of the existing Airport pavements to satisfactorily sustain the type of equipment Contractor plans to use. Should damage occur as a result of construction operations, the Contractor will repair the damaged areas to an acceptable condition at Contractor's expense.

1.05 Contractor's Security Requirements:

A. General Intent: It is intended that the Contractor will comply with all requirements of the Airport Security Plan and with the Safety Plan specified herein. Also, if applicable, the Contractor will execute the Airport Access Request Form and follow all rules and guidelines stated therein. The Contractor will designate to the Owner, in writing, the name of its Contractor Security Officer (CSO). The CSO will be the Contractor's representative on the "Construction Security Committee" and will be accountable for these security requirements for the Contractor. The Contractor will also comply with all requirements concerning sensitive security information as promulgated by the TSA.

B. Contractor Security Personnel Orientation: The CSO will be responsible for all safety precautions. Prior to the commencement of the Work, the CSO will provide the Owner an outline of a proposed accident and fire protection plan for all Work contemplated under the Contract. The CSO will also conduct safety meetings as directed by the Owner for each shift and require the attendance of all supervisors at such meetings. Copies of the minutes of safety meetings will be kept on file in the Contractor's Office.

C. Identification - Personnel: All employees of the Contractor or subcontractors requiring access to the construction site are required to be supplied with identification badges to be worn at all times while within the area. Badges will be supplied by the Contractor and will state **"TPA – (Project Name) Contractor."** Badges can be plastic wallet size, metal pin or sticker with a minimum of 2-1/2" diameter and worn on outer garments so as to be clearly visible. Badging is to be uniform in appearance and sufficiently distinctive in design or color to clearly distinguish, on sight, employees assigned to this Contract. The badge number will be prominent for easy identification. Badges are to be identified numerically and issued individually to whom it was assigned. Blocks of numbers can be assigned to subcontractors. Responsibility for supply issuance and control of identification badges will be that of the Contractor, through the CSO.

In addition, for all Work within the AOA at Tampa International Airport only, the Contractor's onsite supervisors will be badged with Airport ID badges provided by Authority Operations. Supervisors requiring unescorted access to the Security Identification Display Area (SIDA) will be subjected to a FBI fingerprint-based Criminal History Records Check (CHRC) and a Transportation Security Administration Security Threat Assessment (STA). An ID badge will not be issued to an individual until they successfully pass a CHRC and STA.

New applicants applying for a TPA ID badge will continue to be charged for the CHRC and an additional STA fee based upon the expiration length from date of issue. The new STA fees will also apply to ID badge renewals. Each time an individual renews their ID badge (including lost, stolen, name change, etc.), the authorized issue will be charged the STA fee (depending on expiration date period). Contractor shall inquire as to the current applicable rates for the above fees.

Personnel will wear the badge on outermost garment at all times while on the AOA. All employees of Contractor or subcontractor requiring access to the construction site are required to be supplied with identification badges to be worn at all times while within the area. Blocks of numbers can be assigned to subcontractors. Responsibility for supply issuance and control of identification badges will be that of the Contractor, through the CSO and the Owner. The Contractor will be assessed Three Hundred Dollars ($300.00) in liquidated damages for each security badge that is not returned to the Owner at the time of badge expiration or Project completion. These liquidated damages will be paid promptly by the Contractor by company check, or the amount will be withheld by Owner from payments due to the Contractor. Contractor agrees that liquidated damages described herein are not a penalty and are reasonable considering the impacts that a Breach of Security could have to public safety and welfare and the operations of the Airport.

D. Identification - Vehicles: The Contractor, through the CSO, will establish and maintain a list of Contractor and subcontractor vehicles authorized to operate on the Project site and will issue a TPA validation sticker to each vehicle to be made available upon demand by the Owner or any Airport Security Officer. Vehicle validation sticker will be placed on the front left portion of the vehicle and be assigned in a manner to assure positive identification of the vehicle at all times. In lieu of issuing individual vehicle permits, the CSO can require each vehicle to display a large company sign on both sides of the vehicle and advise the Owner of a current list of companies authorized to enter

and conduct Work on the Airport.

E. Identification – Equipment: The Contractor will clearly identify all on-site equipment such as portable motorized or non-motorized equipment, job boxes, material storage containers, port-a-lets, etc., whether owned or rented, with the Contractor's name. Identification must be physically marked on equipment or attached with a durable removable device such as a wire tie.

F. Employee Parking:

1. Area for parking of the Contractor's employee's vehicles is in the Contractor's Construction Area or Staging Area to be defined by the Owner. Parking will be accomplished in straight equally spaced rows. Contractor will organize traffic flow and parking patterns, and supply traffic control signs and markings subject to approval of the Owner. Maintain the parking surface and pick up trash daily. No storage will be allowed at parking site. The Contractor will restore the shape and grade of this parking area upon Project completion, seed and mulch portions where existing ground cover is damaged and perform all Work required to restore the area to its original condition.
2. When the Contractor's employee parking area is adjacent to another Contractor's parking area performing other construction for the Owner, cooperation is required to avoid any interferences in the performance of each respective construction. Any difficulties experienced will be brought to the attention of the Owner immediately.
3. All vehicles entering any public parking garages will be required to pay the normal parking fee which will be calculated at the exit. Free parking will not be authorized.

G. Materials Delivery to the Site: All Contractor's material orders for delivery to the Work site will use as a delivery address the street name and number assigned to the access point onto the Airport.

H. Breach of Security Fine: Contractor agrees that liquidated damages in the amount of Ten Thousand Dollars ($10,000.00) per occurrence will be assessed against the Contractor if the Contractor violates the requirements of the Airport Security Plan or the Security requirements specified herein. Contractor agrees that actual damages for breach of security are uncertain and the liquidated damages described herein are not a penalty and are reasonable considering the impacts that a Breach of Security could have to public safety and welfare and the operations of the Airport.

Notwithstanding the foregoing, repeated and/or flagrant violations of the Security Plan will be grounds for the suspension of the Work at no cost to the Owner, default of the Contractor and/or termination of the Contract.

I. Amendments to this Safety Plan and Security requirements may be made by the Owner and will be immediately binding on Contractor.

END OF SECTION

SECTION 01545 - UTILITIES

PART 1 - GENERAL

1.01 GENERAL

A. Existing facilities, utilities, and features depicted on the Drawings are not guaranteed to be accurate with respect to location, condition, and characteristics. Also, there may be additional facilities, utilities, and features existing that could affect the construction of the Work which are not depicted or described in the Contract Documents.

B. Prior to Bidding, the Contractor will make a thorough investigation of the Project area to satisfy itself as to the location, condition, and characteristics of any and all facilities, utilities, and features which may affect Contractor's Work. No additional compensation will be made for any extra expense relating to an existing facility, utility, or feature.

C. The Contractor hereby agrees to make no claims against the Owner and/or its representatives relating to the existence, or lack thereof, location, condition, and/or characteristics of any existing facilities, utilities, or features.

D. Contractor will pay for the removal and installation of all utilities required by the Contract Documents.

1.02 PROTECTION OF EXISTING UTILITIES

A. The term "utilities" includes FAA power and control cables, TECO power lines, other power lines, telephone cables, lines and fiber optics, Sheriff's Department lines, elevator control cables, airline communication cables, computer cables, airfield lighting cables, Owner underground electrical and communication lines, cables and fiber optics, water lines, irrigation lines, HVAC equipment, sanitary force mains, sanitary lines, stormwater lines and fuel and gas lines. These utilities may be located in the areas of construction. Disruption of these utilities could seriously disrupt the operation of the airport. Although the Drawings attempt to locate the cables and all utilities including fuel and gas lines, actual locations are uncertain and the Contractor is required to verify all locations.

B. To the extent that such public and private utility services, FAA facilities, or utility services of another government agency are known to exist within the limits of the Work, the approximate locations have been indicated on the Drawings and some, but not all, utility services and FAA facilities are indicated as follows:

Utility Service or Facility Person to Contact Telephone
(To the best of the Owner's knowledge, the below information is correct, but it may change without notice.)

FAA Control Cables	Mr. Charles Hinnant, FAA	(813) 371-7751
HCAA	Mr.Nick D'Jimas	(813) 676-4346
TECO	Mr. Greg Keininger	(813) 228-4231
Fuel Lines	Mr. Enos Sage	(813) 396-3626
Irrigation Lines	Mr. Bruce Sather	(813) 870-7883

City of Tampa - Water	Mr. Chad Bailey	(813) 274-3344
City of Tampa – Wastewater	Mr. Jeff Hilton	(813) 274-7844

C. Any intentional, temporary interruption of existing utilities for the purpose of carrying out the Work will be carried out so as to minimize the length and scope of the interruption. Before any such interruption, Contractor will give a minimum of 72 hours written notice to the Owner and will also give at least 72 hours' notice to the appropriate "Person to Contact" listed in Paragraph B of this Section.

D. 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.

E. Contractor will not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or FAA facilities located within the limits of the Work without the written permission of the Owner.

F. Should the Owner, 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 FAA facility during the progress of the Work, the Contractor will cooperate with such utility service or FAA facility by arranging and performing the Work in this Contract so as to facilitate such construction, reconstruction, or maintenance by others. In addition, the Contractor will control its operations to prevent the unscheduled interruption of such utility services, FAA facility, and other facilities. It is understood and agreed that the Contractor will not be entitled to make any claim due to such authorized construction by others or for any delay to the Work resulting from such authorized construction. The Contractor will coordinate all Work with all utility services, FAA facility, or other facility.

G. 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 can be obtained by the Contractor from the Owner.

H. 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, FAA facilities or structures that may be shown on the Drawings or encountered in the Work. Any inaccuracy or omission in such information will not relieve Contractor of its responsibility to protect such existing features from damage or unscheduled interruption of service.

I. It is further understood and agreed that Contractor will, upon execution of the Contract, notify all utility services, FAA facility, or other facilities of the Contractor's plan of operations. Such notification will be in writing addressed to the Person to Contact as provided herein. A copy of each notification will be given to the Owner.

J. In addition to the general written notification hereinbefore provided, it will be the responsibility of the Contractor to keep such individual utility service or FAA facility

advised of changes in Contractor's plan of operation that would affect such utility service or FAA facility.

K. Prior to commencing the Work in the general vicinity of an existing utility service or FAA facility, the Contractor will (1) Call Sunshine 811, and (2) again notify each such utility service or FAA facility in writing, copying the Owner, of Contractor's plan of operations. If, in the Contractor's opinion, assistance is needed to locate the utility service or FAA facility or the presence of a representative of the utility service or FAA facility is desirable to observe the Work, such advice will be included in the written notification. Such notification will be given by the most expeditious means to reach the utility service or FAA facility Person to Contact no later than two business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor will furnish a written summary of the notification to the Owner.

L. Failure of the Contractor to properly coordinate in advance Work on or near existing utilities will be cause for the Owner to suspend Contractor's operations in the general vicinity of such utilities.

M. Power and control cables leading to and from any FAA facilities will be marked in the field by the local FAA Airway Facilities Sector personnel for the information of the Contractor before any Work in the general vicinity is started. Thereafter, through the entire time of the Work, the Contractor will not allow any construction equipment to cross these cables without first protecting the cable with steel boiler plate or similar structural devices on 3-feet either side of the marked cable route. All excavation within 3-feet of existing cables will be accomplished by hand digging only. No grading will be permitted over FAA cables under any conditions.

N. Approval to work in areas where active utility services or FAA facilities are located is subject to withdrawal at any time because of change in the weather, emergency conditions on the existing airfield areas, anticipation of emergency conditions, or for any other reason determined by the Owner or the designated FAA and/or utility service representative. All instructions by the Owner, the utility service, or the FAA facility (by radio or other means) to the Contractor to clear any given area, at any time, will be immediately executed. Construction Work will be commenced in the cleared area only when additional instructions are issued by the Owner.

O. FAA CABLES AND UTILITIES MUST BE PROTECTED AT ALL TIMES.

P. Where the outside limits of an underground utility service or FAA facility have been located and staked on the ground, the Contractor will be required to use excavated methods acceptable to the Owner within 3-feet of such outside limits at such points as may be required to insure protection from damage due to the Contractor's operations.

Q. If damage occurs to any utilities, the Contractor may be assessed a fee of $2,000 liquidated damages per cut per cable, line or strand, which liquidated damages will only represent the expense incurred by the Owner in coordinating the repair, and which will not prevent the Owner or others from recovering from the Contractor other costs, damages, or expenses of any other nature incurred on account of damages to utilities. Contractor agrees that damages for cut cables are uncertain and these liquidated damages are reasonable and are not a penalty and a reasonable consideration of the

impact that damage to utilities could have to the operation of the Airport. There is no intention to double count damages under this provision.

R. FAA FACILITIES AND CABLE RUNS. The Contractor is hereby advised that the construction limits of the Project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the prosecution of the Project work, will comply with the following:

1. The Contractor will permit FAA maintenance personnel the right of access to the Project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

2. The Contractor will notify the above named FAA Airway Facilities Point-of-Contact seven days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

3. If prosecution of the Project work requires a facility outage, the Contractor will contact the above named FAA Person to Contact a minimum of 72 hours prior to the time of the required outage.

4. If prosecution of the Project work results in damages to existing FAA equipment or cables, the Contractor will repair the damaged item in conformance with FAA Airway Facilities' standards to the satisfaction of the above named FAA Point-of-Contact.

5. If the Project work requires the cutting or splicing of FAA owned cables, the above named FAA Point-of-Contact will be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have an FAA Airway Facilities representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA Airway Facilities' specifications and require approval by the above named FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA Airway Facilities restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA Airway Facilities, the Contractor will furnish and install a sufficient length of new cable that eliminates the need for any splice.

S. Should the Contractor damage or interrupt the operation of a utility service or FAA facility by accident or otherwise, Contractor will immediately notify the proper utility service or FAA facility and the Owner and will take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such an event, will cooperate with the utility service or FAA facility and the Owner continuously until such damage has been repaired and service restored to the satisfaction of the utility service or FAA facility.

T. The Contractor will immediately repair, at Contractor's own expense, with identical material by skilled workers, all utilities, FAA cables, and other facilities which are damaged by Contractor's workers, equipment, or work. Prior approval of the appropriate utility service and/or FAA facility and Owner will be obtained for the

materials, workers, time of day or night, method of repairs, and for any temporary or permanent repairs the Contractor proposes to make to any FAA cables or utility service damaged by the Contractor.

U. Airport publicly owned facilities and privately owned facilities located on Airport property, including underground cables, pavements, piping, buildings, turfed areas, vehicles and other facilities/improvements, that are damaged by the Contractor will, at the election of the Owner, (1) be replaced/repaired by the Contractor to the satisfaction of the Owner or (2) be replaced/repaired by the Owner at the Contractor's expense.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01561 - CONSTRUCTION CLEANING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall execute daily cleaning during progress of Work. Contractor shall execute final cleanup prior to Substantial Completion and again prior to Final Acceptance.

B. Hazards Control:

Contractor shall:

1. Store volatile wastes in covered metal containers.

2. Remove containers from premises daily.

3. Prevent accumulation of wastes which create hazardous conditions.

4. Provide adequate ventilation during use of volatile or noxious substances.

C. Contractor shall conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:

1. Contractor shall not burn or bury rubbish and waste materials on Project site.

2. Contractor shall not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.

D. Contractor shall transport waste materials and debris across Airport property in covered trucks.

PART 2 - PRODUCTS

2.01 MATERIALS

Contractor shall use cleaning materials recommended by manufacturer of surface to be cleaned which will not create hazards to health or property and which will not damage surfaces.

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. Contractor shall execute periodic cleaning to keep building, grounds, and public properties free of accumulation of waste materials, rubbish, and wind-blown debris resulting from construction operations.

B. Contractor shall apply protective covering on newly installed Work where reasonably required to ensure freedom from damage or deterioration at time of Substantial Completion and Final Acceptance. Contractor shall clean and perform maintenance on

other newly installed Work as frequently as necessary through remainder of construction period.

C. Contractor shall adjust and lubricate operable components to ensure operability without damaging effects.

D. Contractor shall furnish on-site containers for collection of waste materials, debris, and rubbish.

E. Contractor shall remove waste material, debris, and rubbish from Project site daily.

F. Contractor shall not drop or throw materials from heights.

G. Contractor shall continue cleaning daily until building is ready for occupancy.

3.02 DUST CONTROL

Contractor shall:

A. Clean interior building areas prior to start of finish painting or special coatings.

B. Wet down materials and rubbish to prevent blowing dust.

C. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.03 FINAL CLEANING

A. Contractor shall provide final cleaning of the Work, including all adjacent protection areas surface or unit of Work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Contractor shall comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

1. Removal of labels which are not required as permanent labels.

2. Cleaning of transparent materials, including mirror, window, and door glass, to polished condition. Remove substances which are noticeable as vision obscuring materials.

3. Replacing of broken glass and damaged transparent materials.

4. Cleaning of exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances.

5. Restoring of reflective surface to original reflective condition.

6. Wiping of surfaces of mechanical and electrical equipment clean, including elevator equipment.

7. Removal of excess lubrication and other substances.

8. Removal of debris and surface dust from limited access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.

9. Broom cleaning of concrete floors in non-occupied spaces.

10. Vacuum cleaning of carpeted surfaces and similar soft surfaces.

11. Cleaning of plumbing fixtures to sanitary condition, free of stains, including those resulting from water exposure.

12. Cleaning of equipment to condition of sanitation ready and acceptable for intended use.

13. Cleaning of light fixtures and lamps to function with full efficiency.

14. Cleaning of Project site, including landscape development areas, of litter and foreign substances.

15. Sweeping of paved areas to broom-clean condition. Remove stains, petro-chemical spills, and other foreign deposits.

16. Raking of grounds which are neither planted nor paved to smooth, even-textured surface.

B. Contractor shall remove waste materials from Project site daily and dispose of in a lawful manner.

C. Protection - Limiting Exposures: Contractor shall supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

D. Removal of Protection:

Contractor shall remove temporary protection devices and facilities which were installed during course of the Work to protect previously completed Work during remainder of construction period.

END OF SECTION

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 TRANSPORTATION AND HANDLING

Contractor shall:

A. Deliver, handle, and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss, including theft.

B. Control delivery schedule to minimize long-term storage of products at Project site from overcrowding of construction spaces. Coordinate delivery and installation to minimize holding of storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

C. Deliver products in undamaged conditions, in manufacturer's original containers and prepackaging, with identifying labels intact and legible.

D. Immediately upon delivery, inspect shipments for compliance with requirements of Contract Documents and accepted submittals and to verify that products are properly protected and undamaged.

E. Promptly remove unsatisfactory materials from Project site.

F. Furnish equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

G. Provide transportation and delivery F.O.B. Project Site.

1.02 STORAGE

Contractor shall:

A. Store materials subject to damage from exposure to weather in weather tight storage facilities of suitable size with floors raised above ground. Materials not subject to weather damage may be stored on blocks off ground.

B. Store fabricated products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store products subject to damage by elements in weather tight enclosures. Maintain temperature and humidity within range required by manufacturer's instructions.

C. Cover materials which are subject to deterioration with impervious sheet covering providing adequate ventilation to avoid condensation.

D. Store loose granular materials in well-drained area on solid surfaces to prevent mixing with foreign matter and cover during inclement weather. Store cemetitious and clay products clear of earth or concrete floors, away from walls.

E. Arrange storage in manner to permit easy access for inspections.

F. Protect metal from damage, dirt, or dampness. Furnish flat, solid support for sheet products during storage.

G. Make periodic inspections of stored materials to verify that products are maintained under specified conditions and are free from damage or deterioration.

H. Not use materials in Work which have deteriorated, become damaged, or are otherwise unfit for use.

I. Store and mix paints in assigned room or area kept under lock and key.

J. Remove oil, rags, and other combustible materials daily, store in covered metal containers and take precautions to prevent fire hazards.

K. Not load structure during construction by storing materials with load greater than structure can bear safely.

PART 2 - PRODUCTS

2.01 MATERIAL AND EQUIPMENT INCORPORATED INTO WORK

Contractor shall:

A. Comply with applicable Specifications and Standards.

B. Comply with size, make, type, and quality specified or as specifically accepted in writing by Owner.

C. Design, fabricate, and assemble products in accordance with engineering and shop practices normal to trade.

D. To greatest extent possible, for each unit of Work, provide products, materials, or equipment of singular generic kind and from single source.

E. Manufacture like parts of duplicate units to standard interchangeable sizes and gages. Two or more items of same kind may be identical by same manufacturer.

F. Provide products suitable for service conditions.

G. Adhere to equipment capacities, sizes, and dimensions shown or specified unless variations are specifically accepted in writing.

H. Not use material or equipment for any purpose other than that for which it is designed or is specified.

I. Nameplates:

1. Not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of Work, except for Testing Laboratory approval labels and operating data.

2. Locate required labels and stamps on concealed surface or, where required for observation after installation, on accessible surface which in occupied spaces are not conspicuous.

J. Equipment Nameplates:

1. Provide permanent nameplate on each item of service-connected or power-operated equipment.

2. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings, and similar essential operating data.

3. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

K. Provide products which comply with requirements, which are undamaged and unused at time of installation, and which include accessories, trim, finish, safety guards, and other devices and details needed for installation, intended use, and effect.

L. Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.

M. Contractor shall affix Owner property tags to all equipment required to be inventoried by Owner. Contractor shall verify requirement with Owner for each purchased equipment.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

Contractor shall:

A. When Contract Documents require that installation of Work will comply with manufacturer's printed instructions, obtain and distribute copies of instructions to parties in installation, including two copies to the Owner, prior to commencing Work.

B. Maintain one set of complete instructions at Project site during installation and until completion.

C. Maintain copies for Project Record Documents.

D. Handle, install, connect, clean, condition, and adjust products in strict accord with manufacturer's instructions and in conformity with specified requirements.

E. Inspect substrate to receive Work and conditions under which Work is to be performed.

F. Notify the Owner in writing for further instructions, should job conditions or specified requirements conflict with manufacturer's instructions and not proceed with Work without clear written instructions.

G. Perform Work in accordance with manufacturer's instructions and not omit preparatory steps or installation procedures.

H. Install Work during conditions of temperature, humidity, exposure, forecasted weather, and status of Project completion which will ensure best possible results for each item of material or equipment.

I. Isolate non-compatible materials to prevent deterioration.

J. Mount individual units of Work at industry recognized standard mounting heights for applications indicated and refer questionable mounting height choices to Owner for final decision.

3.02 PROTECTION

Contractor shall:

A. Furnish protection against weather. Cover building openings to protect interior of building from weather.

B. Maintain Work, materials, apparatus, and fixtures free from damage.

C. Protect items having factory finish to prevent damage to finish and equipment.

D. At end of day's Work, cover new Work likely to be damaged or otherwise protect as necessary.

E. After installation, secure substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.

F. Remove protection when no longer needed and upon completion of Work, remove storage facilities from Project site.

G. Install and maintain barricades, stanchions, or other means of protection to keep traffic off of installed product as necessary.

END OF SECTION

SECTION 01605 - PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Definitions: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including such terms as, "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction" and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

1. "Products" are defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for Project or taken from Contractor's stock of previously purchased products.

2. "Named Products" are products identified by use of the Manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the Contract Documents.

3. "Materials" are defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed or applied to form units of Work.

4. "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc).

B. Substitutions: The Contractor's requests for changes in the products, materials, equipment and methods of construction required by the Contract Documents are considered requests for "substitutions" and are subject to the requirements specified herein.

1. The requirements for substitutions do not apply to specified Contractor options on products and construction methods. Revisions to Contract Documents, where requested by the Owner or Design Professional, are "changes" not "substitutions".

2. Requested substitutions during subcontractor bidding period, which have been accepted prior to Receipt of Bids, are included in Contract Documents and are not subject to requirements for substitutions as specified herein.

3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities does not constitute "substitutions", and does not constitute a basis for Change Orders, except as provided for in the Contract Documents. Otherwise, Contractor's requests for changes in products, materials and methods of construction required by Contract Documents are considered requests for "substitutions" and are subject to the requirements

hereof.

C. Standards:

Refer to Specification Section 01095 - DEFINITIONS AND STANDARDS for acceptability of industry standards to products of Project and for acronyms used in text of Specification sections.

1.02 REQUIREMENTS INCLUDED

A. Materials specified are to define standard of quality or performance and to establish basis for evaluation of selections.

B. Size of each item of material and equipment shown on the Drawings is based on dimensions of individual manufacturers. While other manufacturers may be acceptable, it will be responsibility of the Contractor to determine whether or not material and equipment proposed will fit into available space.

C. Compliance requirements for individual products as indicated in Contract Documents are multiple in nature and may include generic, descriptive, proprietary, performance, prescriptive, compliance with standards, compliance with codes, conformance with graphic details, and other similar forms and methods of indicating requirements, all of which must be complied with. Allowances, alternatives, and similar provisions of the Contract Documents will have bearing on selection process.

D. Where materials or equipment are specified by trade or brand name, it is not intended to discriminate against an equivalent product of another manufacturer, except where specifically noted NO SUBSTITUTION.

E. Contractor's options for selecting products are limited by Contract Document requirements and governing regulations and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects.

F. Revisions to Contract Documents, where requested by Owner or Design Professional, are changes not substitutions.

G. When specified products do not comply with requirements or are not a feasible selection, advise Owner in writing before proceeding.

1.03 QUALITY ASSURANCE

A. Source Limitations:

1. To the greatest extent possible for each unit of Work, provide products, materials, or equipment of a singular generic kind from a single source.

2. When it is discovered that specified products are available only from sources that do not or cannot produce a quality adequate to complete Project requirements in a timely manner, consult with the Design Professional for a

determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that produce products that possess these qualities to the fullest extent possible.

B. Compatibility of Options:

When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected will be compatible with products previously selected, even if previously selected products were also options. Complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents but will be provided by the Contractor.

1.04 SUBSTITUTIONS

A. Procedures:

1. During Bidding:

a. Refer to requirements specified under Section 00100 - INSTRUCTIONS TO BIDDERS for substitutions during Bidding.

2. After Contract is Awarded:

a. Contractor's request for substitutions will be received and considered when extensive revisions to Contract Documents are not required and changes are in keeping with general intent of Contract Documents, when timely, fully documented and properly submitted, and when one or more of the following conditions are satisfied, all as judged by the Owner. Otherwise requests will be returned without action except to record non-compliance with these requirements.

(1) Where request is directly related to an "or equal" clause or other language of same effect in Contract Documents.

(2) Where required product, material or method cannot be provided within Contract Time, but not as a result of Contractor's failure to pursue the Work promptly or to coordinate various activities properly.

(3) Where required product, material or method cannot be provided in a manner which is compatible with other materials of the Work, or cannot be properly coordinated therewith, or cannot be warranted as required, or cannot be used without adversely affecting Owner's insurance coverage on completed Work, or will encounter other substantial non-compliances which are not possible to otherwise overcome except by making

requested substitution, which Contractor thereby certifies to overcome such non-compatibility, non-coordination, non-warranty, non-insurability or other non-compliance as claimed.

(4) Where required product, material or method cannot receive required approval by a governing authority and requested substitution can be so approved.

b. Noncomplying requests will be returned without action except to record noncompliance with requirements.

c. Properties of proposed substitution, including but not limited to the following, as applicable, will be considered:

(1) Physical dimension requirements to satisfy space limitations.
(2) Static and dynamic weight limitations, structural properties.
(3) Audible noise levels.
(4) Vibration generation.
(5) Interchangeability of parts or components.
(6) Accessibility for maintenance, possible removal or replacement.
(7) Colors, textures, and compatibility with other materials, products, assemblies, and components.
(8) Equipment capacities and performance characteristics.
(9) Electromagnetic interference.

d. Substitutions will not be considered if:

(1) They are indicated or implied on Shop Drawing, Project Data submittals, or mock-ups without formal request.
(2) Acceptance will require substantial revision of Contract Documents as determined by Owner.
(3) Additional cost to Owner is involved.
(4) Requests for substitutions are not submitted in a timely fashion.

e. Contractor will bear all costs for additional compensation to Owner's Design Professional for redesign and evaluation services, increased costs of other work by Owner or separate contractors, and other incurred costs or similar considerations due to acceptance of substitution.

f. Should substitution be accepted under provisions of above clauses, and substitution subsequently proves defective or otherwise unsatisfactory for service for which it was intended within warranty period, the Contractor will replace defective material with material specified at no additional cost to Owner.

g. Submittal of, and Contractor's acceptance of, shop drawings, product data, or samples which relate to work not complying with requirements of Contract Documents does not constitute an acceptable and valid request for substitution, nor approval thereof.

h. If proposed substitution is not accepted or all requirements are not entirely complied with, provide specified product or material. Costs for delays will be borne by Contractor.

B. Form of Requests:

1. Submit three copies, fully identified for product or method being replaced by substitution, including related Specifications section and drawing number(s), and fully documented to show compliance with requirements for substitutions.

2. Proposed substitutions will state:

a. Product Data, Drawings.

b. Changes required in other elements of Work because of substitution.

c. Availability of maintenance service and source of replacement parts as applicable.

d. When requested, test data from independent testing laboratory to show compliance with performance characteristics specified.

e. Related Specifications sections and drawing numbers, fully documented to show compliance with requirements for substitutions.

f. Description of methods.

g. Samples where applicable.

h. Detailed comparison of significant qualities between specified item and proposed substitution.

i. Statement of effect on construction time and coordination with other affected work.

j. Statement to the effect that proposed substitution will result in Work equal to or better than Work originally indicated.

k. Cost information or proposal.

C. Shop Drawings, Product Data and Sample Submittals:

Contractor's submittal of (and Owner’s acceptance of) Shop Drawings, mock-ups, Product Data or samples which relate to Work not complying with requirements of Contract Documents does not constitute an acceptable or valid request for a substitution, nor approval thereof.

1.05 CONTRACTOR'S REPRESENTATIONS

A. Request for substitution constitutes representation that Contractor:

1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.

2. Will furnish same warranties or bonds for substitution as for product specified.

3. Will coordinate installation of accepted substitution into Work and make such other changes as may be required to make Work complete in all respects.

4. Waives all claims for additional costs which may subsequently become apparent.

1.06 OWNER'S DUTIES

A. Owner will determine acceptability of proposed substitutions.

B. Owner will review requests for substitutions with reasonable promptness and notify Contractor, in writing, of decision to accept or reject requested substitution. Owners judgment and decision is final.

C. Review of Owner's acceptance or failure to take exceptions to substitutions or other review documents will not relieve Contractor of its responsibility for item actually meeting performance or other requirements of Contract Documents.

1.07 SUBMITTALS

A. Product List Schedule:

1. Prepare a schedule showing products specified in a tabular form acceptable to the Owner. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

2. Coordinate the product listing with the Contractor's Construction Schedule and the Schedule of Submittals.

3. Form:

a. Prepare the product listing schedule with information on each item tabulated under the following column headings:

(1) Related Specification heading number.
(2) Generic name used in Contract Documents.
(3) Proprietary name, model number and similar designations.
(4) Manufacturer's name and address.
(5) Supplier's name and address.
(6) Installer's name and address.

4. Initial Submittal:

Within 14 days after date of commencement of the Work, submit initial product list schedule. Provide a written explanation for omissions of data and for known variations from Contract requirements.

5. Owner's Action:

a. The Owner will respond in writing to the Contractor. The Owner's response will include the following:

(1) A list of unacceptable product selections, containing a brief explanation of reasons for this action.

(2) A request for additional data necessary for the review and possible acceptance of the products and manufacturers listed.

PART 2 - PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. General:

1. Provide products which comply with requirements, which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

2. Compliance with codes, graphic details, allowances, and similar provisions of the Contract Documents also have a bearing on the selection process.

3. Refer to Section 01600 - MATERIALS AND EQUIPMENT.

B. Standard Products:

Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.

C. Continued Availability:

Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.

2.02 PRODUCT SELECTION LIMITATIONS

A. Product Selection Procedures: Contractor’s options in product selection are governed

by the Contract Documents and governing regulations, not by previous industry tradition or project experience. Procedures governing product selection include, but are not limited to, the following:

1. Proprietary Specification Requirements:

    a. Where a single product or manufacturer is named, provide the product indicated. Other products may be considered by the Owner in compliance with provisions concerning substitutions. Where the term NO SUBSTITUTION is indicated, provide only product indicated.

    b. Advise the Owner before proceeding when it is discovered that the named product is not a feasible solution.

2. Semi-proprietary Specification Requirements:

    a. Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted, unless the Specifications indicate possible consideration of other products.

    b. Acceptable Manufacturers: When products are specified by one or more manufacturers' model or performance criteria with reference to other acceptable manufacturers, products manufactured by acceptable manufacturers listed must meet minimum performance criteria specified or meet quality of models specified.

    c. Advise the Owner before proceeding when it is discovered that the named product is not a feasible solution.

    d. Where products or manufacturers are specified by name accompanied by the term "or equal" or "or approved equal," comply with Item 1.04 SUBSTITUTIONS of this Section for procedural requirements governing substitutions to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications:

    When the Contract Documents list products or manufacturers that are available and may be incorporated in the Work but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract Document requirements. Comply with Item 1.04 SUBSTITUTIONS of this Section for procedural requirements to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements:

    Where Contract Documents describe a product or assembly listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides those characteristics and otherwise complies with the Contract Documents.

5. Prescriptive Requirements:

   Provide products which have been produced in accordance with prescriptive requirements, using specified ingredients and components and complying with specified requirements for mixing, fabricating, curing, finishing, testing, and similar operations in manufacturing process.

6. Performance Specification Requirements:

   a. Where Contract Documents require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

   b. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

7. Compliance with Standards, Codes and Regulations:

   Where the Contract Documents only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.

8. Visual Matching:

   a. Where Contract Documents require matching an established sample, the Owner’s decision will be final on whether a proposed product matches satisfactorily.

   b. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another category, or for noncompliance with specified requirements.

9. Visual Selection:

   a. Where specified product requirements include the phrase "…..as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Owner will select the color, pattern and texture from the product line selected.

   b. Where specified product requirements include "..as selected from standard colors, patterns, textures available within the industry..", or words to that effect, selection of product complying with requirements and within established cost category is Owner’s and Design Professional's

selection, including designation of manufacturer where necessary to obtain desired color, pattern, or texture.

10. Compatibility of Products:

a. Where more than one choice is available as an option for Contractor's selection of product or material, select the option which is compatible with other products and materials already selected which may have been from among options for other products and materials.

b. Total compatibility among options is not assured by limitations within Contract Documents, but must be provided by Contractor.

c. Compatibility is basic general requirement of product and material selections.

2.03 NAMEPLATES

A. Except as otherwise indicated for required approval labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the Work.

1. Labels: Locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

2. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power-operated equipment. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous. The nameplate will contain the following information and other essential operating data:

a. Name of product and manufacturer.

b. Model and serial number.

c. Capacity.

d. Speed.

e. Ratings.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Except as otherwise indicated in individual sections of the Contract Documents, comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located

and aligned with other Work.

B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion of the whole Work.

END OF SECTION

SECTION 01640 - PRODUCT HANDLING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:

Contractor shall protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:

Additional procedures also may be prescribed in other Sections of these Contract Documents.

See Section 014000 – Quality Control, 1.14 Material Receipt and Storage Inspections.

1.02 QUALITY ASSURANCE

Contractor shall:

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of Work and materials and:

B. Submit a material receipt, offloading, and storage plan to the Owner for approval that addresses the following at a minimum:

1. Delivery, handling, and storage of products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss, including theft.

2. Control delivery schedules to minimize long-term storage of products at Project site and overcrowding of construction spaces.

3. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

4. Delivery of products to the Project site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

5. Inspection of products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected. Submission of a material receipt inspection report including checklists, pictures, etc. along with the daily production report.

6. Storage of products at the Project site in a manner that will facilitate inspection and measurement of quantity or counting of units.

7. Storage of heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

8. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

9. Compliance with laws and regulations regarding storage of material and equipment such as quantity restrictions, stacking, compatibility with adjacent material, fire protection, containment, etc.

10. Provision of drawings indicating delivery routes, off-loading and lay-down areas, and storage areas.

C. Revise and resubmit the material receipt, offloading, and storage plan to the Owner for approval as onsite conditions change and/or project phasing progresses.

1.03 MANUFACTURER'S RECOMMENDATIONS

Except as otherwise approved by the Owner, Contractor shall determine and comply with manufacturer's recommendations on product handling, storage, and protection.

1.04 PACKAGING

A. Contractor shall deliver products to the Project site in their manufacturer's original containers, with labels intact and legible.

Contractor shall:

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. At the time of delivery, inspect and remove damaged material and unsuitable items from the Project site, and promptly replace with material(s) meeting the specified requirements, at no additional cost to the Owner.

B. The Owner may reject as non-complying such material and products that do not bear identification satisfactory to the Owner as to manufacturer, grade, quality, and other pertinent information.

1.05 PROTECTION

Contractor shall:

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

D. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

E. Restore storage areas to their previous condition regarding cleanliness. Remove all trash, debris, and clean up any spills.

1.06 REPAIRS AND REPLACEMENTS

Contractor shall:

A. In event of damage, promptly make replacements and repairs to the approval of the Owner and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Owner to justify an extension in the Contract Time.

1.07 REMOVAL OF NON-COMPLIANT MATERIAL AND EQUIPMENT

A. Material or equipment that is determined to be non-compliant with contract requirements shall not be off-loaded or stored onsite. The Contractor shall make prompt arrangements to have the material or equipment removed from the site. In the event the Contractor cannot or refuses to remove the material or equipment, the Owner reserves the right to have the non-compliant material or equipment removed from the site and stored at an appropriate location at the Contractor's expense.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01650 – CONSTRUCTION SALVAGE AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes demolition and construction salvage and construction waste management requirements. This section does not include hazardous materials removed. Refer to other sections, as applicable, for hazardous materials removed.

1.02 DEFINITIONS

A. Alternative Daily Cover (ADC): Material, other than earthen material, placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter and scavenging.

B. Co-mingled or Off-site Separation: Collecting all material types into a single bin or mixed collection System and separating the waste materials into recyclable material types at an off-site facility.

C. Construction and Demolition Waste (CDW): Includes all nonhazardous solid wastes resulting from construction, remodeling, alterations, repair, and demolition. This includes material that is recycled, reused, salvaged or disposed as garbage.

D. Diversion Rate: (Total Waste Diverted from Landfill / Total Waste produced by project) x 100.

E. Garbage: Product or material typically considered to be trash or debris that is unable to be salvaged for resale, salvaged and reused, returned, or recycled.

F. Hazardous Materials/Hazardous Substance: Any substance that (i) the presence of which requires investigation, reporting, removal or remediation under any Environmental Law; (ii) that is or becomes defined as a “hazardous waste,” “hazardous substance,” “hazardous material,” “extremely hazardous substance,” or other type of pollutant or contaminant under any applicable Environmental Law; (iii) that is toxic, reactive, explosive, corrosive, flammable, radioactive, carcinogenic, mutagenic, teratogenic, or otherwise hazardous and is or becomes regulated by any applicable Environmental Law; (iv) that is or contains oil, gasoline, diesel fuel, aviation fuel, or other petroleum hydrocarbons, products or derivatives, other than petroleum, crude oil, and petroleum products to the extent contained within regularly operated motor vehicles; (v) that is or contains PCBs, asbestos, radon, urea formaldehyde or any substance that contains per- and polyfluoroalkyl substances (PFAS); (vi)

that is fungi or bacterial matter which reproduces through the release of spores or the splitting of cells, including but not limited to, mold (including, without limitation, penicillium/aspergillus and stachybotrys chartarum), and Legionella (legionella pneumophila); or (vii) the presence of which causes or threatens to cause a nuisance upon the Property or to adjacent property or poses or threatens to pose a hazard to the health or safety of any person, to plant or animal life, or to the environment, including, but not limited to sewage sludge, industrial slag, solvents and/or any other similar substances or materials.

Notwithstanding the foregoing, “Hazardous Substances” shall not include (i) "de minimis" quantities of such materials; (ii) substances customarily present in the ordinary course of business of ownership, operation and maintenance of a residential and commercial mixed-use property in a prudent manner, but only during the period that the same are stored in reasonable and customary quantities and stored and/or used in accordance with applicable Environmental Laws; or (iii) any quantities of such materials which are permitted to remain in the environment, including soil, sediments, groundwater, or other environmental media pursuant to principles of risk-based corrective action under applicable Environmental Laws.

G. Land Clearing Debris (LCD): Materials that are natural (e.g., rock, soil, stone, vegetation). This also includes uncontaminated soils that are designated as geotechnically unsuitable or excess excavation.

H. Proper Disposal: Disposal pursuant to all laws, rules, regulations and codes of the law.

I. Recyclable Materials: Products and materials that can be recovered and remanufactured into new products.

J. Recycling: The process of sorting, cleaning, treating and reconstituting materials for the purpose of using the material in the manufacture of a new product. This may be conducted on-site (e.g., as in the grinding of concrete).

K. Recycling Facility: An operation that is permitted to accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product.

L. Salvage for Reuse: Existing usable product or material that can be saved and reused in some manner on the project site or other projects off-site.

M. Salvage for Resale: Existing usable product or material that can be saved and removed intact (as is) from the project site to another site for resale to others without remanufacturing.

N. Solid Waste including Universal Waste: Any waste that is or becomes defined as a “solid waste”, “waste”, “special waste”, “garbage”, or “commercial solid waste” under any environmental law or any waste that can require special handling and management, including but not limited to, white goods, waste tires, used oil, lead-acid batteries, construction and demolition debris, ash residue, yard trash, biological wastes, pesticides, pharmaceuticals and mercury-containing devices and lamps; or any waste that is not hazardous waste and that is not prohibited from disposal in a lined landfill or yard trash, construction and demolition debris, processed tires, asbestos, carpet, cardboard, paper, glass, plastic, or furniture other than appliances.

O. Source Reduction: Eliminating project waste through reduced packaging, prefabrication, modular construction, or incorporating standard material lengths or sizes into construction documents.

P. Source-Separated Materials: Materials that are sorted at the site into separate containers for the purpose of reuse or recycling.

Q. Sources Separation: Sorting the recovered materials into specific material types with no, or a minimum amount of, cross-contamination on site.

R. Time-Based Separation: Collecting waste during each phase of construction or deconstruction that results in primarily one major type of recovered material. The material is removed before it becomes mixed with the material from the next phase of construction.

S. Waste Diversion: A management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

T. Waste-to-Energy: The conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, anaerobic digestion, and landfill gas (LFG) recovery.

1.03 SUBMITTALS

A. Construction Waste Management Plan

B. Contractor Staging Area Site Plan

C. Construction Waste Management Monthly Report

D. Construction Waste Management Final Report

1.04 PERFORMANCE GOALS

A. General: Divert CDW and LCD from landfill disposal by one or more combination

of the following activities:

1. Salvage
2. Reuse or refurbishment
3. Source separated recycling
4. Co-mingled recycling
5. Donation to approved non-profit organization
6. Resale in accordance with Authority Standard Procedure S440.05 Transfer/Disposal of Equipment/Construction Salvage
7. Incineration in approved waste-to-energy facility

B. CDW materials that can be salvaged, resold, reused or recycled, include, but are not limited to the following:

1. Clean dimensional wood, pallet wood, plywood, Oriented Strand Board (OSB), and particleboard
2. Asphalt
3. Concrete and concrete masonry units
4. Brick
5. Ferrous and non-ferrous metals
6. Gypsum products
7. Acoustical ceiling tile
8. Glass, both window and bottle
9. Plastics, including plastic film
10. Carpet and pad
11. Cardboard packaging
12. Insulation
13. Field office waste paper, aluminum cans, glass, plastic, and cardboard
14. Non-hazardous solid waste or universal waste

1.05 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Unless specifically waived by the Owner in writing, the Contractor shall include a Construction Waste Management Plan as outlined in this section.

B. Submit to the Owner a Construction Waste Management (CWM) Plan narrative in accordance with these specifications.

C. The Construction Waste Management Plan shall include the following:

1. Name of designated Waste Management Coordinator.
2. The plan must account for all materials, including land-clearing debris, materials to be used for alternative daily cover (ADC), and other materials not contributing to diversion but not included in the diverted waste total.
3. A list of [Note to Designer: Insert # of applicable waste streams to project scope here, typically no greater than five (5)] demolition or construction waste materials that will be diverted from landfill disposal. Materials may

be structural or non-structural.

4. Include approximate percentage of overall project waste each materials represents.
5. Separately track CDW, LCD, landfill disposal, and recycled materials.
6. Identify materials as demolition or construction waste.
7. Include reference to separate hazardous materials removal, tracking and disposal procedures in accordance with other sections, as applicable.
8. Identify waste handling methods to be used, including one or more of the following:

    a. Method 1 - Contractor or subcontractor(s) hauls recyclable materials to an approved recycling facility.
    b. Method 2 - Contracting with diversion/recycling hauler to haul recyclable material to an approved recycling or material recovery facility.
    c. Method 3 - Recyclable material reuse on-site.
    d. Method 4 - Recyclable material salvage for resale.

9. Identification of each recycling or material recovery facility to be utilized, including name, address, types of materials being recycled at each facility and/or how the materials will be disposed or reused onsite.
10. Description of the method to be employed in collecting, and handling, waste materials.
11. Description of methods to communicate Construction Waste Management Plan to personnel and subcontractors.

1.06 CONTRACTOR STAGING AREA SITE PLAN

A. Submit a Contractor Staging Area Site Plan to achieve salvage and waste management goals prior to the start of construction.

    1. Identify designated areas in coordination with the Owner for stockpiling recyclable materials, including non-contaminated soils for re-use on site, including but not limited to infrastructure elevation changes, development of noise berms and consideration for landscape needs.
    2. Designate on-airport contractor haul routes in coordination with the Owner, focusing on safety and minimizing on-airport travel distances.

1.07 CONSTRUCTION WASTE MANAGEMENT MONTHLY REPORTS

A. Submit a monthly construction waste management status report.

    1. Include items-to-date as noted in 1.08 CONSTRUCTION WASTE MANAGEMENT FINAL REPORT.

1.08 CONSTRUCTION WASTE MANAGEMENT FINAL REPORT

A. Submit a Construction Waste Management Final Report. The report shall list the following for the project:

1. A record of each waste material type and quantity recycled, reused, salvaged, or disposed from the Project.
2. Include total quantity of waste material removed from the site and hauled to a landfill.
3. Percentage of total waste material generated that was recycled, reused, or salvaged.
4. Documentation of recycling rates for commingled facilities if applicable.
5. Total waste per gross floor area of project if applicable.

B. Quantities shall be reported by weight (tons) unless otherwise approved by the Owner.

C. Submit copies of manifests, weight tickets, recycling/disposal receipts or invoices, which validate the calculations or a signed certification of completeness and accuracy of the final quantities reported.

D. Submit a construction and demolition waste calculator or equivalent tool, tracking total and diverted waste streams.

E. The final reporting of hazardous materials removal will be in accordance with other sections and will not be included in the project's tracking total.

1.09 QUALITY ASSURANCE

A. Regulatory Requirements: The Contractor shall maintain compliance with all applicable Federal, State, or Local laws.

B. Disposal Sites, Recyclers and Waste Materials Processors: All facilities utilized for management of any materials covered under this specification must maintain all necessary permits as required by federal, state and local jurisdictions.

PART 2 – PRODUCTS - Not used.

PART 3 – EXECUTION

3.01 SOURCE-SEPARATED CDW AND LCD RECYCLING

A. Provide individual containers for separate types of CDW and LCD to be recycled clearly labeled with a list of acceptable and unacceptable materials.

3.02 CO-MINGLED CDW AND LCD RECYCLING

A. Provide containers for co-mingled CDW and LCD to be recycled, clearly labeled with a list of acceptable and unacceptable materials.

3.03 LANDFILL

A. Provide containers for CDW and LCD that are to be disposed of in a landfill clearly labeled as such.

3.04 REMOVAL OF CDW and LCD FROM PROJECT SITE

A. Transport CDW and LCD off Owner's property and legally dispose of it.

PART 4 – MEASUREMENT AND PAYMENT

4.01 GENERAL

A. No separate measurement or payment will be made for the work required by this section. The cost for this portion of the Work will be considered incidental to and included in the payments made for the applicable project amount or bid item(s).

END OF SECTION

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

Closeout is hereby defined as the performance of activities and the preparation and submittal of documents following Substantial Completion as specified in the Contract Documents as necessary to Final Acceptance and Contract closure. Specific requirements for individual units of Work are specified in other Sections. Should phased Substantial Completion be requested by the Owner, the Contractor and Owner will establish the extent of the area and scope that reached Substantial Completion. For each phased Substantial Completion area, the Contractor shall comply with this section.

1.02 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. Prior to requesting Owner's and Design Professional inspection for Certificate of Substantial Completion, for either the whole Work or designated portions thereof, complete the following and list known exceptions in request:

1. In progress payment request, coinciding with, or first following date claimed, show 100% completion for portion of Work claimed as substantially completed, or list incomplete items, value of incompletion, and reasons for being incomplete.

2. Include supporting documentation for completion as indicated in the Contract Documents.

3. Submit statement showing accounting of changes to the Contract sum.

4. Advise Owner of pending insurance change-over requirements.

5. Obtain and submit releases enabling Owner's full and unrestricted use of the Work and access to services and utilities, including, where required, occupancy permits, operating certificates, and similar releases.

6. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.

7. Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.

8. Complete start-up testing of systems and instructions of Owner's operating-maintenance personnel. Discontinue, or change over, and remove from Project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

In Owner's sole discretion, it may waive the above requirements in writing and provide a deadline after Substantial Completion, but before final completion for compliance.

B. Cleaning and Repairs:

Immediately prior to the Owner's and Design Professional's inspection for Substantial Completion of the whole Work or designated portions thereof, the Contractor will completely clean the premises. Concrete and ceramic surfaces will be cleaned and washed. Resilient coverings will be cleaned, waxed and buffed. Woodwork will be dusted and cleaned. Sash, fixtures, and equipment will be thoroughly cleaned. Stains, spots, dust, marks, and smears will be removed from all surfaces. Hardware and all metal surfaces will be cleaned and polished. Glass and plastic surfaces will be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic will be replaced by the Contractor at the Contractor's expense. Refer to Section 01561 - CONSTRUCTION CLEANING. In the event the Contractor does not strictly comply with these cleaning requirements, Owner may have the Work cleaned and backcharge the Contractor.

C. Inspection Procedures:

1. Incomplete Items Prior to Substantial Completion:

a. One week prior to anticipated date of Substantial Completion, the Contractor will furnish the Owner a list of items which Contractor expects will be incomplete at date of Substantial Completion.

b. The Owner will review the list and confirm its acceptability, or itemize objections and transmit such to the Contractor for action. Approval of this list by Owner will be a precondition for conducting the Substantial Completion inspection.

2. Upon receipt of Contractor's request for inspection, the Owner will either proceed with inspection or advise Contractor of prerequisites that are not fulfilled. Following initial inspection, the Owner will either prepare the Certificate of Substantial Completion or advise Contractor of work which must be performed prior to issuance of certificate. The Owner will repeat inspection when requested and when assured that the work has been substantially completed. A listing of work to be completed or corrected and the submission of closeout documents specified in Paragraph 1.03.A.1 will constitute the Final Acceptance punch list.

a. For projects under $10 million, the Final Acceptance punch list will be developed within 30 days after Substantial Completion and will be provided to the Contractor within five days after its completion.

b. For projects over $10 million, the Final Acceptance punch list will be

developed within 60 days after Substantial Completion and will be provided to the Contractor within five days after its completion.

3. Following Substantial Completion, the Contractor will correct or complete all Final Acceptance punch list items, excluding closeout documents, to the satisfaction of the Owner within 30 days after delivering the Final Acceptance punch list for projects under $10 million and 60 days for projects above $10 million If subsequent inspections are necessary after the prescribed time in order to eliminate all deficiencies, the cost of all subsequent inspections with respect to Owner's time will be paid by the Contractor. When ready, the Contractor will request in writing a final inspection of the Work. Upon completion of re-inspection, the Owner will either prepare a Certificate of Final Acceptance or advise Contractor of Work that is not completed or obligations that are not fulfilled as required for Final Acceptance. If necessary, procedures will be repeated. In the event of unacceptable Work discovered on the final inspection or if the submission of the closeout document is incomplete, the issuance of the Certificate of Final Acceptance will be withheld until all Final Acceptance punch list items and closeout documents are corrected or submitted to the Owner's satisfaction.

1.03 PREREQUISITES FOR FINAL COMPLETION AND ACCEPTANCE

A. Prior to requesting Owner's final inspection for Certification of Final Acceptance as required by this Part 2 Contract, complete the following and list known exceptions in requests:

1. Submit certified copy of Final Acceptance punch list with a statement that each item has been completed, submitted or otherwise resolved for acceptance, and has been endorsed and dated by Owner. The Final Acceptance punch list will contain the requirement that the following named items will be submitted as closeout documents on Owner or statutory forms:

a. Consent of Surety to Payment
b. Contractor's Final Affidavit of Payment of Debts and Claims
c. Contractor's Affidavit of Releases of Lien waivers
d. Waiver of Right to Claim Against Payment Bond upon Final Payment
e. List of Contractor's first tier and second tier subcontractors and suppliers, including addresses, phone numbers and a summary of the scope of work.
f. Final release of lien from each subcontractor and supplier listed in d. above
g. Statement of compliance with labor standards and payment of all applicable taxes
h. Statement of Contractor's one-year general warranty
i. Specific warranties as specified in Contract Documents and include the subcontractor or supplier with its contact information when applicable.
j. Accounting of final Contract amount

k. Accounting of actual DBE (W/MBE) participation
l. As-Built drawings sufficient for the production of record drawings
m. O&M manuals, Record Project Manual and record documents (see paragraph 1.06)
n. Evidence of continuing insurance complying with specified requirements
o. Contractor's final pay application
p. Final amendment – when applicable

2. Submit final meter readings for utilities, measured record of stored fuel, and similar data either as of time of Substantial Completion or when Owner took possession of and responsibility for corresponding elements of the Work.

3. Complete final cleaning requirements, including touch-up of marred surfaces. Refer to Section 01561 - CONSTRUCTION CLEANING, Paragraph 3.03 FINAL CLEANING.

4. Touch-up and otherwise repair and restore marred exposed finishes.

1.04 PREREQUISITES TO FINAL PAYMENT

A. Final Payment: Final Payment will be made after Final Acceptance of the whole Work by the Owner upon request by the Contractor and on condition that the Contractor:

1. Acceptance and final payment: The Owner will check the final estimate submitted by the Contractor of the items of Work actually performed. The Contractor will approve the Owner's final estimate or advise the Owner of Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities.

The Contractor and the Owner will resolve all disputes in the measurement and computation of final quantities to be paid within 30 days of the Contractor's submission of the final estimates. If, after such 30 day period, a dispute still exists, the Contractor may approve the Owner's estimate under protest of the portions of Work in dispute, and such disputed quantities will be considered by the Owner as a claim in accordance with the Contract Documents.

a. After the Contractor has approved, or approved under protest, the Owner's final estimate, 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 progress payments will be subject to correction in the final estimate and payment.

b. If the Contractor has filed a claim for additional compensation under the provisions of the Contract, such claims will be considered by the Owner. Upon final resolution of such claims, any additional payment

determined to be due the Contractor, if any, will be paid.

1.05 COMPLIANCES

A. Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at Project site, bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of in a lawful manner.

B. Where extra materials of value remain after Work has been completed and become Owner's property, they will be relocated and stored as directed by Owner.

1.06 RECORD DOCUMENT SUBMITTALS

A. Specific requirements for record documents are shown in this Section. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in submittals sections. Contractor should not use record documents for construction purposes, should protect record documents from deterioration and loss in a secure, fire-resistant location and should provide access to record documents for Owner's reference during normal working hours.

1. Definition: Record documents are defined to include those documents relating directly to performance of the Work which Contractor is required to prepare or maintain for Owner's records and which record the Work as actually performed. In particular, record documents show changes in the Work in relation to way in which shown and specified by original Contract Documents and show additional information of value to Owner's records but not indicated by original Contract Documents. Record documents include newly-prepared drawings (if any are specified), marked-up copies of Contract Documents, specifications, addenda and change orders, field records for variable and concealed conditions such as excavations and foundations, and miscellaneous record information on Work which is otherwise recorded only schematically or not at all.

2. Record Drawings: Upon receipt of acceptable as-built drawings, Designer of Record will produce the official record drawings in the manner prescribed by the Contract Documents. The Contractor will submit the as-built drawings to the Owner for coordination. Record Drawings shall be sent electronically through the Owner’s Management Software.

3. Record Project Manual: Upon completion of mark-up, submit to Owner for Owner's records. Record Project Manual shall be sent electronically through the Owner’s Management Software.

4. Maintenance Manuals: Contractor will complete, place in order, properly identify and submit to Owner for Owner's records. Maintenance Manuals shall be sent electronically through the Owner’s Management Software (close-out module) prior to required training and before substantial completion when

applicable.

5. Miscellaneous Record Submittals: As defined in F, 1, a-g of this Section: Provide Reports from Owner's Management Software for each of the areas of Miscellaneous Records with Bookmarks for each section. Complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to Owner for Owner's records through the Owner's Management Software Close-out Module after Substantial Completion.

B. Contractor's as-built drawings:

1. As-built drawings: The Contractor will maintain one conformed set of as-built drawings at the Project site. These will be kept legible and current and will be available for inspection at all times by the Owner. Changes or work added on these drawings will be shown in a contrasting color. Should as-built drawings be maintained electronically, the Owner shall have access to them at all times.

a. Mark-up Procedure: During progress of the Work, maintain a white-set (blue-line or black-line) of contract drawings and shop drawings, with mark-up of actual installations which vary substantially from the Work as originally shown. Mark fully and accurately whatever drawing is most capable of showing actual physical condition. Where shop drawings are marked-up, mark cross-reference on contract drawings at corresponding location. Mark with erasable colored pencil, using separate colors where feasible, or editable in electronic format, to distinguish between changes for different categories of Work at same general location. Mark-up important additional information which was either shown schematically or omitted from original drawings. Give particular attention to information on Work concealed which would be difficult to identify or measure and record at a later date. Note alternate numbers, change order numbers and similar identification. Require each person preparing mark-up to initial and date mark-up and indicate name of firm. Label each sheet "AS-BUILT" in 1/2 inch high letters. Contractor will provide in BIM format if BIM specification submittals are required

b. Show actual position of all underground and otherwise concealed civil, mechanical and electrical lines, conduit, pipes, ducts, etc. Items in areas with accessible ceilings or other ready access will not be considered as being concealed.

c. In showing changes in the Work, use the same legends as used on the original drawings. Indicate exact locations by dimensions and exact elevations by job datum. Give dimensions from a permanent point.

d. When manholes, boxes, underground conduits, plumbing hot or chilled water lines, inverts, etc., are involved as part of the Work, the

Contractor will furnish true elevations and locations, all properly referenced by using the original bench mark used for this Project.

e. The Contractor will submit completed as-built drawings to the Owner for coordination. The Contractor will transmit original ½ size hard copy to the Owner and the Contractor will submit a consolidated electronic copy via Owner's Management Software and organized by design packages inclusive of all ASIs/ESIs.

f. As-built drawings will contain the names, addresses and phone numbers of the Contractor and the major subcontractors.

g. As-built drawings will be reviewed monthly for compliance and acceptability.

h. The Owner will be the sole judge of the acceptability of the as-built drawings. Receipt and acceptance of the as-built drawings is a pre-requisite for Final Payment.

C. Record Project Manual:

1. During progress of the work, maintain one copy of the record project manual, including addenda, change orders and similar modifications issued in printed form during construction. Mark-up variations in actual Work in comparison with text of specification and modification as issued. Give particular attention to substitutions, selection of options, and similar information on Work where it is concealed or cannot otherwise by readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable.

2. Where record project manual is printed on one side of page only, mark variation on blank left-hand pages of record project manual, facing printed right-hand pages containing original text affected by variation.

3. Upon completion of the Work, the document information maintained during construction such as addenda, alternates, construction change directives, change orders, work orders, etc. will be recorded as follows:

a. Neatly cross out the non-conforming portion of the record project manual and add by writing in the revised portion of the record project manual. Do not revise the record project manual by cutting and pasting the actual addenda, alternates, construction change directive, change orders, work orders, etc., as actually issued by the Owner. The revisions have to be actually written by the Contractor.

b. The volume(s) of record project manual will be clearly marked "PROJECT RECORD" in 1/2 inch high letters and bear the name of the Contractor

and where applicable, the name of the subcontractor.

c. The Contractor will review the completed record project manual and ascertain that all data furnished in the record project manual is accurate and truly represents the Work as actually installed.

d. Any deviations from the method of executing the record project manual as described above will be considered just cause for disapproval by the Owner and the Design-Builder will be required to conform and resubmit.

e. Submit the record project manual to the Owner for compliance review and approval through the Owner's Management Software Close-out Module

f. Upon Owner's approval, the Contractor will submit the completed record project manual to the Owner through the Owner's Management Software Close-out Module

4. Information maintained during construction such as addenda, alternates, construction change directives, change orders, work orders, etc. will also be electronically recorded in original word processed documents converted to PDF format prior to submittal using strike-throughs for deletions, bold and italic for revisions and additions, and/or other acceptable method(s) where feasible to distinguish between changes. All of this information is to be submitted through the Owner's Management Software in individual records for each document.

D. Record Product Data:

During progress of the Work, maintain electronic copies of each product data submittal and mark-up significant variations in the actual Work in comparison with submitted information. Include both variations in product as delivered to Project site and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications. Product Data should be submitted through the Owner's Management Software Close-out Module by Specification Division with each Specification Subdivision requirement bookmarked. Submit prior to Final Completion.

E. Record Sample Submittal:

After Substantial Completion, and prior to Final Completion, Owner's personnel will meet with Contractor at Project site and will determine if any of submitted samples maintained by Contractor during progress of the Work are to be transmitted to Owner for record purposes. Comply with Owner's instruction for packaging, identification marking, and delivery to Owner's sample storage space. Dispose of other samples in manner specified

for disposal of surplus and waste materials, unless otherwise indicated by Owner.

F. Miscellaneous Record Submittals:

1. Refer to other Sections of these Contract Documents for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to date(s) of Substantial Completion, complete miscellaneous records should be properly entered in to the Owner's Management Software in the appropriate modules for the types of records, and ready for continued use and reference. For Close-Out submission, provide reports as described in section 1.06.A.5 above. Categories of requirements resulting in miscellaneous work records are recognized to include, but, the following:

   a. Required field records on excavations, foundations underground construction, wells and similar Work.

   b. Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping, valves, tanks and manholes.

   c. Surveys establishing lines and levels of building.

   d. Soil treatment certification.

   e. Inspection and Test Reports, where not processed as shop drawings or product data.

   f. Concrete mix design record.

   g. Concrete Block Certification.

G. Digital Electronic Format:

1. The Contractor will submit Record Documents, after review and approval by the Owner, in digital electronic format as follows:

   a. All textual data will be provided in PDF with Optical Character Recognition (OCR) and a report quality of 300 dpi or higher format. All formatting and tabular data will be preserved. Tabular data will be embedded in the document in Excel for Windows format.

   b. All Drawings will be provided in AutoCAD 2000 (or higher) format, as well as a PDF document of each drawing.

   c. After the documents are in correct digital electronic format, they will be submitted to the Owner on a solid state hard drive containing all

documents in an organized document library.

1.07 GUARANTEES AND WARRANTIES

A. After Substantial Completion and prior to Final Acceptance, all guarantees and warranties, as specified under various sections of the Contract Documents, will be obtained by the Contractor, addressed to and in favor of the Owner.

B. Delivery of said guarantees and/or warranties will not relieve the Contractor from any obligations assumed under any other provision of the Contract.

C. If, within any guarantee and/or warranty period, repairs or changes are required in connection with the guaranteed and/or warrantied work, which in the opinion of the Owner is rendered necessary as the result of the use of materials, equipment or workmanship which are defective, inferior or not in accordance with the terms of the Contract, the Contractor will, upon receipt of notice from the Owner, and without expense to the Owner, proceed within seven calendar days to:

1. Place all guaranteed and/or warrantied work in satisfactory conditions correct all defects therein, and make good all damages to the structure or site.

2. Make good all work or materials, or the equipment and contents of structures or site, disturbed in fulfilling any such guarantee and/or warranty.

D. If the Contractor, after notice, fails to comply with the terms of the guarantee and/or warranty, the Owner may have the defects corrected and the Contractor and Contractor’s surety will be liable for all expenses incurred, including Owner's fees.

E. All Guarantees and Warranties will be submitted to the Owner through the Owner’s Management Software Close-Out Module and via original hard copy, giving a summary of the guarantees and warranties attached and stating the following with respect to each:

1. Description of work included

2. Name of subcontractors

3. Period of guarantee/warranty

4. Conditions of guarantee/warranty

1.08 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Prior to any required training, and prior to Final Acceptance, complete operating instructions and maintenance manuals will be obtained by the Contractor for each piece of equipment or system furnished under the Contract. Organize operating and maintenance data into suitable sets of manageable size. Each manual will be uploaded to the Owner’s Management Software Close-out Module in a separate record and the

documents will be properly bookmarked for ease of use.

1. In addition to the electronic version submitted through Owner's Management Software , the Contractor will submit one copy of each completed manual on equipment and systems, in final form, to the Owner for review and distribution. There should be an individual manual that is organized and indexed for each unit of equipment, each operating system, and each electric and electronic system.

2. Refer to Specification Sections for individual requirements on operating and maintenance of the various pieces of equipment and operating systems.

B. Equipment and Systems:

1. Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.

a. Description: Provide a complete description of each unit and related component parts, including the following:

(1) Equipment or system function.
(2) Operating characteristics.
(3) Limiting conditions.
(4) Performance curves.
(5) Engineering data and tests.
(6) Complete nomenclature and number of replacement parts.

b. Manufacturer's Information: For each manufacturer of a component part of a piece of equipment provide the following:

(1) Printed operating and maintenance instructions.
(2) Assembly drawings and diagrams required for maintenance.
(3) List of items recommended to be stocked as spare parts.

c. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:

(1) Routine operations.
(2) Trouble-shooting guide.
(3) Disassembly, repair and reassembly.
(4) Alignment, adjusting and checking.

d. Operating Procedures: Provide information on equipment and system operating procedures, including the following:

(1) Start-up procedures.
(2) Equipment or system break-in.
(3) Routine and normal operating instructions.

(4) Regulation and control procedures.
(5) Instructions on stopping.
(6) Shut-down and emergency instructions.
(7) Summer and winter operating instructions.
(8) Required sequences for electric or electronic systems.
(9) Special operating instructions.

e. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.

f. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.

g. Coordination Drawings will be submitted through the BIM Model submittal requirement.

h. Valve Tags: Provide charts of valve tag numbers with the location and function of each valve.

i. Circuit Directories: For electric and electronic systems, provide complete circuit directors of panel-boards, including the following:

(1) Electric service.
(2) Controls.
(3) Communication.

1.09 REPLACEMENT MATERIALS

Prior to Final Acceptance, Contractor will transmit and turn over, at the Project site, in a location directed by Owner, all replacement materials which may be required by other sections of these Contract Documents.

PART 2 - PRODUCTS

"Not Used"

PART 3 - EXECUTION

3.01 EQUIPMENT OPERATIONAL DEMONSTRATIONS

A. Prior to Substantial Completion of the whole Work or designated portions thereof, and prior to Final Acceptance, the Contractor will provide a competent and experienced person thoroughly familiar with the Work to demonstrate and instruct the Owner's personnel in operation, adjustment and maintenance of products, equipment and systems. This instruction will include normal start-up, run, stop, and emergency

operations, location and operation of all controls, alarms and alarm systems, etc. The instruction will include tracing the system in the field and on the diagrams in the instruction booklets so that the Owner's operating personnel will be thoroughly familiar with both the system and the data supplied. Provide instruction at mutually agreed upon times.

1. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

2. For equipment that requires seasonal operation, provide similar instruction during other seasons.

B. If installers and/or Contractor's personnel are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.
13. Similar procedures and facilities.
14. Any other appropriate item.

C. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up.
2. Shut down.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.
8. Similar operations.
9. Any other appropriate procedure.

D. Review maintenance and operations in relation to applicable warranties, agreements to maintain bonds, and similar continuing commitments.

E. Owner will be notified in writing of scheduling and completion of all equipment operational instructions and demonstrations.

END OF SECTION

SECTION 01740 - WARRANTIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties required by the Contact Documents, including manufacturer’s standard warranties on products and special warranties.

1. Refer to Section 00700, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, as modified, for terms of the Contractor's special warranty of workmanship and materials.

2. General closeout requirements are included in Section 01700 - PROJECT CLOSEOUT.

3. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual Sections of the Specifications.

4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations:

. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor of Contractual warranty requirements.

1.02 DESCRIPTION OF REQUIREMENTS/DEFINITIONS

A. Categories of Specific Warranties:

1. It is recognized that warranties on the Work are in several categories, including those of the conditions of the Contract and including (but not necessarily limited to) the following specific categories related to the individual units of Work specified in the sections of the Specifications:

a. Special Warranty (Guarantee): A warranty specifically written and signed by the Contractor for a defined portion of the Work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor. Formerly generally recognized as (and sometimes specified in Contract Documents as) a "guarantee".

b. Specified Product Warranty: A warranty which is required by Contract Documents to be provided for a manufactured product which is incorporated into the Work, regardless of whether the manufacturer has published the warranty without consideration for specific

incorporation of product into the Work, or has written and executed the warranty as a direct result of Contact Documents requirements.

c. Coincidental Product Warranty: A warranty which is not specifically required by Contract Documents (other than as specified in this Section) but which is available on a product incorporated into the Work by virtue of the fact that the manufacturer of the product has published the warranty in connection with purchases and uses of product without regard for specific applications, except as otherwise limited by terms of the warranty.

B. Definition: Manufactured Product:

A physical item for incorporation into the Work which has been produced from raw or natural materials by a manufacturing process and which is purchased from a manufacturer either specifically for the Work or for Contractor's/subcontractor's/ fabricator's/installer's stock from which it is drawn for incorporation into the Work.

C. General Limitations:

1. It is recognized that specific warranties are intended primarily to protect Owner against failure of Work to perform as required and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in Work which result from:

a. Damage or defect caused by abuse

b. Modifications not executed by the Contractor

c. Improper or insufficient maintenance

d. Improper operations, or normal wear and tear under normal usage

2. Although manufacturer's commitments in product warranties on products used in the Work are generally written to exclude product failures which result from failure of other Work (such as failure of substrate supporting product), such limitations in product warranties do not relieve Contractor of the more general warranties on Work which incorporates use of such products. Except as otherwise indicated, this same relationship applies to units of Work performed by other entities (other than manufacturers), such as fabricators, installers and subcontractors, who are required to countersign special Project warranties with Contractor for such units of Work.

3. Owner’s signature on any manufacturer’s or other warranties does not excuse the Contractor from its common law warranty obligations or its contractual warranty obligations.

1.03 WARRANTY REQUIREMENTS

A. Related Damages and Losses:

When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty:

When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty will be equal to the original warranty from the date of correction or rebuilding.

C. Replacement Cost:

Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse:

1. Written warranties made to the Owner are in addition to contractual and implied warranties and will not limit the duties, obligations, rights and remedies otherwise available under the law, nor will warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

    a. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

2. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work until evidence is presented that entities required to countersign such commitments are willing to do so.

3. Written warranties shall not require the signature of the Owner for compliance.

1.04 SUBMITTALS

A. Submit written warranties to the Owner prior to the date certified for Final Payment.

1. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.

    Submit a draft to the Owner for approval prior to final execution.

a. Refer to individual sections of Division 2 through 16 for specific content requirements and particular requirements for submittal of special warranties.

2. Submit specific warranties for beginning of the warranty periods. Date(s) will be inserted to correspond with certification or acceptance dates, as established and accepted by the Owner.

B. Form of Submittal:

1. Provide one Electronic Copy and one Hard copy of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Record Project Manual. All Warranties should be submitted through the owners Project Management Software.

2. Bind warranties in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, with thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.

a. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer.

b. Identify each binder on the front and the spine with the typed or printed title 'WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.

3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

Conformed Documents Submittal

Tampa International Airport

TPA LTPG AC REPLACEMENTS

TECHNICAL SPECIFICATIONS

HCAA PROJECT NO. 6930 22

RS&H PROJECT NUMBER 204-1880-038

TLC ENGINEERING SOLUTIONS

RS&H

LTPG AC Replacements
Project Manual – Issued for Construction

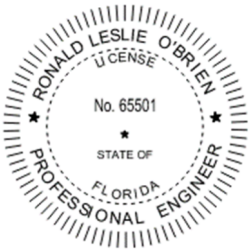
Tampa International Airport
HCAA Project No: 6930 22
RS&H Project No: 204-1880-038

4890 W Kennedy Blvd., Suite 250
Tampa, FL 33609

Technical Specifications found in this project manual were prepared by the Design Professional whose name and stamp appear below:

ELECTRICAL ENGINEERING
(E000, E101, E401, E402, E501, E601, E701)

RONALD O'BRIEN, PE



THIS ITEM HAS BEEN SIGNED AND SEALED BY RONALD O'BRIEN.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ELECTRONIC COPIES.

TLC ENGINEERING SOLUTIONS.
4890 W KENNEDY BLVD.,
SUITE 250
TAMPA, FL 33609

RONALD O'BRIEN, PE, NO. 65501
THE ABOVE-NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.00, F.A.C.

LTPG AC Replacements
Project Manual – Issued for Construction

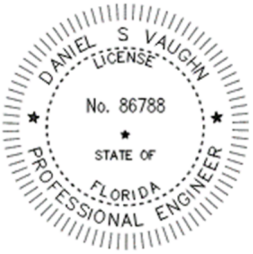
Tampa International Airport
HCAA Project No: 6930 22
RS&H Project No: 204-1880-038

4890 W Kennedy Blvd., Suite 250
Tampa, FL 33609

Technical Specifications found in this project manual were prepared by the Design Professional whose name and stamp appear below:

MECHANICAL ENGINEERING
(M000, M001, M101, M201, M202, M203, M204, M301, M501, M502, M601, M801)

Daniel Vaughn, PE



THIS ITEM HAS BEEN SIGNED AND SEALED BY DANIEL VAUGHN.

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SECTION A-100 – LTPG AC REPLACEMENTS

1.1 DESCRIPTION

A. This item provides information for measurement and payment purposes only for the bid items associated specifically with the replacement of the dx rooftop units, with dx split systems, at the Tampa International Airport (TPA) Long Term Parking Garage elevator penthouses. Construction methods shall be as established in the Contract Documents and/or as recommended by the manufacturer as appropriate.

1.2 METHOD OF MEASUREMENT

A. Measurement will be made as indicated below.

1. **A-100-1** – The four (4) 10-ton rooftop units at the long term parking garage elevator penthouses (one per penthouse) shall be replaced with 5-ton dx split systems. The scope also includes associated electrical modifications to accommodate the new split systems.

1.3 BASIS OF PAYMENT

A. Payment will be made at the established contract unit price per the unitary measurement indicated below. This payment shall be full compensation for furnishing and installation of all necessary materials and for all related labor equipment, tools and incidentals. Payment for final coatings associated with each item shall be included in Item A-100-1.

B. Items which are not specifically identified as a unit price bid item in the Bid Schedule (Section 00340), but are an integral and necessary part of the construction, shall be included in the appropriate bid items below.

Payment will be made under:

A-100-1 AC Replacements – per lump sum

END OF SPECIFICATION SECTION A-100

SPECIFICATIONS TABLE OF CONTENTS

LTPG ELEVATOR ROOM AIR CONDITIONING REPLACEMENTS

HCAA Project Number 6930 22

TAMPA INTERNATIONAL AIRPORT
Tampa, Florida

SECTION 230010 – 230010 BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Basic Requirements: Requirements of the Contract Forms, Conditions of the Contract, Specifications, Drawings, and Addenda and Contract Modifications (the Contract Documents), apply to the requirements of each Section of Division 23

B. Conflicts: Nothing contained in this Section shall be construed to conflict in any way with other provisions or requirements of the Contract documents.

1.2 SUMMARY

A. General: Unless an item is specifically mentioned as being provided by others, the requirements of Division 23 Contract Documents shall be completed. The systems, equipment, devices and accessories shall be installed, finished, tested and adjusted for continuous and proper operation. Any apparatus, material or device not shown on the Drawings but mentioned in these Specifications, or vice versa, or any incidental accessories necessary to make the project complete and operational in all respects, shall be furnished, delivered and installed without additional expense to the Authority. Include all materials, equipment, supervision, operation, methods and labor for the fabrication, installation, start-up and tests necessary for complete and properly functioning systems.

1.3 APPLICABLE STANDARDS

A. Code Compliance: Refer to Division 1. As a minimum, unless otherwise indicated, comply with all rules, regulations, standards, codes, ordinances and laws of local, state and federal governments and the amendments and interpretation of such rules, regulations, standards, codes, ordinances and laws of local, state and federal governments by the authorities having lawful jurisdiction.

B. ADA: Comply with the requirements of the Americans with Disabilities Act (ADA).

C. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards as adopted by the Local Authority having Jurisdiction.

D. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards indicated.

E. Florida Building Code 2010: Conform in strict compliance to the Florida Building Code (FBC) and the amendments which are enforced by the local authority having jurisdiction.

1. Florida Building Code – Mechanical
2. Florida Building Code – Energy Conservation

F. NATIONAL FIRE PROTECTION (NFPA) Standards:

1. NFPA-1, Uniform Fire Code™, 2006 Revision
2. NFPA-90A, Standard for the Installation of Air Conditioning and Ventilation Systems, 2002 Revision
3. NFPA-90B, Standard for the Installation of Warm Air Heating and Air Conditioning Systems, 2006 Revision

G. Notification: Comply with all of the requirements of the Federal "Right-To-Know" Regulations and the Florida "Right-To-Know" Law and provide notification to all parties concerned as to the use of toxic substances.

H. Authority Design Guidelines: Comply with all the requirements of the latest Authority MEP Engineering Design Guidelines and the latest Authority Architectural Construction Standards.

1.4 DRAWINGS AND SPECIFICATIONS

A. Intent: The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable mechanical systems complete in every respect.

B. Equipment Placement: The drawings are diagrammatic, intended to show general arrangement, capacity and location of various components, equipment and devices. Each location shall be determined by reference to the general building plans and by actual measurements in the building as built. Reasonable changes in locations ordered by the Design-Builder prior to the performance of the affected Work shall be provided at no additional cost to the Authority.

C. Drawing Scale: Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets, transitions and fittings may not be shown but shall be provided at no additional cost.

D. Conflict: In the event of a conflict, the Design-Builder will render an interpretation in accordance with the General Conditions.

1.5 DEFINITIONS

A. Provide/Install: The word "provide" shall mean furnish, install, connect, test, complete, and leave ready for operation. The word "install" where used in conjunction with equipment furnished by the Authority or under another contract shall mean mount, connect, complete, and leave ready for operation.

B. Concealed: The surface of insulated or non-insulated piping, ductwork or equipment is concealed from view when standing inside a finished room, such as inside a chase or above a ceiling.

C. Exposed: The surface of insulated or non-insulated piping, ductwork or equipment is seen from inside a finished room, such as inside an equipment or air handling unit room.

D. Protected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building but protected from direct exposure to rain by an overhang, eave, in an unconditioned parking garage or building crawl space.

E. Unprotected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building and exposed to rain.

F. Abbreviations: Abbreviations, where not defined in the Contract Documents, shall be interpreted to mean the normal construction industry terminology, as determined by the Architect. Plural words shall be interpreted as singular and singular words shall be interpreted as plural where applicable for context of the Contract Documents.

1.6 SHOP DRAWINGS

A. General: Refer to paragraph entitled "SUBMITTAL" in this section. Include the following data:

1. Shop Drawings:

a. Submit shop drawings for the following:

1) Each piping system
2) Ductwork systems
3) Coordination drawings

1.7 RECORD DRAWINGS

A. General: Refer to Division 1.

1.8 SUBMITTAL

A. General: The provisions of this section are supplemental to the requirements in Division 1, and only apply to the material and equipment covered in Division 23.

B. Time: Submit manufacturer's literature, performance data and installation instructions covered in each Section of Division 23 under an individual letter of transmittal within 30 days after Notice to Proceed unless otherwise indicated.

C. Submitter's Review: All items required for each section shall be reviewed before submittal. Submittal information for each item shall bear a review stamp of approval, indicating the name of the Contractor and Subcontractor (where applicable), the initials of submitter and date checked. Responsibility for errors or omissions in submittals shall not be relieved by the Architect's review of submittals. Responsibility for submittals cannot be subrogated to material suppliers by Contractors or Subcontractors.

1. Review of the submittal data, whether indicated with "APPROVED" or with review comments, does not constitute authorization for or acceptance of a change in the contract price.

D. Architect's Review: The submittal data shall be reviewed only for general conformance with the design concept of the project and for general compliance with the Contract Documents. Any action indicated is subject to the requirements of the Contract Documents. Reviews of submittal data review shall not include quantities; dimensions (which shall be confirmed and correlated at the job site); fabrication processes; techniques of construction; and co-ordination of the submittal data with all other trades. Copies of the submittal data will be returned marked "ACCEPTED AS SUBMITTED", "ACCEPTED AS NOTED", "REVISED AS NOTED AND RESUBMIT", "REJECTED, REVISED AS NOTED AND RESUBMIT".

E. Submittal Items: Mark the appropriate specification section or drawing reference number in the right hand corner of each item. All typewritten pages shall be on the product or equipment manufacturer's printed letterhead.

1. Manufacturer's Literature: Where indicated, include the manufacturer's printed literature. Literature shall be clearly marked to indicate the item intended for use.
2. Performance Data: Provide performance data, wiring and control diagrams and scale drawings which show that proposed equipment will fit into allotted space (indicate areas required for service access, connections, etc.), and other data required for the Architect to determine that the equipment complies with the Contract Documents. Where noted, performance data shall be certified by the manufacturer at the design rating points.
3. Installation Instructions: Where requested, each product submittal shall include the manufacturer's installation instructions. Generic installation instructions are not acceptable. Instructions shall be the same as those included with the product when it is shipped from the factory.
4. Written Operating Instructions: Instructions shall be the manufacturer's written operating instructions for the specified product. If the instructions cover more than one model or type of product they shall be clearly marked to identify the instructions that cover the product delivered to the project. Operating Instructions shall be submitted immediately after the product or equipment submittal has been returned from the Architect marked "APPROVED" or "APPROVED AS NOTED".
5. Maintenance Instructions: Information shall be the manufacturer's printed instructions and parts lists for the equipment furnished. If the instructions cover more than one model or type of equipment they shall be marked to identify the instructions for the furnished product. Submit maintenance instructions immediately after the product or equipment submittal has been returned from the Architect marked "APPROVED" or "APPROVED AS NOTED".

F. Substitutions:

1. General: Refer to Division 1.

G. Technical Information Brochure:

1. General: Refer to Division 1.

1.9 SHOP DRAWINGS FOR PIPING SYSTEMS

A. Requirements: Make Shop Drawings for piping systems at a minimum scale of 1/4 inch per foot in AutoCAD Version 2014 (or later) and print on reproducible transparencies to verify clearances and equipment locations. Show required maintenance and operational clearances. Identify Shop Drawings by project name and include names of Architect, Engineer, Contractors, Subcontractors and supplier, date in Shop Drawing title block. Number drawings sequentially and indicate:

1. Architectural and structural backgrounds with room names and numbers, etc., including but not limited to plans, sections, elevations, details, etc.
2. Fabrication and erection dimensions.
3. Arrangements and sectional views.
4. Necessary details, including complete information for making connections to equipment.
5. Descriptive names of equipment.
6. Modifications and options to standard equipment required by Contract Documents.

B. Stamp Area: Leave 4 inch by 2-1/2 inch blank area near title block for Architect's shop drawing stamp. The acceptance of a shop drawing by indicating "APPROVED" does not relieve the contractor from full compliance with the sizes and equipment connections shown on the contract documents unless the changes are specifically indicated on the shop drawing.

C. Reference Key: Indicate by cross-reference the Contract Drawings, notes, or Specification paragraph numbers where item(s) occur in the Contract Documents.

D. Additional Requirements: See specific Sections for additional requirements.

1.10 SHOP DRAWINGS FOR DUCT SYSTEMS

A. Requirements: Make Shop Drawings for duct systems at a minimum scale of 1/4 inch per foot in AutoCAD Version 2014 (or later) and print on reproducible transparencies to verify clearances and equipment locations. Show required maintenance and operational clearances. Identify Shop Drawings by project name and include names of Architect, Engineer, Contractors, Subcontractors and supplier, date in Shop Drawing title block. Number drawings sequentially and indicate:

1. Architectural and structural backgrounds with room names and numbers, etc., including but not limited to plans, sections, elevations, details, etc.
2. Fabrication and erection dimensions.
3. Arrangements and sectional views.
4. Necessary details, including complete information for making connections to air distribution devices and air handling equipment.
5. Kinds of materials and finishes.
6. Descriptive names of equipment.
7. Modifications and options to standard equipment required.

B. Stamp Area: Leave 4 inch by 2-1/2 inch blank area near title block for Architect's shop drawing stamp. The acceptance of a shop drawing by indicating "APPROVED" does not relieve the

contractor from full compliance with the sizes and connections shown on the contract documents unless the changes are specifically indicated on the shop drawing.

C. Reference Key: Indicate by cross-reference the Contract Drawings, notes, or Specification paragraph numbers where item(s) occur in the Contract Documents.

D. Ceiling Plans: Provide Shop Drawings, using sepias of architectural reflected ceiling plans, which indicate locations of exposed air distribution devices, sprinkler heads, lights and access panel.

E. Additional Requirements: See specific Sections for additional requirements.

1.11 COORDINATION DRAWINGS

A. General: Provide detailed (minimum 1/4 inch per foot) scaled coordination drawings showing locations and positions of all architectural, structural, (FF&E) equipment, electrical, plumbing, fire protection and mechanical elements for all installations. Provide overlay drawings, prior to beginning work, indicating work in and above ceilings and in mechanical and electrical rooms with horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions and other services. Accommodate phasing and temporary conditions indicated on the contract drawings as necessary to complete the work without disruption to the Authority's use of the existing occupied areas of the building(s).

B. Coordination of Space:

1. Coordinate use of project space and sequence of installation of mechanical and electrical work which is indicated diagrammatically on drawings. Follow routings shown for pipes, ducts and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
2. In finished areas except as otherwise shown, conceal pipes, ducts, and wiring in construction. Coordinate locations of fixtures and outlets with finish elements. Contractor shall provide background drawings showing partitions, ceiling heights, and structural framing locations and elevations, and existing obstructions. Contractor shall resolve major interferences at initial coordination meeting prior to production of coordination drawings.

C. Precedence of Services: In event of conflicts and interferences involving location and layout of work, use the following priority to resolve interferences:

1. Structure has highest priority.
2. Walls systems.
3. Ceiling grid/light fixtures.
4. Gravity drainage lines.
5. Large pipe mains.
6. Ductwork/diffusers, registers and grilles.
7. Sprinkler heads.
8. Small piping and tubing/electrical conduit.
9. Access panels.

D. Drawings shall be developed on AutoCAD Version 2010 (or later), and utilize AIA Standard layering conventions. At the completion of the project construction, the Contractor shall provide two (2) full-sized print sets and two (2) CDs of all drawing files with related reference files representing as-built installations for Architect review. Upon approval that the submitted information is complete, a similar submittal shall be provided to the Authority.

E. Stamp Area: Leave 4 inch by 2-1/2 inch blank area near title block for Architect's shop drawing stamp.

F. Reference Key: Indicate by cross-reference the Contract Drawings, notes, or Specification paragraph numbers where item(s) occur in the Contract Documents.

G. Additional Requirements: See specific Sections for additional requirements.

1.12 MANUFACTURER'S CHECKOUT

A. Start-up and Checkout: At completion of installation and prior to performance verification, a factory-trained representative of the manufacturer shall provide start-up and checkout service. After the performance verification the manufacturer's representative shall examine performance information and check the equipment in operation, and sign start-up report for the record. Submit a copy of report on each item of equipment where indicated in individual sections of these specifications for inclusion in each Technical Information Brochure. The start-up report shall be included with the performance verification data. Do not request "Instruction in Operation Conference" or request final inspection until reports have been submitted and found acceptable.

1.13 INSTRUCTION TO AUTHORITY

A. General: Instructions to the Authority shall be by competent representatives of the manufacturers involved, with time allowed for complete coverage of all operating procedures. Provide classroom instruction and field training in the design, operation and maintenance of the equipment and troubleshooting procedures. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar provisions of the systems. On the date of substantial completion, turn over the prime responsibility for operation of the mechanical equipment and systems to the Authority's operating personnel.

B. Training Period: Unless otherwise indicated training periods shall encompass the following number of hours of classroom and hands-on instructions with a maximum period of 4 hours per day for either. Mixing classroom instructions and hands on training in the same day is unacceptable.

1. Training periods: refer to individual specification sections for hours.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Products: Manufacturer's names and product model numbers indicated on the drawings and in these specifications establish the type, style, quality, performance, and sound rating of the desired product. Listing of other manufacturers indicates that their equivalent products would be acceptable if they meet the specification requirements, the specific use and installation shown on the drawings, including space and clearance requirements, and the energy consumption and efficiency of the specified product. The listing of additional manufacturers in no way indicates that the manufacturer can provide an acceptable product.

B. Space Requirements: All manufactured products furnished on this project must have the required space and service areas indicated in the manufacturer's printed literature or shown on their shop drawing. When the manufacturer does not indicate the space required for servicing the equipment, the space shown on the drawings or as required by the Architect must be provided.

2.2 MATERIAL AND EQUIPMENT

A. General: Material and equipment used shall be produced by manufacturers regularly engaged in the production of similar items.

B. Specified Equipment: Equipment shall be the capacity and types indicated or shall be equivalent in the opinion of the Design-Builder. Material and equipment furnished and installed shall be new, recently manufactured, of standard first grade quality and designed for the specific purpose. Equipment and material furnished shall be the manufacturer's standard item of production unless specified or required to be modified to suit job conditions. Sizes, material, finish, dimensions and the capacities for the specified application shall be published in catalogs for national distribution. Ratings and capacities shall be certified by a recognized rating bureau. Products shall be complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

C. Compatibility: Material and equipment of one and the same kind, type or classification and used for identical or similar purposes shall be made by the same manufacturer. Where more than one choice is available, select the options which are compatible with other products already selected. Compatibility is a basic general requirement of product selection.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General: The installation of materials and equipment shall be done in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a first-quality installation. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks. All materials and equipment shall be installed per the manufacturer's written requirements.

B. Acceptable Workmanship: Acceptable workmanship is characterized by first-quality appearance and function which conforms to applicable standards of building system construction and exhibits a degree of quality and proficiency which is judged by the Design-Builder as equivalent or better than that ordinarily produced by qualified industry tradesmen.

C. Performance: Personnel shall not be used in the performance of the installation of material and equipment who, in the opinion of the Design-Builder, are deemed to be careless or unqualified to perform the assigned tasks. Material and equipment installations not in compliance with the Contract Documents, or installed with substandard workmanship in the opinion of the Design-Builder, shall be removed and reinstalled by qualified craftsmen at no change in the contract price.

3.2 CLEANING AND PROTECTION

A. General: Refer to Division 1.

B. Emergency Contacts: Prior to the beginning of the project, provide the Authority with a list of names, emergency telephone and beeper numbers of individuals who can be contacted during working and non-working hours, including weekends, for assistance throughout the warranty period if leaks, equipment failure or other damages occur. Update the list throughout installation and warranty to provide continuous availability of responsible parties to the Authority. If the Authority cannot contact the responsible party during an emergency situation, the Authority may effect emergency repairs through other means and may backcharge for the costs of repair material and labor incurred.

C. Emergency Contacts: Along with the operating and maintenance manual submittal, provide the Authority with a list of the names and emergency telephone and beeper numbers of individuals who can be contacted during working and non-working hours, including weekends, for assistance throughout the warranty period should leaks, equipment failure or other damage occur. Update the list throughout warranty to provide continuous availability of responsible parties to the Authority. If the Authority cannot contact the responsible party during an emergency situation, the Authority may effect emergency repairs through other means and may backcharge for the costs of repair material and labor incurred.

D. Housekeeping: Keep interiors of duct and pipe systems clean and free from dirt, rubbish and foreign matter. Close open ends of piping and ductwork at all times throughout the installation. Install 30% efficient filter media over each return air grille and open return duct opening; change media regularly during construction when dirty to keep duct interiors clean. Prevent dust, debris and foreign material from entering the piping and ductwork.

E. Equipment Protection: Protect fan motors, switches, equipment, fixtures, and other items from dirt, rubbish and foreign matter. Do not operate air-handling equipment if the building is not clean or if dust can enter the coils or the fan housings.

F. Equipment Cleaning: Thoroughly clean equipment and entire piping systems internally upon completion of installation and immediately prior to final acceptance. Open dirt pockets and strainers, blow down each piping system and clean strainer screens of accumulated debris. Remove accumulated dirt, scale, oil and foreign substances. Thoroughly wipe clean internal

surfaces of ductwork and air handling units prior to request for substantial completion. (See para. 3.2 above.)

G. Building Cleanup: Remove debris, rubbish, leftover materials, tools and equipment from work areas and site. Clean tunnels and closed off spaces of packing boxes, wood frame members and other waste materials used in the installation. Final acceptance shall not be approved until site is cleaned.

H. Fixture Cleanup: Remove temporary labels, stickers, etc., from fixtures and equipment. Do not remove permanent nameplates, equipment model numbers, ratings, etc.

I. Filter Replacement: Provide filters, with the same efficiency rating as required for the final installation, for the protection of the air moving equipment and ductwork continuously throughout the construction phase. Provide a new set of clean filters for the test and balance of the air side equipment.

J. Protection of Finished Installation: Where installation is required in areas previously finished by other trades, protect the area from marring, soiling or other damage.

K. Air Handling Unit Operation During Construction Phase: Do not operate air handling equipment during building construction phase unless filter fabric is fastened to all duct systems' inlets and all specified and scheduled air filters are installed to minimize dirt entry into ductwork and air moving equipment. When running air handling units to dry out the building, control the building temperature to drop very slowly, and verify all HVAC insulation is completed and doors and windows are installed and closed, to prevent condensation of water from humid air on building interior surfaces, equipment, materials and ductwork.

3.3 CORRECTION OF WORK

A. General: At no additional cost to the Authority, rectify discrepancies between the actual installation and contract documents when in the opinion of the T&B Agency or the Design-Builder the discrepancies will affect system balance and performance.

B. Drive Changes: Include the cost of all pulley, belt, and drive changes, as well as balancing dampers, valves and fittings, and access panels to achieve proper system balance recommended by the T&B Agency.

3.4 COORDINATION AND ASSISTANCE

A. General: Provide all labor, equipment, tools and material required to operate the equipment and systems necessary for the testing and balancing of the systems and for the adjustment, calibration or repair of all electric or pneumatic automated control devices and components. These services shall be available on each working day during the period of final testing and balancing.

B. Drawings and Specifications: Provide to the T&B Agency a complete set of project record drawings and specifications and an approved copy of all HVAC shop drawings and equipment submittals. The T&B Agency shall be informed of all changes made to the system during construction, including applicable change orders.

C. Coordination: Coordinate the work of all trades and equipment suppliers to complete the modifications recommended by the T&B Agency and accepted by the Design-Builder. Cut or drill holes for the insertion of air measuring devices as directed for test purposes; repair to as-new condition, inserting plastic caps or covers to prevent air leakage. Repair or replace insulation and re-establish the integrity of the vapor retardant.

3.5 PREPARATIONS FOR PERFORMANCE VERIFICATION

A. Verification: Prior to commencement of the balancing by the T&B Agency, the Contractor shall verify in writing:

1. That air filters have been replaced and are in clean condition.
2. That linkages between dampers and their actuators are secure, non-overloading and non-binding.
3. That ductwork specialties are in their normal operating positions.
4. That fans are operating at the correct rotation and specified RPM.
5. That ductwork has been pressure tested and accepted.
6. That strainers have been removed, cleaned and replaced, and that temporary construction strainers have been removed.
7. That air vents at coils and high points of the piping systems have been inspected and installed and operating freely.
8. That automatic valves, hand valves, and balancing valves have been placed in a fixed open position for full flow through all devices.
9. That linkages between valves and their actuators are secure, non-overloading and non-binding.
10. That pressures for hydronic reducing valves have been set.
11. That operating temperatures have been set for chillers, regulating valves, etc.
12. That pumps are operating at the correct rotation and specified horsepower.
13. That piping has been pressure tested and accepted and piping systems have been cleaned, flushed, sterilized and refilled with chemicals and prescribed treated water and vented.
14. That pressures for steam reducing valves have been set.
15. That operating temperatures have been set for boilers, regulating valves, etc.
16. That the operating safeties (thermal overloads, firestat/freezestats, smoke detectors, relief valves, etc.), are installed and fully functional.
17. That equipment has been lubricated and can be operated without damage.
18. That the systems are operational and complete.
19. That no latent residual work remains to be completed.

3.6 ACCEPTANCE TESTING PROCEDURE

A. General: Each HVAC system shall be tested to confirm proper operation and function in accordance with the construction documents and control sequence of operations.

B. The enclosed checklists shall be completed for each system and signed off by the mechanical contractor project representative, then verified and signed-off by the mechanical sub-contractor project supervisor and the Design-Builder systems engineer. All checklists shall be incorporated into the project's close-out manuals submitted for Authority record.

C. On-site testing by the Architect and Engineer shall be performed at the discretion of the Design-Builder/Engineer for any or all systems to confirm test results and system function, in the supervision of the Authority, HCAA for all meetings.

D. The Contractor is responsible to provide adequate time in the completion of the construction to perform these system tests prior to final inspections in the affected areas/systems.

E. The Contractor is responsible for ensuring all required system tests are conducted successfully and recording associated test data and results.

F. The Contractor is responsible for contacting the Design-Builder and Engineer at least one week prior to system test availability and schedule acceptable to Design-Builder/Engineer for on-site testing.

G. If, in the Design-Builder's and Engineer's opinion, the test results indicate that the systems' installation is not adequately complete for testing, the testing shall be re-scheduled and the Contractor shall be responsible to prepare for such re-test.

H. Prior to Authority occupancy, all system testing shall be completed and approved by Engineer. Compliance to the contract documents and design intent letter will be provided by the Engineer in the form of a Substantial Completion Letter.

3.7 PROTECTION OF MATERIALS AND EQUIPMENT

A. Requirements: Do not store fiberglass insulation or any equipment within the building until it has been "dried in". If dry space is unavailable and the insulation and equipment must be installed or stored before the building is "dried in" and completely enclosed, provide polyethylene film cover for protection.

B. Replacement of Damaged Stored Material and Equipment: Any material and equipment that has been wet or otherwise damaged prior to installation, in the opinion of the Design-Builder, shall be replaced with new material regardless of the condition of the material and equipment at the time of installation.

C. Repair of Damaged Installed Material and Equipment: After installation correct or repair dents, scratches and other visible blemishes. At the direction of Design-Builder replace or repair to "as new" condition equipment which has been damaged during construction.

D. During construction, all piping and ductwork system openings shall be capped with at least two layers of polyethylene film, fastened tightly in place with banding material or foil tape until connection of the continuation of such piping or ductwork is occurring.

3.8 ASBESTOS AND HAZARDOUS MATERIALS

A. General: Should asbestos or other hazardous material be encountered during execution of the work, or should the presence of asbestos or other hazardous material be suspected, immediately notify the Design-Builder and suspend work in the affected area. The Authority will initiate a study to determine if asbestos or other hazardous materials are present and will

determine what action will be taken. Removal of asbestos or other hazardous materials will be done under a separate contract.

3.9 COORDINATION OF SERVICES

A. General: Coordinate interruption of services to Authority-occupied areas in writing in advance with the Design-Builder in accordance with the Authority's procedures. Shutdown time and duration of services interruption shall be decided by the Authority. Provide shutoff valves at points of interconnection to minimize downtime. Procedures incidental to the outage shall be prepared in advance to minimize downtime.

B. General: Coordinate interruption of existing services in writing at least 1 week in advance with the Design-Builder. Shutdown time and duration of services interruption shall be decided by the Authority. Provide shutoff valves at points of interconnection to minimize downtime. Procedures incidental to the outage shall be prepared in advance to minimize downtime.

C. Fire Safety in Existing facilities: Do not decrease the fire rating of walls, partitions, ceilings, floors, doors or combinations thereof in adjacent areas or means of egress. Do not interrupt fire sprinkling or life safety systems without prior coordination with the Design-Builder. Protection of Facilities: Portions of the building may be operational during construction. Maintain operation of the equipment and systems whenever the installation interfaces with existing equipment or systems. Provide protection for the building, its contents and occupants wherever installation under the contract is performed. As necessary, move, store, and protect furniture, office fixtures and carpets. Provide acoustical isolation of the work area with temporary doors, partitions, etc., to allow normal work functions. Provide exhaust fans, temporary dust barrier partitions and any containment measures required to prevent dirt, dust or fumes from reaching adjacent occupied spaces as required by the Authority or Design-Builder. Access to the building, including exit stairs, doors and passageways, and loading dock and other delivery areas shall be kept open and continuously accessible to the occupants. Workmen shall be confined to those areas directly involved in the project installation, and only during time periods indicated and approved by the Authority.

3.10 LAYOUT OF EXISTING EQUIPMENT

A. General: Existing equipment, piping, ductwork, etc., as indicated on the drawings have, for the most part, been provided to the Design-Builder through existing drawings. The layouts shown may not be from as-built drawings and may be from partial copies of original design documents not produced by the Architect. The Architect is not responsible for the accuracy nor completeness of the existing installation and all layouts are shown for reference only. It is to be understood that unforeseen conditions probably exist and that existing and new work may not be field located exactly as shown on the drawings. Verify existing conditions in the field and notify the Design-Builder of any deviations required to install the work as shown. Coordinate new work with existing equipment, including removing, relocating, rerouting, extending with new materials, and reinstall existing piping, ductwork, conduits, wiring, tubing, supports and other equipment. The Design-Builder shall make the final decision on all deviations or modifications required by the existing conditions.

3.11 AUTHORITYSHIP OF REMOVED EQUIPMENT

A. General: Construction materials and items of mechanical and electrical equipment which are removed and not reused shall be removed from the job-site unless indicated as to be retained for the Authority. Include rigging, removal and hauling cost, as well as any salvage value, in the contract.

3.12 CLEAN-UP

A. General: Debris and rubbish shall not be disposed into the Authority's containers.

END OF SECTION 230010

ACCEPTANCE TESTING CHECKLIST		
1. AIR HANDLING UNIT # _____	OK	N/A
FANS AND CASING SECTIONS:		
1. Spring isolators installed and not bottomed out.		
2. Motor rotation correct and free fan wheel rotation.		
3. Motor belts aligned and properly tensioned.		
4. Proper starter/VFD installed and labeled.		
5. Bearing races secured tight to fan shaft.		
6. Bearing grease cert fitting accessible and lubricated.		
7. All bolts, fasteners, and set screws checked & tightened.		
8. At full speed, fans have no unusual noise or vibration.		
9. All safety guards are properly installed.		
10. Access doors close tightly, door gaskets installed.		
11. Casing/duct sealed with proper sealant.		
12. Proper insulation installed on casing and duct, and joints sealed.		
13. No evidence of air escaping unit or insulation ballooning w/fans on.		
14. No evidence of negative machine room pressure with fans operating.		
15. Fan air volume measuring device installed.		
16. Duct static pressure control sensor installed at proper location.		
17. Duct safety static pressure sensor installed at proper location.		
18. Flex connection at fan discharge installed.		
19. Condensate drain trapped properly and run to floor drain.		
20. Manufacturer's required clearances for unit/components maintained.		
21. Dampers/actuators properly installed & close tightly.		
22. Damper linkage checked for binding, min. play & right blades.		
23. Required maintenance clearances maintained.		
24. Filters installed tightly and checked for no bypass.		
25. Metal spacers installed in filter rack.		

26. Filter manometers installed and calibrated.		
27. Air Handler control system operational.		

Air Handling Unit Comments:

Approvals:

Mech. Contractor Signature Date

GC PM/Sys. Engineer Signature Date

SECTION 230513 – COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general requirements for single-phase and poly-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.

B. Comply with NEMA MG 1 unless otherwise indicated.

C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Energy efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Rotor: Random-wound, squirrel cage.

F. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

G. Temperature Rise: Match insulation rating.

H. Insulation: Class F.

I. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

SECTION 230529 – HANGERS AND SUPPORT FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Equipment supports.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 23 Section "Hydronic Piping" for hanger sizes.
3. Division 23 Section(s) "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7 .

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 ACTION SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
2. Metal framing systems.
3. Fiberglass strut systems.
4. Pipe stands.
5. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.6 SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel .

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel or stainless steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
2. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:

    a. Cooper B-Line, Inc.
    b. Flex-Strut Inc.
    c. GS Metals Corp.
    d. Thomas & Betts Corporation.
    e. Unistrut Corporation; Tyco International, Ltd.

3. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
4. Standard: MFMA-4.
5. Channels: Continuous slotted steel channel with inturned lips.
6. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
7. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel .
8. Metallic Coating: Hot-dipped galvanized .

2.4 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.6 PIPE STANDS

A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

C. High-Type, Single-Pipe Stand:

1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
2. Base: Stainless steel.
3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

D. High-Type, Multiple-Pipe Stand:

1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
2. Bases: One or more; plastic.
3. Vertical Members: Two or more protective-coated-steel channels.
4. Horizontal Member: Protective-coated-steel channel.
5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.

2.7 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Division 07 Section "Roof Accessories" for curbs.

G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

J. Install lateral bracing with pipe hangers and supports to prevent swaying.

K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

1. Central Utility Plant: Piping hung from the structure, shall be supported at every horizontal member it crosses. Where hangers fall between support beams, the load must be trapeze across to spread the load equally. No exceptions.

2. Utility Corridor and 71’ Level: Piping shall be supported by pipe stands on the intervals shown and coordinated with structural.

M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

N. Insulated Piping:

1. Attach clamps and spacers to piping.

   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
b. NPS 4 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

Space / Location	(Hanger Material)
Mechanical Spaces / Indoors	(Carbon Steel)
Cooling Tower – Attachments / Outdoors	(Stainless Steel – hangers and attachment bolts)
Exterior – Garages / Baggage	(Electroplated Steel)

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and metal framing systems and attachments for general service applications.

F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.

G. Use copper-plated pipe hangers and or stainless-steel attachments for copper piping and tubing.

H. Use padded hangers for piping that is subject to scratching.

I. Use thermal-hanger shield inserts for insulated piping and tubing.

J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 (DN 65 to DN 900) if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
3. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
4. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.
5. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
6. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 (DN 50 to DN 600) if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.

K. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 (DN 50 to DN 750) if vertical and lateral adjustment during installation might be required in addition to expansion and contraction. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 230529

SECTION 230548 – VIBRATION CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. General: Provide vibration hangers and isolation supports for equipment and piping as required to prevent transmission of vibration and structure-borne noise to building structure.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device type required.

B. Shop Drawings:

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For each vibration isolation device.

1. Include design calculations for selecting vibration isolators and for designing vibration isolation bases.

D. Coordination Drawings: Show coordination of vibration isolation device installation for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.

E. Qualification Data: For testing agency.

F. Welding certificates.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For restrained-spring mounts to include in operation and maintenance manuals.

1.5 APPROVED MANUFACTURERS

A. The vibration control equipment in this Section is based upon the products of Mason Industries, Inc., other acceptable manufacturers are as listed per product type.

PART 2 - PRODUCTS

2.1 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads: (TYPE A)
   1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
      a. Ace Mountings Co., Inc.
      b. Kinetics Noise Control, Inc.
      c. Mason Industries, Inc. – Type NK
      d. Vibration Isolation.
   2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area. Sandwich cork with two layers of neoprene waffle.
   3. Size: Factory or field cut to match requirements of supported equipment.
   4. Pad Material: Oil and water resistant with elastomeric properties.
   5. Surface Pattern: Waffle pattern.
   6. Minimum ½ inch thickness.
   7. Load-bearing metal plates adhered to pads.

2.2 ELASTOMERIC ISOLATION MOUNTS

A. Double-Deflection, Elastomeric Isolation Mounts: (TYPE B)
   1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
      a. Amber-Booth
      b. Kinetics Noise Control, Inc.
      c. Mason Industries, Inc. – Type ND.
      d. Vibro-Acoustics
   2. Mounting Plates:
      a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.

b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.

3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.3 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

A. Restrained Elastomeric Isolation Mounts: (TYPE C)

1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
   a. Amber-Booth
   b. Kinetics Noise Control, Inc.
   c. Mason Industries, Inc.- Type BR
   d. Vibro-Acoustics

2. Description: All-directional isolator with restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.

   a. Housing: Cast-ductile iron or welded steel.
   b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.4 OPEN-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators: (TYPE D)

1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
   a. Amber-Booth
   b. Kinetics Noise Control, Inc.
   c. Mason Industries, Inc. – Type SLF
   d. Vibro-Acoustics

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Baseplates: Factory-drilled steel plate for bolting to structure with an elastomeric isolator pad attached to the underside. Baseplates shall limit floor load to 500 psig (3447 kPa).
7. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

2.5 HOUSED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing: (TYPE E)

1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings comparable product by one of the following:
    a. Amber-Booth
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc. – Type C
    d. Vibro-Acoustics

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.

    a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
    b. Top housing with attachment and leveling bolt.

2.6 RESTRAINED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint: (TYPE F)

1. Manufacturer: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
    a. Amber-Booth
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc. – Type SLR
    d. Vibro-Acoustics

2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.

    a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
    b. Top plate with threaded mounting holes.
    c. Internal leveling bolt that acts as blocking during installation.

3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
6. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.7 VIBRATION ISOLATION EQUIPMENT BASES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Kinetics Noise Control.
   2. Mason Industries, Inc. – Type BMK
   3. Vibro-Acoustics

B. Concrete Inertia Base: Factory-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete. (TYPE L)

   1. Design Requirements: Lowest possible mounting height with not less than 1-inch (25-mm) clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.

      a. Include supports for suction and discharge elbows for pumps.

   2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
   3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
   4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

2.8 FLEXIBLE PIPE CONNECTORS AND GUIDES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Proco
   2. Mason Industries, Inc.
   3. Amber Booth

B. (TYPE M) Flexible Pipe Connector at AHU: Flexible stainless steel hose constructed of stainless steel braid and carbon steel fittings. Connections: Male threaded ends for piping 2-1/2 inches and smaller and flanged ends for piping 3 inches and larger. Lengths as recommended by manufacturer. Mason Industries, Inc. – Type FFLSS

C. (TYPE N) Non-ferrous single arch expansion joint connector fabricated of multiple plies of nylon cord, fabric and neoprene; furnished with metallic flanges which are independent of the casing and retained by beaded ends which fit into machined grooves, forming a liquid tight seal without gasketing. Provide bolted stabilizing/control rods to maintain anchoring where required, due to size or operating pressure. Mason Industries, Inc. – Type SFEJ

D. (TYPE O) Non-ferrous twin arch expansion joint connector fabricated of multiple plies of nylon cord, fabric and neoprene; furnished with metallic flanges which are independent of the casing and retained by beaded ends which fit into machined grooves, forming a liquid tight seal without gasketing. Provide bolted stabilizing/control rods to maintain anchoring where required, due to size or operating pressure. Mason Industries, Inc. – Type SFDEJ

E. (TYPE P) Pipe Guide: stainless steel wrapping the carbon steel foot where it passes through horizontal U guides similarly lined to prevent corrosion. The baseplate shall have multiple holes for bolting to beam flanges or flat surfaces. Bases may be welded in position in lieu of bolting. Height must be adjustable to accept different thicknesses of insulation. Guides shall be professionally load rated for bottom, overhead, side mounted or riser positioning to provide both load bearing and guiding capabilities. Mason Industries, Inc. – Type ASG

F. (TYPE Q) Pipe Guide: Spider type, using stainless steel ring and mounting plate, with a pipe ring and guide shield sized to accept the pipe insulation thickness. Mason Industries Type SPG

G. (TYPE R) Pipe Anchor: All directional acoustical pipe anchor, consisting of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2 inch thickness of heavy duty neoprene and duck or neoprene isolation material. Vertical restraints provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolator material not to exceed 500 PSI and the design balanced for equal resistance in any direction. Mason Industries Type ADA.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GENERAL

A. Installation: Isolators shall be installed in strict accordance with the manufacturer's instructions and shall be adjusted prior to requesting final inspection or the performance of any vibration testing specified. If, in the opinion of the Architect, objectionable noise or vibration is produced or transmitted, necessary changes or additions shall be performed to eliminate the noise and vibration without additional cost to the Owner.

B. Corrosion Protection: Steel components shall be phosphated and painted. All nuts, bolts and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc-chromate or metal etching primer.

C. Weather Protection: All isolators exposed to weather shall have steel parts PVC coated, neoprene coated or hot-dip galvanized. Aluminum components shall be etched and painted. Nuts, bolts and washers shall be zinc-electroplated.

D. Positioning: Each item of equipment (machinery, piping, etc.), which is required to have vibration isolation equipment, shall rest in its intended, operating position (i.e.; exactly level, etc.) after installation of vibration isolation equipment. Acceptance of such vibration isolation equipment by the Architect shall not constitute a waiver of this responsibility.

E. Pads: Rotating or vibrating equipment that is specified to rest on concrete housekeeping pads shall have minimum 5/16 inch thick isolation pads unless otherwise indicated. Loading shall not exceed manufacturer's recommended rating.

F. Cleaning: Prior to start-up, clean out all foreign matter between isolators or bases and equipment and verify there are no isolation short-circuits in the installation.

3.3 PIPING IN MECHANICAL EQUIPMENT AND AIR HANDLING UNIT ROOMS

A. General:

1. Isolators for equipment and piping are described elsewhere in this division. The vibration isolation manufacturer shall coordinate the selection of piping supports with equipment supports to provide a carefully engineered system designed to accommodate expansion and contraction without excessive stress or misalignment at equipment connections or in the piping.
2. Temporary anchors, where required, shall be installed to permit pre-adjustment of springs in risers.
3. Permanent limit stops shall be installed to prevent excessive vertical motion of risers in the event water is drained from system. Locations and other details of these limit stops shall be submitted to the Architect for acceptance.
4. Piping connected to vibration isolated equipment shall not strain or force out of alignment the vibration isolators supporting the basic equipment, nor shall pipes restrict such equipment from "floating" freely on its respective vibration isolation system.
5. Piping connected to vibrating equipment shall not physically contact any building construction or non-isolated systems or components.
6. The weight of the pipe shall not be carried by walls through which the pipe passes.

B. At Equipment Connections:

1. At the pump outlet, provide isolator TYPE N.

3.4 VIBRATION CONTROL DEVICE INSTALLATION

A. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

3.5 VIBRATION ISOLATION SCHEDULE

A. Provide mechanical equipment with vibration isolation according to the following schedule:

EQUIPMENT	ISOLATOR TYPE
Base mounted pumps	L
Air handling units - suspended	K
Air handling units – floor mounted	-
Fans - Suspended	K
Fans – Roof mounted (utility type)	E
Chiller	A

B. Provide the following piping systems with vibration isolation according to PART 3 of this Section:

1. Chilled Water Piping

END OF SECTION 230548

SECTION 230553 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections include the following:

1. Section 230719 "HVAC Piping Insulation" for requirements that relate to pipe jacket colors.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Duct labels.
5. Stencils.
6. Valve tags.
7. Warning tags.
8. Detectable Underground Warning Tape and Markers

1.3 SUBMITTALS

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

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch (0.8-mm), Stainless steel, 0.025-inch (0.64-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: White
3. Background Color: Black
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: White

C. Background Color: Red

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

E. Exterior Pipe, Underground: Place a color-coded 6 inch wide, 0.004 inch thick polyethylene printed identification tape directly above all underground piping systems. The tapes shall be located approximately 12 inches below finish grade. Each tape shall be continuously printed with the words "CAUTION" in large bold lettering, and with the type of service piping also indicated.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches (32 mm) for ducts; and minimum letter height of 3/4 inch (19 mm) for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Aluminum, Brass, Fiberboard or metal.
2. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel (as appropriate for the material being painted), black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm) , Stainless steel, 0.025-inch (0.64-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.6 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches (75 by 133 mm) minimum Approximately 4 by 7 inches (100 by 178 mm).
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; accessible maintenance spaces such as plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) Insert dimension in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
8. Underground Pipe Markers:

    a. Chilled-Water Piping: Provide at welded joints and utility crossings.

B. Pipe Label Color Schedule:

1. Chilled-Water Piping:

    a. Background Color.....Green
    b. Letter Color .....White

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape.....1-1/2 inches (38 mm), round.
2. Valve-Tag Color:.....Natural Metal
3. Letter Color:.....Black or Stamped

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

SECTION 230593 – TESTING, ADJUSTING, AND BALANCE FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-air-volume systems.

1.3 SCOPE OF WORK

A. This project consists of the replacement of the four (4) roof top air handlers, serving the long term parking garage elevator penthouses (Lindberg, Wright Brothers, Jannus, and Goddard), with new DX split system heat pump units.

B. Scope Includes:
1. Split system air handlers.

1.4 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.5 SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.6 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC NEBB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.

B. TAB Conference: Meet with Architect Owner, Construction Manager or Commissioning Authority on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Architect .

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.7 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.8 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in

AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

L. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

M. Examine system pumps to ensure absence of entrained air in the suction piping.

N. Examine operating safety interlocks and controls on HVAC equipment.

O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's

"Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 23 Section "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
   1. Measure total airflow.
      a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
   2. Measure fan static pressures as follows to determine actual static pressure:
      a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
      b. Measure static pressure directly at the fan outlet or through the flexible connection.
      c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
      d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
   3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
      a. Report the cleanliness status of filters and the time static pressures are measured.
   4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
   5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
   6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
   7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
   1. Measure airflow of submain and branch ducts.
      a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
   2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.7 PROCEDURES FOR BOILERS

A. Hydronic Boilers: Measure and record entering- and leaving-water temperatures and water flow.

3.8 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.
2. Water flow rate.
3. Water pressure drop.
4. Dry-bulb temperature of entering and leaving air.
5. Wet-bulb temperature of entering and leaving air for cooling coils.
6. Airflow.
7. Air pressure drop.

B. Measure, adjust, and record the following data for each electric heating coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

C. Measure, adjust, and record the following data for each steam coil:

1. Dry-bulb temperature of entering and leaving air.
2. Airflow.
3. Air pressure drop.
4. Inlet steam pressure.

D. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.9 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the refrigerant charge.
4. Check the condition of filters.
5. Check the condition of coils.
6. Check the operation of the drain pan and condensate-drain trap.
7. Check bearings and other lubricated parts for proper lubrication.
8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.10 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.
4. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.11 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.12 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.

3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.

7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches, and bore.
i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Preheat-coil static-pressure differential in inches wg.
g. Cooling-coil static-pressure differential in inches wg.
h. Heating-coil static-pressure differential in inches wg.
i. Outdoor airflow in cfm.
j. Return airflow in cfm.
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.

c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft..
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Water flow rate in gpm.
i. Water pressure differential in feet of head or psig.
j. Entering-water temperature in deg F.
k. Leaving-water temperature in deg F.
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig.
n. Refrigerant suction temperature in deg F.
o. Inlet steam pressure in psig.

G. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft..
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

I. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.

g. Space temperature in deg F.

J. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Entering-water temperature in deg F.
c. Leaving-water temperature in deg F.
d. Water pressure drop in feet of head or psig.
e. Entering-air temperature in deg F.
f. Leaving-air temperature in deg F.

K. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and size.
e. Model number and serial number.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.
h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):

a. Static head in feet of head or psig.
b. Pump shutoff pressure in feet of head or psig.
c. Actual impeller size in inches.
d. Full-open flow rate in gpm.

e. Full-open pressure in feet of head or psig.
f. Final discharge pressure in feet of head or psig.
g. Final suction pressure in feet of head or psig.
h. Final total pressure in feet of head or psig.
i. Final water flow rate in gpm.
j. Voltage at each connection.
k. Amperage for each phase.

L. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.13 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 25 percent of air outlets.
b. Measure water flow of at least 10 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect Construction Manager and or .
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Architect, Construction Manager, Owner, and or Commissioning Authority.
3. Architect or Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.14 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

C. The TAB shall provide a technician to support the commissioning of the project with rechecks of air and or water flow, pressure tests of duct high pressure limits, smoke detectors, coil and filter pressure drop signals, terminal air flow and space temperature, humidity and CO2 sensor verification of calibration on up to not less than 25% (or higher if the Cx A sampling is specified to be higher) of the VAV terminal, temperature control zones.

END OF SECTION 230593

SECTION 230713 – DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed return located in unconditioned space.
3. Indoor, concealed exhaust between isolation damper and penetration of building exterior.

B. Related Sections:

1. Section 230719 "HVAC Piping Insulation."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Sheet Form Insulation Materials: 12 inches (300 mm) square.
2. Sheet Jacket Materials: 12 inches (300 mm) square.
3. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

D. Qualification Data: For qualified Installer.

E. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

F. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Architect. Use materials indicated for the completed Work.

1. Ductwork Mockups:

    a. One 10-foot (3-m) section each of rectangular and round straight duct.
    b. One each of a 90-degree mitered round and rectangular elbow, and one each of a 90-degree radius round and rectangular elbow.
    c. One rectangular branch takeoff and one round branch takeoff from a rectangular duct. One round tee fitting.
    d. One rectangular and round transition fitting.
    e. Four support hangers for round and rectangular ductwork.
    f. Each type of damper and specialty.

2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Obtain Architect's approval of mockups before starting insulation application.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Aeroflex USA, Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.

H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; Commercial Board.
b. Fibrex Insulations Inc.; FBX.
c. Johns Manville; 800 Series Spin-Glas.
d. Knauf Insulation; Insulation Board.
e. Manson Insulation Inc.; AK Board.
f. Owens Corning; Fiberglas 700 Series.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. ASJ Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm (0.03 metric perm) at 35-mil (0.9-mm) dry film thickness.
2. Service Temperature Range: 0 to 180 deg F (Minus 18 to plus 82 deg C).
3. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
4. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
2. Service Temperature Range: 0 to plus 180 deg F (Minus 18 to plus 82 deg C).
3. Color: White.

2.5 SEALANTS

A. ASJ Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
4. Color: White.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches (75 mm).
2. Thickness: 11.5 mils (0.29 mm).
3. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.7 SECUREMENTS

A. Bands:

1. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 1/2 inch (13 mm) wide with wing seal or closed seal.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, diameter shank, length to suit depth of insulation indicated.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Duct liner not permitted.

B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

C. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

E. Install insulation with longitudinal seams at top and bottom of horizontal runs.

F. Install multiple layers of insulation with longitudinal and end seams staggered.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).

1. Comply with requirements in Section 078413 "Penetration Firestopping and fire-resistive joint sealers.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.

2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

3.7 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.

2. Indoor, exposed return located in unconditioned space.
3. Indoor, concealed exhaust between isolation damper and penetration of building exterior.

B. Items Not Insulated:

1. Factory-insulated flexible ducts.
2. Factory-insulated plenums and casings.
3. Flexible connectors.
4. Vibration-control devices.
5. Factory-insulated access panels and doors.

3.8 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, round and flat-oval, supply and return-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

B. Concealed, rectangular, supply and return -air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

C. Concealed, rectangular, outdoor-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

D. Concealed, supply and return -air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

E. Exposed in Mechanical Rooms, round and flat-oval, supply and return -air duct insulation shall be the following:

1. Mineral-Fiber Blanket: 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

F. Exposed in Mechanical Rooms, rectangular, supply and return -air duct insulation shall be the following:

1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

G. Exposed in Mechanical Rooms, rectangular, outdoor-air duct insulation shall be the following:

1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

H. Exposed in Mechanical Rooms, rectangular, exhaust-air duct insulation shall be the following:

1. None

I. Exposed in Mechanical Rooms, outdoor-air plenum insulation shall be the following:

1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

J. Exposed in Mechanical Rooms, exhaust-air plenum insulation shall be the following:

1. None

END OF SECTION 230713

SECTION 230719 – HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes insulating the following HVAC piping systems:

1. Condensate drainage piping, indoors.

2. Condensate drainage piping, outdoors.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," and "Indoor Piping Insulation Schedule," articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
   1. Products: Subject to compliance with requirements, provide the following :
      a. Aeroflex USA, Inc.; Aerocel.
      b. Armacell LLC; AP Armaflex.
      c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
   1. Products: Subject to compliance with requirements, provide the following :
      a. Aeroflex USA, Inc.; Aeroseal.
      b. Armacell LLC; Armaflex 520 Adhesive.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
      d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide the following :

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
   b. Eagle Bridges - Marathon Industries; 225.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
   d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

4. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
5. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide the following :

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
   b. Eagle Bridges - Marathon Industries; 405.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F.
5. Color: White or gray.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Metal Jacketing and Sealants:

1. Products: Subject to compliance with requirements, provide the following :

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
b. Eagle Bridges - Marathon Industries; 405.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Flashing Sealants:

1. Products: Subject to compliance with requirements, provide the following :

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. Metal Jacket:

1. Products: Subject to compliance with requirements, provide the following :

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
b. ITW Insulation Systems; Aluminum Jacketing.
c. RPR Products, Inc.; Insul-Mate..

C. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

a. Factory cut and rolled to size.
b. Finish and thickness are indicated in field-applied jacket schedules.
c. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
d. Factory-Fabricated Fitting Covers:

1) Same material, finish, and thickness as jacket.
2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3) Tee covers.
4) Flange and union covers.
5) End caps.
6) Beveled collars.
7) Valve covers.
8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.5 TAPES

A. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide the following :

a. ABI, Ideal Tape Division; 488 AWF.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
c. Compac Corporation; 120.
d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.6 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide the following :

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs..

2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation,

install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation..

B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and screw at end joints.

3.9 FINISHES

A. Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color per Owner Standards. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum jackets.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Condensate drainage piping

3.11 INDOOR, ABOVE GROUND PIPING INSULATION SCHEDULE

A. Condensate Drainage:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Flexible Elastomeric: 1 inch thick.

3.12 OUTDOOR, ABOVE GROUND PIPING INSULATION SCHEDULE

A. Outdoor areas shall include un-conditioned piping pathways that are subject to ambient temperatures and humidity. This includes, but is not limited to: Bridge to Long Term Garage mechanical room, and piping mounted below drive aisle ceilings.

B. Condensate Drainage:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Flexible Elastomeric: 3 inches thick.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed to the elements and ambient conditions: Exterior Roof.

1. Aluminum, Smooth: 0.024 inch thick.

END OF SECTION 230719

SECTION 232300 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-22:

1. Suction Lines for Air-Conditioning Applications: 185 psig.
2. Suction Lines for Heat-Pump Applications: 325 psig.
3. Hot-Gas and Liquid Lines: 325 psig.

B. Line Test Pressure for Refrigerant R-134a:

1. Suction Lines for Air-Conditioning Applications: 115 psig.
2. Suction Lines for Heat-Pump Applications: 225 psig.
3. Hot-Gas and Liquid Lines: 225 psig.

C. Line Test Pressure for Refrigerant R-407C:

1. Suction Lines for Air-Conditioning Applications: 230 psig.
2. Suction Lines for Heat-Pump Applications: 380 psig.
3. Hot-Gas and Liquid Lines: 380 psig.

D. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig.
2. Suction Lines for Heat-Pump Applications: 535 psig.
3. Hot-Gas and Liquid Lines: 535 psig.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Thermostatic expansion valves.

2. Solenoid valves.
3. Hot-gas bypass valves.
4. Filter dryers.
5. Strainers.
6. Pressure-regulating valves.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Shop Drawing Scale: 1/4 inch equals 1 foot.
2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.8 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.9 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type K or L.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; Type, Grade, and wall thickness as selected in Part 3 piping applications articles.

B. Wrought-Steel Fittings: ASTM A 234/A 234M, for welded joints.

C. Steel Flanges and Flanged Fittings: ASME B16.5, steel, including bolts, nuts, and gaskets, bevel-welded end connection, and raised face.

D. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

E. Flanged Unions:

1. Body: Forged-steel flanges for NPS 1 to NPS 1-1/2 and ductile iron for NPS 2 to NPS 3. Apply rust-resistant finish at factory.

2. Gasket: Fiber asbestos free.
3. Fasteners: Four plated-steel bolts, with silicon bronze nuts. Apply rust-resistant finish at factory.
4. End Connections: Brass tailpiece adapters for solder-end connections to copper tubing.
5. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
6. Pressure Rating: Factory test at minimum 400 psig.
7. Maximum Operating Temperature: 330 deg F.

F. Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, stainless-steel-wire-reinforced protective jacket
2. End Connections:

   a. NPS 2 and Smaller: With threaded-end connections.
   b. NPS 2-1/2 and Larger: With flanged-end connections.

3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.3 VALVES AND SPECIALTIES

A. Diaphragm Packless Valves:

1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
3. Operator: Rising stem and hand wheel.
4. Seat: Nylon.
5. End Connections: Socket, union, or flanged.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

B. Packed-Angle Valves:

1. Body and Bonnet: Forged brass or cast bronze.
2. Packing: Molded stem, back seating, and replaceable under pressure.
3. Operator: Rising stem.
4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
5. Seal Cap: Forged-brass or valox hex cap.
6. End Connections: Socket, union, threaded, or flanged.
7. Working Pressure Rating: 500 psig.
8. Maximum Operating Temperature: 275 deg F.

C. Check Valves:

1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
3. Piston: Removable polytetrafluoroethylene seat.
4. Closing Spring: Stainless steel.
5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
6. End Connections: Socket, union, threaded, or flanged.
7. Maximum Opening Pressure: 0.50 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 275 deg F.

D. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

E. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.

1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24-V ac coil.
6. Working Pressure Rating: 400 psig.
7. Maximum Operating Temperature: 240 deg F.
8. Manual operator.

F. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.

1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
2. Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Seat Disc: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Working Pressure Rating: 400 psig.
6. Maximum Operating Temperature: 240 deg F.

G. Thermostatic Expansion Valves: Comply with ARI 750.

1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F.
6. Superheat: Adjustable.
7. Reverse-flow option (for heat-pump applications).

8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 700 psig.

H. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig.
5. Maximum Operating Temperature: 275 deg F.

I. Angle-Type Strainers:

1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig.
6. Maximum Operating Temperature: 275 deg F.

J. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

K. Replaceable-Core Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Rated Flow: Refer to manufacturer's recommendations
9. Working Pressure Rating: 500 psig.
10. Maximum Operating Temperature: 240 deg F.

L. Permanent Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell.

2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Rated Flow: Refer to manufacturer's recommendations.
9. Working Pressure Rating: 500 psig.
10. Maximum Operating Temperature: 240 deg F.

M. Mufflers:

1. Body: Welded steel with corrosion-resistant coating.
2. End Connections: Socket or flare.
3. Working Pressure Rating: 500 psig.
4. Maximum Operating Temperature: 275 deg F.

N. Receivers: Comply with ARI 495.

1. Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
2. Comply with UL 207; listed and labeled by an NRTL.
3. Body: Welded steel with corrosion-resistant coating.
4. Tappings: Inlet, outlet, liquid level indicator, and safety relief valve.
5. End Connections: Socket or threaded.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

O. Liquid Accumulators: Comply with ARI 495.

1. Body: Welded steel with corrosion-resistant coating.
2. End Connections: Socket or threaded.
3. Working Pressure Rating: 500 psig.
4. Maximum Operating Temperature: 275 deg F.

2.4 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.
5.

C. ASHRAE 34, R-134a: Tetrafluoroethane.

D. ASHRAE 34, R-407C: Difluoromethane/Pentafluoroethane/1,1,1,2-Tetrafluoroethane.

E. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Suction Lines NPS 2 to NPS 3-1/2 for Conventional Air-Conditioning Applications: Copper, Type L, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Suction Lines NPS 4 and Smaller for Conventional Air-Conditioning Applications: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with soldered joints.

D. Hot-Gas and Liquid Lines: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

E. Hot-Gas and Liquid Lines: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

F. Hot-Gas and Liquid Lines: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.

G. Hot-Gas and Liquid Lines: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.

H. Hot-Gas and Liquid Lines:

1. NPS 5/8 and Smaller: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 3/4 to NPS 1 and Smaller: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
3. NPS 1-1/4 and Smaller: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.
4. NPS 1-1/2 to NPS 2: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.

I. Hot-Gas and Liquid Lines NPS 2 to NPS 4: Schedule 40, black-steel and wrought-steel fittings with welded joints.

J. Safety-Relief-Valve Discharge Piping: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

K. Safety-Relief-Valve Discharge Piping: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

L. Safety-Relief-Valve Discharge Piping: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.

M. Safety-Relief-Valve Discharge Piping: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.

N. Safety-Relief-Valve Discharge Piping:

1. NPS 5/8 and Smaller: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 3/4 to NPS 1 and Smaller: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
3. NPS 1-1/4 and Smaller: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.
4. NPS 1-1/2 to NPS 2: Copper, Type K L, drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.

O. Safety-Relief-Valve Discharge Piping NPS 2 to NPS 4: Schedule 40, black-steel and wrought-steel fittings with welded joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

A. Install diaphragm packless valves in suction and discharge lines of compressor.

B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.

D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.

E. Install a full-sized, three-valve bypass around filter dryers.

F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.

G. Install thermostatic expansion valves as close as possible to distributors on evaporators.

1. Install valve so diaphragm case is warmer than bulb.
2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

H. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:

1. Solenoid valves.
2. Thermostatic expansion valves.
3. Hot-gas bypass valves.
4. Compressor.

K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.

L. Install receivers sized to accommodate pump-down charge.

M. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence of Operations for HVAC Controls" for solenoid valve controllers, control wiring, and sequence of operation.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Install refrigerant piping in protective conduit where installed belowground.

N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

S. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.4 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

F. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

H. Welded Joints: Construct joints according to AWS D10.12/D10.12M.

I. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
4. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
5. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
6. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
7. NPS 2-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
8. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.
9. NPS 4: Maximum span, 12 feet; minimum rod size, 1/2 inch.

D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.
2. NPS 2-1/2: Maximum span, 11 feet; minimum rod size, 3/8 inch.
3. NPS 3: Maximum span, 12 feet; minimum rod size, 3/8 inch.
4. NPS 4: Maximum span, 14 feet; minimum rod size, 1/2 inch.

E. Support multifloor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

a. Fill system with nitrogen to the required test pressure.
b. System shall maintain test pressure at the manifold gage throughout duration of test.
c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 00

SECTION 233113 – METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.

5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

B. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations for selecting hangers and supports.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Sprinklers.
e. Access panels.
f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Lindab Inc.
b. McGill AirFlow LLC.

c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM 525/A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel, stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
10. Products: Foster 32-19 (VOC: 24 g/l), Childers CP-146 (VOC:24 g/l), or approved equal.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.

8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
11. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
12. Service: Indoor or outdoor.
13. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
14. Products: Foster 32-14, Childers CP-140, or approved equal.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths. No mitered offsets permitted.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.[Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
3. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
4. Unconditioned Space, Exhaust Ducts: Seal Class C.
5. Unconditioned Space, Return-Air Ducts: Seal Class B.
6. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
7. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
8. Conditioned Space, Exhaust Ducts: Seal Class B.
9. Conditioned Space, Return-Air Ducts: Seal Class C.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.5 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

    a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, totaling no less than 25 percent of total installed duct area for each designated pressure class.
    b. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
    c. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.

d. Exhaust Ducts with a Pressure Class of 2-Inch or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
e. Outdoor Air Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.7 DUCT CLEANING

A. General: this section shall be used when existing systems in the Main Terminal are adjacent to construction areas, and air moving equipment is to remain active. Refer to Division 1 and 230100 specifications part 3.3 for protection of duct openings.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

B. Supply Ducts:

1. Ducts Connected to Constant-Volume Air-Handling Units:

a. Pressure Class: Positive 3-inch wg.
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 6.

2. Ducts Connected to Variable-Air-Volume Air-Handling Units:

   a. Pressure Class: Positive 4-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.

3. Ducts Connected to Equipment Not Listed Above:

   a. Pressure Class: Positive 2-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.

C. Return Ducts:

1. Ducts Connected to Air-Handling Units:

   a. Pressure Class: Positive or negative 3-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.

2. Ducts Connected to Equipment Not Listed Above:

   a. Pressure Class: Positive or negative 2-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1) Air:

   a. Pressure Class: Negative 2-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 12.

2. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 2) Air:

   a. Pressure Class: Negative 4-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 6.

3. Ducts Connected to Air-Handling Units:

   a. Pressure Class: Positive or negative 3-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 6.

4. Ducts Connected to Equipment Not Listed Above:

   a. Pressure Class: Positive or negative 3-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.

c. SMACNA Leakage Class for Rectangular: 6.

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.

a. Exposed to Airstream: Match duct material.
b. Not Exposed to Airstream: Match duct material.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

a. Velocity 1000 fpm or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm:

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

c. Velocity 1500 fpm or Higher:

1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."

    a. Rectangular Main to Rectangular Branch: 45-degree entry.
    b. Rectangular Main to Round Branch: Spin in.

END OF SECTION 233113

SECTION 233300 – AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Fire dampers.
3. Smoke dampers.
4. Combination fire and smoke dampers.
5. Manual volume dampers.
6. Control dampers.
7. Flange connectors.
8. Turning vanes.
9. Remote damper operators.
10. Duct-mounted access doors.
11. Flexible connectors.
12. Flexible ducts.
13. Duct-mounted Hydronic Coils

B. Related Requirements:

1. Section 283111 "Digital, Addressable Fire-Alarm System" for duct-mounted fire and smoke detectors.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Control-damper installations.

d. Wiring Diagrams: For power, signal, and control wiring.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

D. Source quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90 (Z275).
2. Exposed-Surface Finish: Mill phosphatized.

B. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and for exposed ducts.

C. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

D. Extruded Aluminum: Comply with ASTM B 221 (ASTM B 221M), Alloy 6063, Temper T6.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.3 BACKDRAFT DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Air Balance, Inc.
2. Greenheck
3. Nailor
4. Penn
5. Ruskin
6. Young Regulator Co.

B. Description: Gravity balanced.

C. Maximum Air Velocity: 1000 fpm (5.1 m/s).

D. Maximum System Pressure: 2-inch wg (0.5 kPa).

E. Frame: Hat-shaped, 0.063-inch- (1.6-mm-) thick extruded aluminum, with welded corners or mechanically attached and mounting flange.

F. Blades: Multiple single-piece blades, end pivoted, maximum 6-inch (150-mm) width, 0.050-inch- (1.2-mm-) thick aluminum sheet with sealed edges.

G. Blade Action: Parallel.

H. Blade Seals: Neoprene, mechanically locked.

I. Blade Axles:

1. Material: Stainless steel.
2. Diameter: 0.20 inch (5 mm).

J. Tie Bars and Brackets: Aluminum.

K. Return Spring: Adjustable tension.

L. Bearings: Steel ball.

M. Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Screen Mounting: Front mounted in sleeve.
    a. Sleeve Thickness: 20 gage (1.0 mm) minimum.
    b. Sleeve Length: 6 inches (152 mm) minimum.
3. Screen Material: Aluminum.
4. Screen Type: Bird.
5. 90-degree stops.

2.4 SMOKE DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Air Balance, Inc.
2. Greenheck
3. Nailor
4. Penn
5. Ruskin
6. Young Regulator Co.

B. General Requirements: Label according to UL 555S by an NRTL.

C. Smoke Detector: Integral, factory wired for single-point connection.

D. Frame: Hat-shaped, 0.094-inch- (2.4-mm-) thick, galvanized sheet steel, with welded corners and mounting flange.

E. Blades: Roll-formed, horizontal, interlocking, 0.063-inch- (1.6-mm) thick, galvanized sheet steel.

F. Leakage: Class II.

G. Rated pressure and velocity to exceed design airflow conditions.

H. Mounting Sleeve: Factory-installed, 0.05-inch- (1.3-mm-) thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking.

I. Damper Motors: two-position action.

J. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Section 230900 "Instrumentation and Control for HVAC."
3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F (minus 40 deg C).
6. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
7. Electrical Connection: 115 V, single phase, 60 Hz.

K. Accessories:

1. Auxiliary switches for position indication.
2. Momentary test switch, remote mounted.

2.5 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Air Balance, Inc.
2. Greenheck
3. Nailor
4. Penn
5. Ruskin
6. Young Regulator Co.

B. Type: Dynamic; rated and labeled according to UL 555 and UL 555S by an NRTL.

C. Closing rating in ducts up to 4-inch wg (1-kPa) static pressure class and minimum 2000-fpm (10-m/s) velocity.

D. Fire Rating: 1-1/2 and 3 hours.

E. Frame: Hat-shaped, 0.094-inch- (2.4-mm-) thick, galvanized sheet steel, with welded corners and mounting flange.

F. Heat-Responsive Device: Electric resettable device and switch package, factory installed, rated.

G. Smoke Detector: Integral, factory wired for single-point connection.

H. Blades: Roll-formed, horizontal, interlocking, 0.063-inch- (1.6-mm-) thick, galvanized sheet steel.

I. Leakage: Class II.

J. Rated pressure and velocity to exceed design airflow conditions.

K. Mounting Sleeve: Factory-installed, 0.05-inch- (1.3-mm-) thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking.

L. Master control panel for use in dynamic smoke-management systems.

M. Damper Motors: two-position action.

N. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Section 230900 "Instrumentation and Control for HVAC."
3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F (minus 40 deg C).
6. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
7. Electrical Connection: 115 V, single phase, 60 Hz.

O. Accessories:

1. Auxiliary switches for position indication.
2. Momentary test switch, remote mounted.

2.6 MANUAL VOLUME DAMPERS

A. Standard, Aluminum, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Air Balance, Inc.
    b. Greenheck
    c. Nailor
    d. Penn
    e. Ruskin
    f. Young Regulator Co.

2. Standard leakage rating, with linkage outside airstream.
3. Suitable for horizontal or vertical applications.
4. Frames: Hat-shaped, 0.10-inch- (2.5-mm-) thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:

    a. Multiple or single blade.
    b. Parallel- or opposed-blade design.
    c. Stiffen damper blades for stability.
    d. Roll-Formed Aluminum Blades: 0.10-inch- (2.5-mm-) thick aluminum sheet.
    e. Extruded-Aluminum Blades: 0.050-inch- (1.2-mm-) thick extruded aluminum.

6. Blade Axles: Stainless steel.
7. Bearings:

    a. Stainless-steel sleeve.
    b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Tie Bars and Brackets: Aluminum.

B. Low-Leakage, Aluminum, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Air Balance, Inc.
    b. Greenheck
    c. Nailor
    d. Penn
    e. Ruskin
    f. Young Regulator Co.

2. Comply with AMCA 500-D testing for damper rating.
3. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
4. Suitable for horizontal or vertical applications.
5. Frames: U-shaped, 0.10-inch- (2.5-mm-) thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
6. Blades:

    a. Multiple or single blade.
    b. Parallel- or opposed-blade design.
    c. Roll-Formed Aluminum Blades: 0.10-inch- (2.5-mm-) thick aluminum sheet.
    d. Extruded-Aluminum Blades: 0.050-inch- (1.2-mm-) thick extruded aluminum.

7. Blade Axles: Stainless steel.
8. Bearings:
    a. Stainless-steel sleeve.
    b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

9. Blade Seals: Neoprene.
10. Jamb Seals: Cambered stainless steel.
11. Tie Bars and Brackets: Aluminum.
12. Accessories:

    a. Include locking device to hold single-blade dampers in a fixed position without vibration.

C. Jackshaft:

1. Size: 1-inch (25-mm) diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

D. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.7 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Air Balance, Inc.
2. Greenheck
3. Nailor
4. Penn
5. Ruskin

B. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

C. Frames:

1. U shaped.
2. 0.05-inch- (1.3-mm-) thick stainless steel.
3. Mitered and welded corners.

D. Blades:

1. Multiple blade with maximum blade width of 6 inches (152 mm).
2. Parallel- and opposed-blade design.
3. Aluminum.
4. 0.0747-inch- (1.9-mm-) thick dual skin.
5. Blade Edging: Closed-cell neoprene.

E. Blade Axles: 1/2-inch- (13-mm-) diameter; stainless steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.

1. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).

F. Bearings:

1. Stainless-steel sleeve.

2. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
3. Thrust bearings at each end of every blade.

2.8 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Ductmate Industries, Inc.
2. Nexus PDQ; Division of Shilco Holdings Inc.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.

D. Gage and Shape: Match connecting ductwork.

2.9 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Barber-Coleman, Airturns
2. Dura-Dyne, VR
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

E. Vane Construction: Double wall.

F. Vane Construction: Single wall for ducts up to 48 inches (1200 mm) wide and double wall for larger dimensions.

2.10 REMOTE DAMPER OPERATORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Pottorff.

2. Ventfabrics, Inc.
3. Young Regulator Company.

B. Description: Cable system designed for remote manual damper adjustment.

C. Tubing: Aluminum.

D. Cable: Stainless steel.

E. Wall-Box Mounting: Recessed.

F. Wall-Box Cover-Plate Material: Stainless steel.

2.11 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Ventfabrics, Inc., Ventlok
2. Ruskin
3. United Sheet Metal

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2 (7-2M), "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."

1. Door:

a. Double wall, rectangular.
b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
c. Vision panel.
d. Hinges and Latches: 1-by-1-inch (25-by-25-mm)butt or piano hinge and cam latches.
e. Fabricate doors airtight and suitable for duct pressure class.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

a. Access Doors Less Than 12 Inches (300 mm) Square: No hinges and two sash locks.
b. Access Doors up to 18 Inches (460 mm) Square: Continuous and two sash locks.
c. Access Doors up to 24 by 48 Inches (600 by 1200 mm): Continuous and two compression latches with outside and inside handles.
d. Access Doors Larger Than 24 by 48 Inches (600 by 1200 mm): Continuous and two compression latches with outside and inside handles.

2.12 DUCT ACCESS PANEL ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Ventfabrics, Inc., Ventlok
2. Ruskin
3. United Sheet Metal

B. Labeled according to UL 1978 by an NRTL.

C. Panel and Frame: Minimum thickness 0.0528-inch (1.3-mm) carbon steel.

D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.

E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F (1093 deg C).

F. Minimum Pressure Rating: 10-inch wg (2500 Pa), positive or negative.

2.13 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Ductmate Proflex Vinyl
2. Durodyne
3. Ventfabrics

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches (146 mm) wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

2.14 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Insulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film, maximum 0.17 permeability per ASTM E96-A.

1. Pressure Rating: 6-inch wg positive and 4.0-inch wg negative.
2. Maximum Air Velocity: 6000 fpm.
3. Temperature Range: Minus 10 to plus 200 deg F.
4. Insulation R-value: R-value = 8.0.

C. Flexible Duct Connectors:

1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.

2.15 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.16 DUCT MOUNTED HYDRONIC COILS

A. Water Coils: Coils shall be leak tested to 200 psig air pressure underwater and designed for 300 psig working pressure. The coils shall be continuous seamless copper tube with aluminum plate fins bonded by mechanical expansion of the tubes, unless otherwise indicated. Fin spacing shall not exceed 12 per inch. Frames shall be constructed of minimum 16 gauge Type 304 stainless steel casing with copper headers brazed to tubes and threaded connections. Both supply and return headers shall be provided with 1/8 inch NPT vent connection at top and bottom for venting and draining coil. The coils shall be arranged for the water to counterflow in the direction of the air flow. Tube sheets shall be minimum 16 gauge Type 304 stainless steel, located on each end and at a maximum of 80-inch intermediate spans with drain collars to support tubes. Return bends shall be die-formed, brazed to tubes and header and shall be seamless hard-drawn copper tubing. Casing channels shall be free draining, without depressions to collect moisture and contaminants or to block fin area, and with an air bypass/water carryover arrester between the casing bottom channel and the fins.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine ducts, plenums, and casings to receive air coils for compliance with requirements for installation tolerances and other conditions affecting coil performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before coil installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

D. Set dampers to fully open position before testing, adjusting, and balancing.

E. Install test holes at fan inlets and outlets and elsewhere as indicated.

F. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. Upstream from duct filters.
3. At outdoor-air intakes and mixed-air plenums.
4. At drain pans and seals.
5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
6. Control devices requiring inspection.
7. Elsewhere as indicated.

G. Install access doors with swing against duct static pressure.

H. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
3. Head and Hand Access: 18 by 10 inches (460 by 250 mm).
4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
5. Body Access: 25 by 14 inches (635 by 355 mm).
6. Body plus Ladder Access: 25 by 17 inches (635 by 430 mm).

I. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

J. Install flexible connectors to connect ducts to equipment.

K. For fans developing static pressures of 5-inch wg (1250 Pa) and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

L. Connect terminal units to supply ducts with maximum 12-inch (300-mm) lengths of flexible duct. Do not use flexible ducts to change directions.

M. Connect flexible ducts to metal ducts with draw bands.

N. Install duct test holes where required for testing and balancing purposes.

O. Flexible duct length maximum of 8'-0" long, with no more than the equivalent of (2) 90 degree bends.

P. Provide saddles at flexible duct hangers to prevent restriction of internal duct due to the weight of the supported section.

Q. Install coils level and plumb.

R. Install galvanized stainless-steel drain pan under each coil.

1. Construct drain pans with connection for drain.
2. Extend drain pan upstream and downstream from coil face.
3. Extend drain pan under coil headers and exposed supply piping.

S. Straighten bent fins on air coils.

T. Clean coils using materials and methods recommended in writing by manufacturers, and clean inside of casings and enclosures to remove dust and debris.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to coils to allow service and maintenance.

C. Connect water piping with unions and shutoff valves to allow coils to be disconnected without draining piping. Control valves are specified in Section 230900 "Instrumentation and Control for HVAC," and other piping specialties are specified in Section 232116 "Hydronic Piping Specialties."

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Inspect turning vanes for proper and secure installation.

4. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233713 – GRILLES, REGISTERS AND DIFFUSERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Round ceiling diffusers.
2. Rectangular and square ceiling diffusers.
3. Linear slot diffusers.
4. Nozzles
5. Adjustable bar registers and grilles.

B. Related Sections:

1. Section 089119 "Fixed Louvers" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Price Industries.
2. Titus.
3. Kreuger.
4. Air Concepts.
5. Krantz
6. Metalaire
7. Trox

2.2 CEILING DIFFUSERS

A. Round Ceiling Diffuser

1. Devices shall be specifically designed for variable-air-volume flows.
2. Material: Aluminum.
3. Finish: Baked enamel, color selected by Architect.
4. Face Style: Plaque.
5. Mounting: Duct connection.

B. Round Ceiling High Induction Diffuser

1. Devices shall be specifically designed for variable-air-volume flows.
2. Material: Aluminum.
3. Finish: Baked enamel, color selected by Architect.
4. Face Style: Swirl.
5. Mounting: 24”x24” square lay-in
6. Connection: Insulated integral plenum with side duct connection.

C. Rectangular and Square Ceiling Diffusers:

1. Devices shall be specifically designed for variable-air-volume flows.
2. Material: Aluminum.
3. Finish: Baked enamel, color selected by Architect.
4. Face Style: Plaque.
5. Mounting: Duct connection.

2.3 CEILING LINEAR SLOT OUTLETS

A. Linear Slot Diffuser:

1. Devices shall be specifically designed for variable-air-volume flows.
2. Material - Shell: Aluminum, insulated.
3. Material - Pattern Controller and Tees: Aluminum.
4. Finish - Face and Shell: Baked enamel, black.
5. Finish - Pattern Controller: Baked enamel, black.
6. Finish - Tees: Baked enamel, color selected by Architect.
7. Accessories: as indicated on drawings.

2.4 NOZZLES

1. Devices shall be specifically designed for variable-air-volume flows.
2. Material: Aluminum.
3. Finish: Baked enamel, color selected by Architect.
4. Face Style: adjustable swivel jet.
5. Mounting: Duct connection.

2.5 REGISTERS AND GRILLES

A. Adjustable Bar Register and Grilles:

1. Material: Aluminum.
2. Finish: Baked enamel, white.
3. Face Blade Arrangement: Horizontal spaced as indicated on schedule.
4. Core Construction: Integral.
5. Frame: 1 inch wide.
6. Mounting: Countersunk screw.
7. Damper Type: as indicated on schedule.

2.6 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied color finishes.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set(s) for each air-handling unit.
2. Gaskets: One set(s) for each access door.
3. Fan Belts: One set(s) for each air-handling unit fan.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. For Compressor: Five year(s) from date of Substantial Completion.
b. For Parts: One year(s) from date of Substantial Completion.
c. For Labor: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.
2. Trane; a business of American Standard companies.
3. YORK; a Johnson Controls company.
4. Diakin.

2.2 INDOOR UNITS (5 TONS (18 kW) OR LESS)

A. Concealed Evaporator-Fan Components:

1. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
2. Insulation: Faced, glass-fiber duct liner.
3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
4. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for overcurrent protection.
5. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
6. Fan Motors:
    a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
    b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
    c. Wiring Terminations: Connect motor to chassis wiring with plug connection.
7. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
8. Filters: Permanent, cleanable.
9. Condensate Drain Pans:
    a. Fabricated with two percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
        1) Depth: A minimum of 2 inches (50 mm) deep.
    b. Single-wall, galvanized-steel sheet.

c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.

1) Minimum Connection Size: NPS 1 (DN 25).

d. Pan-Top Surface Coating: Asphaltic waterproofing compound.

B. Wall-Mounted, Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
3. Fan: Direct drive, centrifugal.
4. Fan Motors:

a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
c. Enclosure Type: Totally enclosed, fan cooled.
d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
f. Mount unit-mounted disconnect switches on exterior of unit.

5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
6. Condensate Drain Pans:

a. Fabricated with two percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
1) Depth: A minimum of 1 inch (25 mm) deep.

b. Single-wall, galvanized-steel sheet.
c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.

1) Minimum Connection Size: NPS 1 (DN 25).

d. Pan-Top Surface Coating: Asphaltic waterproofing compound.

7. Air Filtration Section:

a. General Requirements for Air Filtration Section:

1) Comply with NFPA 90A.

2) Minimum Arrestance: According to ASHRAE 52.1 and MERV according to ASHRAE 52.2.
3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.

b. Disposable Panel Filters:

1) Factory-fabricated, viscous-coated, flat-panel type.
2) Thickness: 1 inch (25 mm).
3) Merv according to ASHRAE 52.2: 5.
4) Media: Interlaced glass fibers sprayed with nonflammable adhesive.
5) Frame: Galvanized steel, with metal grid on outlet side, steel rod grid on inlet side, and hinged; with pull and retaining handles.

2.3 OUTDOOR UNITS (5 TONS (18 kW) OR LESS)

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

a. Compressor Type: Scroll.
b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
c. Refrigerant Charge: R-410A.
d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

3. Fan: Aluminum-propeller type, directly connected to motor.
4. Motor: Permanently lubricated, with integral thermal-overload protection.
5. Low Ambient Kit: Permits operation down to 45 deg F (7 deg C).
6. Mounting Base: Polyethylene.

2.4 ACCESSORIES

A. Control equipment and sequence of operation are specified in Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence and Operations for HVAC Controls."

B. Automatic-reset timer to prevent rapid cycling of compressor.

C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

D. Drain Hose: For condensate.

E. Additional Monitoring:
   1. Monitor variable-frequency-drive operation.
   2. Monitor cooling load.
   3. Monitor air distribution static pressure and ventilation air volumes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Equipment Mounting:

   1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
   2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
      a. Provide code required hurricane tie down straps and anchors.

D. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain units.

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SECTION 260100 – BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. Basic Requirements: The Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. General Provisions: Provide all labor, materials, equipment, and incidentals required to make ready for use complete electrical systems as specified herein and shown on the drawings.

C. Provide and Install: The word "provide" where used on the Drawings or in the Specifications shall mean "furnish, install, mount, connect, test, complete, and make ready for operation". The word "install" where used on the Drawings or in the Specifications shall mean "mount, connect, test, complete, and make ready for operation". Perform work required by, and in accordance with, the Contract Documents.

D. Installation: Provide and place in satisfactory condition, ready for proper operation, raceways, wires, cables, and other material needed for all complete electrical systems required by the Contract Documents. Additional raceways and wiring shall be provided to complete the installation of the specific equipment provided. Include auxiliaries and accessories for complete and properly operating systems. Provide electrical systems and accessories to comply with the NEC, state and local codes and ordinances. It is the intent of these Specifications that the electrical systems be suitable in every way for the use intended. Material and work which is incidental to the work of this Contract shall be provided at no additional cost to the Contract.

E. Field Connections: Provide field connections to remote equipment and control panels provided under other Divisions of these Specifications. Provide raceway, wire, and interconnections between equipment, transmitters, local indicators, and receivers. Provide 120V and low voltage surge protection equipment in accordance with Section 16709 at equipment as required. Install field connections to "packaged" equipment provided under other Divisions of these Specifications.

1.2 SCOPE OF WORK

A. General: Provide labor, materials, permits, inspections and re-inspection fees, tools, equipment, transportation, insurance, temporary protection, temporary power and lighting, supervision and incidental items essential for proper installation and operation of the Electrical systems indicated in the Contract Documents. Provide materials not specifically mentioned or indicated but which are usually provided or are essential for proper installation and operation of the Electrical systems indicated in the contract documents.

B. Notices: Give notices, file Plans, pay fees, and obtain permits and approvals from authorities having jurisdiction. Include all fees in the Bid Price.

1.3 INTERPRETATION OF DRAWINGS

A. General: The Drawings are diagrammatic and are not intended to show exact locations of Raceway runs, outlet boxes, junction boxes, pull boxes, etc. The locations of equipment, appliances, fixtures, Raceways, outlets, boxes and similar devices shown on the Drawings are approximate only. Exact locations shall be determined and coordinated in the field. The right is reserved to change, without additional cost, the location of any outlet within the same room or general area before it is permanently installed. Obtain all information relevant to the placing of electrical work and in case of interference with other work, proceed as directed by the Engineer.

B. Discrepancies: Notify the Architect of any discrepancies found during construction of the project. The Engineer will provide written instructions as to how to proceed with that portion of work. If a conflict exists between the Contract Documents and an applicable code or standard, the most stringent requirement shall apply.

C. Wiring: Each three-phase circuit shall be run in a separate Raceway unless otherwise shown on the Drawings. Unless otherwise accepted by the Engineer, Raceway shall not be installed exposed. Where circuits are shown as "home-runs" all necessary fittings, supports, and boxes shall be provided for a complete raceway installation.

D. Layout: Circuit layouts are not intended to show the number of fittings, or other installation details. Connections to equipment shall be made as required, and in accordance with the accepted shop and manufacturer's setting drawings.

E. Coordination: Coordinate final equipment locations with drawings or other disciplines. Layout before installation so that all trades may install equipment in available space. Provide coordination as required for installation in a neat and workmanlike manner.

1.4 EQUIPMENT SIZE AND HANDLING

A. Coordination: Investigate each space in the structure through which equipment must pass to reach its final location. If necessary, ship the equipment in sections of specific sizes to permit the passing through the necessary areas within the structure.

B. Handling: Equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the manufacturer shall be required to brace the equipment suitably, to insure that the tilting does not impair the functional integrity of the equipment.

1.5 RECORD DRAWINGS

A. Production: The Contractor shall provide two (2) sets of black or blue line on white drawings to maintain and submit record "As-Built Documents". Label each sheet of the

Record Document set with “Project Record Documents” with company name of the installing contractor in stamped or printed letters. One set shall be maintained at the site and at all times be accurate, clear, and complete. These drawings shall be available at all times to the Architect's field representatives.

B. Recording: Record information concurrent with construction progress. Make entries within 24 hours upon receipt of information. The "As-Built" drawings shall accurately reflect installed electrical work specified or shown on the Contract Documents.

C. Completion: At the completion of the Work, transfer changes with a colored pencil onto the second set and submit to the Engineer. The "As-Built" drawings shall be made available to the Engineer to make the substantial completion punch list.

D. Final: Upon Contractor’s completion of the Engineer’s final punch list, transfer all “As-Built” conditions and all requirements by the Engineer to a reproducible set of drawings and CAD files. Submit drawings and CAD disks for review and acceptance. The Contractor shall provide updated disks which include final As-Built conditions.

1.6 ABBREVIATIONS

A. Abbreviations: The following abbreviations or initials may be used:

A/C	Air Conditioning
AC	Alternating Current
ABV CLG	Above Ceiling
ADA	Americans with Disabilities Act
AF	Ampere Frame
AFF	Above Finished Floor
AFG	Above Finished Grade
AHU	Air Handler Unit
AIC	Amps Interrupting Capacity
AL	Aluminum
AMP	Ampere
ANSI	American National Standards Institute
ASA	American Standards Association
AT	Ampere Trip
ATS	Automatic Transfer Switch
AUX	Auxiliary
AWG	American Wire Gauge
BC	Bare Copper
BIL	Basic Impulse Level
BMS	Building Management System
BRKR or BKR	Breaker
CAB	Cabinet
C	Conduit or Raceway
CB	Circuit Breaker
CBM	Certified Ballast Manufacturers
CCTV	Closed Circuit Television

CKT	Circuit
CLEC	Clock Equipment Cabinet
CLG	Ceiling
CO	Conduit or Raceway Only
COAX	Coaxial Cable
COND	Conductor
CONN	Connection
CPU	Central Processing Unit
CRT	Cathode Ray Terminal (Video display terminal)
CT	Current Transformer
CU	Copper
CW	Cold Water
DC	Direct Current
DDC	Direct Digital Control
DEG	Degree
DISC	Disconnect
DO	Draw Out
DN	Down
DPST	Double Pole Single Throw
EMT	Electrical Metallic Tubing
EO	Electrically Operated
EOL	End of Line Resistor
EWC	Electric Water Cooler
FAAP	Fire Alarm Annunciator Panel
FACP	Fire Alarm Control Panel
FCU	Fan Coil Unit
FLA	Full Load Amperes
FM	Factory Mutual
GF	Ground Fault
GFCI	Ground Fault Circuits Interrupter
GND	Ground
HOA	Hand-Off-Automatic
HORIZ	Horizontal
HP	Horsepower
IC	Intercom
ICU	Intensive Care Unit
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IMC	Intermediate Metallic Raceway
IN	Inches
IT	Instantaneous Trip
IPCEA	Insulated Power Cable Engineers Association
JB	Junction Box
KCMIL	Thousand Circular Mills
KV	Kilovolt
KVA	Kilo-Volt-Amps
KW	Kilowatts
LBS	Pounds

LED	Light Emitting Diode
LT	Light
LTD	Long Time Delay
LTT	Long Time Trip
LTG	Lighting
MAX	Maximum
MCB	Main Circuit Breaker
MCC	Motor Control Center
MCP	Motor Circuit Protector
MIC	Microphone
MIN	Minimum
MLO	Main Lugs Only
MTD	Mounted
MTG	Mounting
MUX	Multiplex (Transponder) Panel
MVA	Mega Volt Amps
N	Neutral
NC	Normally Closed
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIC	Not in Contract
NF	Non Fused
NL	Non Linear
NO	Number or Normally Open
#	Number
Ø	Phase
OL	Overload
OSHA	Occupational Safety and Health Administration
P	Pole
PB	Pullbox
PIV	Post Indicator Valve
PNL	Panel
PR	Pair
PWR	Power
PF	Power Factor
PRI	Primary
PT	Potential Transformer
PVC	Polyvinylchloride
REF	Refrigerator
RGC or GRC	Rigid Galvanized Raceway
RMS	Root-Mean-Square
RPM	Revolutions Per Minute
RECPT	Receptacle
SCA	Short Circuit Amps
SD	Smoke Detector
SEC	Secondary

S/N	Solid Neutral
SPKR	Speaker
SPST	Single Pole Single Throw
SST	Solid State Trip
ST	Short Time Trip
STD	Short Time Delay
SW	Switch
SWGR	Switchgear
SWBD	Switchboard
TEL	Telephone
TTB	Telephone Terminal Board
TTC	Telephone Terminal Cabinet
TVEC	Television Equipment Cabinet
TYP	Typical
UL	Underwriters Laboratories
UON	Unless Otherwise Noted
V	Volt
VFD	Variable Frequency Drive
VSD	Variable Speed Drive
W	Wire
WP	Weatherproof
XFMR	Transformer

1.7 CODES, FEES, AND STANDARDS

A. Application: The codes, standards and practices listed herein generally apply to the entire project and specification sections. Other codes, standards or practices that are more specific will be referenced within a particular specification.

B. Requirements: All materials and types of construction covered in the specifications will be required to meet or exceed applicable standards of manufacturer, testing, performance, and installation according to the requirements of UL, ANSI, NEMA, IEEE, and NEC referenced documents where indicated and the manufacturer's recommended practices. Requirements indicated on the contract documents that exceed but are not contrary to governing codes shall be followed.

C. Compliance and Certification: The installation shall comply with the governing state and local codes or ordinances. The completed electrical installation shall be inspected and certified by applicable agencies that it is in compliance with codes.

D. Applicability: The codes and standards and practices listed herein, and their respective dates are furnished as the minimum latest requirements.

1. State of Florida
2. Hillsborough County
3. City of Tampa
4. HCAA Design Criteria Manual
5. HCAA tenant work permit general construction standards

E. Utility Company: Comply with latest utility company regulations.

F. State Code: Florida Administrative Code

G. Building Code: Florida Building Code (2020).

H. Manuals: Accessibility requirements manual Florida Department of Community Affairs.

I. Labels: Materials and equipment shall be new and free of defects, and shall be U.L. listed, bear the U.L. label or be labeled or listed with an approved, nationally recognized Electrical Testing Agency. Where no labeling or listing service is available or desired for certain types of equipment, test data shall be submitted to validate that equipment meets or exceeds available standards.

J. NFPA: National Fire Protection Association (NFPA) Standards

NFPA-70	National Electrical Code 2017
NFPA-101	Life Safety Code 2018

1.8 INVESTIGATION OF SITE

A. General: Before commencing work, verify existing conditions at the premises and examine adjoining work on which work is in anyway dependent. Contractor shall confirm electrical characteristics such as voltage, phase, and loads, for equipment purchased prior to installation.

B. Responsibility: No waiver of responsibility for defective and inadequate work or additional cost as a result of existing conditions which should have been verified shall be considered unless notice of same has been filed by the Contractor and agreed to in writing by the Engineer before the bid date.

C. Site Renovation: Verify and coordinate existing site raceways and pipes at any excavation on site. Provide hand-digging and required rerouting in areas of existing Raceways and pipes within bid price.

D. All existing wiring that is to remain in renovated areas shall be made code compliant.

1.9 SUPERVISION OF THE WORK

A. Supervision: Provide one field superintendent who has had a minimum of four (4) years previous successful experience on projects of comparable sizes, type and complexity. The Superintendent shall be present at all times when work is being performed. At least one member of the Electrical Contracting Firm shall hold a State Master Certificate of Competency.

1.10 COORDINATION

A. General: Compare drawings and specifications with those of other trades and report any discrepancies between them to the Engineer. Obtain from the Engineer written instructions to make the necessary changes in any of the affected work. Work shall be installed in cooperation with other Trades installing interrelated work. Before installation, Trades shall make proper provisions to avoid interferences in a manner approved by the Engineer.

B. Provide all required coordination and supervision where work connects to or is affected by work of others, and comply with all requirements affecting this Division. Work required under other divisions, specifications or drawings to be performed by this Division shall be coordinated with the Contractor and such work performed at no additional cost to Owner including but not limited to electrical work required for:

1. Door hardware
2. Roll-up doors
3. Roll-up grilles
4. Signage
5. Fire shutters
6. Elevators
7. Sliding or automatic doors
8. Mechanical Division of the Specifications
9. Landscape Architect drawings
10. Lifts
11. Interior design drawings
12. Fountains
13. Millwork design drawings and shop drawings

C. Obtain set of Contract Documents from Owner's Authorized Representative or Contractor for all areas of work noted above and include all electrical work in bid whether included in Division 26 Contract Documents or not.

D. Secure approved shop drawings from all required disciplines and verify final electrical characteristics before roughing power feeds to any equipment. When electrical data on approved shop drawings differs from that shown or called for in Construction Documents, make adjustments to the wiring, disconnects, and branch circuit protection to match that required for the equipment installed.

E. Damage from interference caused by inadequate coordination shall be corrected at no additional cost to the Owner.

F. Adjustments: Locations of raceway and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. Determine the exact routing and location of systems prior to fabrication or installation.

G. Priorities: Lines which pitch shall have the right of way over those which do not pitch. For example, plumbing drains shall normally have the right of way. Lineswhose

elevations cannot be changed shall have the right of way over lines whose elevations can be changed.

H. Modifications: Offsets and changes of direction in raceway systems shall be made to maintain proper headroom and pitch of sloping lines whether or not indicated on the drawings. Provide elbows, boxes, etc., as required to allow offsets and changes to suit job conditions.

I. Replacement: Work shall be installed in a way to permit removal (without damage to other parts) of other system components provided under this Contract requiring periodic replacement or maintenance. Raceway shall be arranged in a manner to clear the openings of swinging overhead access doors as well as ceiling tiles.

J. Layout: The Contract Drawings are diagrammatic only intending to show general runs and locations of raceway and equipment, and not necessarily showing required offsets, details and accessories and equipment to be connected. Work shall be accurately laid out with other Trades to avoid conflicts and to obtain a neat and workmanlike installation, which will afford maximum accessibility for operation, maintenance and headroom.

K. Contract Conflicts: Where discrepancies exist in the Scope of Work as to what Trade provides items such as starters, disconnects, flow switches, etc. such conflicts shall be coordinated between the divisions involved. It is the intent of the Contract Documents that all work shall be provided complete as one bid price.

L. Drawing Conflicts: Where drawing details, plans or specification requirements are in conflict and where sizes of the same item run are shown to be different within the contract documents, the most stringent requirement shall be included in the Contract. Systems and equipment called for in the specification or as shown on the drawings shall be provided as if it was required by both the drawings and specifications. Prior to ordering or installation of any portion of work, which appears to be in conflict, such work shall be brought to Engineer’s attention for direction as to what is to be provided.

M. The Contract Documents describe specific sizes of switches, breakers, fuses, Raceways, conductors, motor starters and other items of wiring equipment. These sizes are based on specific items of power consuming equipment (heaters, lights, motors for fans, compressors, pumps, etc.). Coordinate the requirements of each load with each load’s respective circuitry shown and with each load’s requirements as noted on its nameplate data and manufacturer’s published electrical criteria. Adjust circuit breaker, fuse, Raceway, and conductor sizes to meet the actual requirements of the equipment being provided and installed and change from single point to multiple points of connection (or vice versa) to meet equipment requirements. Changes shall be made at no additional cost to the Owner.

N. Working Clearances: Minimum working clearances about electrical equipment shall be as referenced in the applicable edition NEC Article 110, and shall include equipment installed in ceiling spaces.

1.11 DEMOLITION

A. General: Relocate existing equipment and reroute existing raceways in areas being renovated as required to facilitate the installation of the new systems. The Owner shall require continuous operation of the existing systems, while demolition, relocation work or new tie-ins are performed.

B. Coordination: Prior to any deactivation, relocation or demolition work, arrange a conference with the Engineer and the Owner's representative in the field to inspect each of the items to be deactivated, removed or relocated. Care shall be taken to protect equipment designated as being relocated and reused or equipment remaining in operation and integrated with the new systems.

C. Provisions: Deactivation, relocation, and temporary tie-ins shall be provided by the Contractor. Demolition, removal and the legal disposal of demolished materials shall be provided by the Contractor.

D. Owner’s Salvage: The Owner reserves the right to inspect the material scheduled for removal and salvage any items he deems usable as spare parts.

E. Phasing: The Contractor shall perform work in phases as directed by the Architect to suit the project progress schedule, as well as the completion date of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Specified Method: Where several brand names, make or manufacturers are listed as acceptable each shall be regarded as equally acceptable, based on the design selection but each must meet all specification requirements. Where a manufacturer's model number is listed, this model shall set the standard of quality and performance required. Where no brand name is specified, the source and quality shall be subject to Engineer's review and acceptance. Where manufacturers are listed, one of the listed manufacturers shall be submitted for acceptance. No substitutions are permitted.

B. Certification: When a product is specified to be in accordance with a trade association or government standard requested by the Engineer, Contractor shall provide a certificate that the product complies with the referenced standard. Upon request of Engineer, Contractor shall submit supporting test data to substantiate compliance.

C. Basis of Bid: Each bidder represents that his bid is based upon the manufacturer's, materials, and equipment described in the Contract Documents.

D. Space Requirements: Equipment or optional equipment shall conform to established space requirements within the project. Equipment which does not meet space requirements, shall be replaced at no additional expense to the Contract. Modifications of related systems shall be made at no additional expense to the Contract. Submit modifications to the Engineer for acceptance.

E. Samples: Samples are to be submitted for items requested within Specification Sections to determine that the item meets specifications and requirements before being accepted for use on Project. Samples shall be submitted within 30 days after the award of the contract. Each sample shall be tagged, labeled, or marked, "Sample of ..... for (Project). Accompany samples with copy, in duplicate of manufacturer's instructions regarding installation, and maintenance.

F. All screws, bolts, washers, and other fasteners used in supporting fixtures, conduit, outlets will be fabricated from rust-resistant metal and will be of a common replacement design type. No rivets or other non-replaceable type fastener will be permitted. The use of tie wire outside of slab work is not acceptable. Gun power set anchors are not permitted.

2.2 SHOP DRAWINGS

A. General: Shop drawings shall be submitted for every item listed within the Submittals section each individual specification section. One copy shall be submitted to the engineer prior to ordering equipment. Refer to Basis of approval paragraph.

B. Responsibility: It is the Contractors responsibility to provide material in accordance with the plans and specifications. Material not provided in accordance with the plans and specifications shall be removed and replaced at the Contractors expense.

C. Official Record: The shop drawing submittal shall become the official record of the materials to be installed. If materials are installed which do not correspond to the record submittal they shall be removed from the project without any additional cost or delays in construction completion.

D. Information: The shop drawing record submittal shall include the following information to the extent applicable to the particular item;

1. Manufacturer's name and product designation or catalog number.
2. Standards or specifications of ANSI, ASTM, ICEA, IEEE, ISA, NEMA, NFPA, OSHA, UL, or other organizations, including the type, size, or other designation.
3. Dimensioned plan, sections, and elevations showing means for mounting, raceway connections, and grounding, and showing layout of components.
4. Materials and finish specifications, including paints.
5. List of components including manufacturer's names and catalog numbers.
6. Internal wiring diagram indicating connections to components and the terminals for external connections.
7. Manufacturer's instructions and recommendations for installation, operation, and maintenance.
8. Manufacturer's recommended list of spare parts.
9. Provide 1/2” = 1’-0” enlarged electrical room layout drawings for all electrical rooms. All equipment shall be indicated at actual size of equipment being provided. All dimensions and required working clearances shall be shown.

E. Preparation: Prior to submittal, shop drawings shall be checked for accuracy and contract requirements. Shop drawings shall bear the date checked and shall be accompanied by a statement that the shop drawings have been examined for conformity to Specifications and Drawings. This statement shall also list discrepancies with the Specifications and Drawings. Shop drawings not so checked and noted shall be returned to Contractor unreviewed.

F. Basis of Review: Approval is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Contractor is responsible for quantities, dimensions, fabrication processes, and construction techniques.

G. Responsibility: The responsibility that dimensions are confirmed and correlated with proper coordination of other trades shall be included as part of the Contract Documents. The responsibility and the necessity of providing materials and workmanship required by the Specifications and Drawings which may not be indicated on the shop drawings shall be included as part of the Contract Documents. The Contractor is responsible for any delays in job progress occurring directly or indirectly from late submissions or re-submissions of shop drawings, product data, or samples.

H. Ordering Equipment: No material shall be ordered or shop work started until the Engineer has officially received the shop drawings record submittal and has formally released the Contractor for submittal requirements.

I. Brochure Requirements: Submit Technical Information Brochures at the start of construction or no later than 30 days after Award of the Contract. Each brochure shall consist of an adequately sized, hardcover, 3-ring binder for 8-1/2" X 11" sheets. Provide correct designation on outside cover and on end of brochure. When one binder is not enough to adequately catalog all data, an additional binder shall be submitted.

J. Brochure Contents: First sheet in the brochure shall be a photocopy of the Electrical Index pages in these specifications. Second sheet shall be a list of Project Addresses for this project. Third sheet shall list Project Information. Provide reinforced separation sheets tabbed with the appropriate specification reference number and typed index for each section in the Electrical Schedule. Technical Information consisting of marked catalog sheets or shop drawings shall be inserted in the brochure in proper order on all items specified and shown on drawings. At the end of the brochure, provide and insert a copy of the specifications for this Division and all addenda applicable to this Division.

K. Contractor's Review: Review the brochures before submitting to the Engineer. No request for payment shall be considered until the brochure has been reviewed, stamped and submitted for review.

L. Cost: Submit cost breakdown on work in the Technical Information Brochures. The cost of material and labor for each item shall be indicated. The cost of fittings and incidentals are not required.

M. Title Drawings: Title drawings to include identification of project and names of Architect, Engineer, Contractors, and/or supplier, data, number sequentially and indicate in general;

1. Fabrication and Erection dimensions.
2. Arrangements and sectional views.
3. Necessary details, including complete information for making connections with other work.
4. Kinds of materials and finishes.
5. Descriptive names of equipment.
6. Modifications and options to standard equipment required by the contract.
7. Leave blank area, size approximately 4 by 2-1/2 inches, near title block (for Engineer's stamp imprint).
8. In order to facilitate review of shop drawings, they shall be noted, indicating by cross-reference the contract drawings, notes, and specification paragraph numbers where items occur in the contract documents.
9. See specific sections of specifications for further requirements.

N. Technical Data: Submit technical data verifying that the item submitted complies with the requirements of the specifications. Technical data shall include manufacturer's name and model number, dimensions, weights, electrical characteristics, and clearances required. Indicate optional equipment and changes from the standard item as called for in the specifications. Provide drawings, or diagrams, dimensioned and in correct scale, covering equipment, showing arrangement of components and overall coordination.

O. Same Manufacturer: In general, relays, contactors, starters, motor control centers, switchboards, panelboards, dry type transformers, disconnect switches, circuit breakers, manual motor starter switches, etc., shall be supplied and manufactured by the same manufacturer. This requirement shall apply to same type of electrical components specified in other Divisions. Panelboards, switchboards, breakers, etc will match the existing building standard equipment.

2.3 EQUIPMENT, MATERIALS, AND SUPPORTS

A. General: Each item of equipment or material shall be manufactured by a company regularly engaged in the manufacturer of the type and size of equipment, shall be suitable for the environment in which it is to be installed, shall be approved for its purpose, environment, and application, and shall bear the UL label.

B. Installation Requirements: Each item of equipment or material shall be installed in accordance with instructions and recommendations of the manufacturer, however, the methods shall not be less stringent than specified herein.

C. Required Accessories: Provide all devices and materials, such as expansion bolts, foundation bolts, screws, channels, angles, and other attaching means, required to fasten enclosures, raceways, and other electrical equipment and materials to be mounted on structures which are existing or new.

D. Protection: Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by the elements. Equipment shall be stored in dry permanent shelters. If apparatus has been damaged, such damage shall be repaired at no additional cost or time extension to the Contract. If apparatus has been subject to possible injury, it shall be thoroughly cleaned, dried out and put through tests as directed by the Manufacturer and Engineer, or shall be replaced, if directed by the Engineer, at no additional cost to the Contract.

2.4 IDENTIFICATION OF EQUIPMENT

A. General: Electrical items shall be identified as specified in the Contract Documents. Such identification shall be in addition to the manufacturer's nameplates and shall serve to identify the item's function and the equipment or system, which it serves or controls. Refer to Identification Section of the specifications for additional information.

2.5 CONCRETE PADS

A. General: Provide reinforced concrete pads for floor mounted electrical equipment. Unless otherwise noted, pads shall be nominal four (4) inches high and shall exceed dimensions of equipment being set on them, including future sections, by six (6) inches on all sides, except when equipment is flush against a wall, then the side or sides against the wall shall be flush with the equipment. Chamfer top edges 1/2". Trowel surfaces smooth. Reinforce pads with #5 reinforcing bars at 24" centers each way, unless specifically detailed on drawings.

2.6 SURFACE MOUNTED EQUIPMENT

A. General: Surface mounted fixtures, outlets, cabinets, panels, etc. shall have a factory-applied finish or shall be painted as accepted by Engineer. Raceways and fittings, where allowed to be installed surface mounted, shall be painted to match the finish on which it was installed. Paint shall be in accordance with other applicable sections of these specifications.

2.7 CUTTING AND PATCHING

A. Core Drilling: The Contractor shall be responsible for core drilling as required for work under this section, but in no case shall the Contractor cut into or weld onto any structural element of the project without the written approval of the Architect.

B. Cutting and Patching: Cutting, rough patching and finish patching shall be provided as specified in the contract documents. Cutting and patching shall be performed in a neat and workmanlike manner. Upon completion, the patched area shall match adjacent surfaces.

C. Openings and Sleeves: Locate openings required for work performed under this section. Provide sleeves, guards or other accepted methods to allow passage of items installed under this section.

D. Roof Penetration: Provide roofer with pitch pans, fittings, etc., required for electrical items which penetrate the roof. Roof penetrations are to be waterproofed in such a manner that roofing guarantees are fully in force. Roof penetrations shall be coordinated with other Trades to ensure that roof warranty is not invalidated.

2.8 SLEEVES AND FORMS FOR OPENINGS

A. Sleeves: Provide sleeves for Raceways penetrating floors, walls, partitions, etc. Locate necessary slots for electrical work and form before concrete is poured. Watertight sleeves shall be line seal type WS. Fire rated partition sleeves shall be mild steel. Size shall be one standard diameter larger than pipe being installed or of a larger diameter to below 1/4" minimum clearance.

B. Forms: Provide boxed out forms for Raceway penetrations only where allowed by the Architect. Fill opening after Raceway installation, with equivalent material.

2.9 OPERATING AND MAINTENANCE INSTRUCTIONS

A. General: Thoroughly instruct the Owner’s Representative, to the complete satisfaction of the Engineer, in the proper operation of all systems and equipment provided. The Contractor shall make all arrangements, via the Engineer, as to whom the instructions are to be given in the operation of the systems and the period of time in which they are to be given. The Engineer shall be completely satisfied that the Owner’s Representative has been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Engineer determines that complete and thorough instructions have not been given by the Contractor to the Owner's Representative, then the Contractor shall be directed by the Engineer to provide whatever instructions are necessary until the intent of this paragraph of the Specification has been complied with.

B. Submittals: Submit to the Engineer for approval five (5) typed sets, bound neatly in loose-leaf binders, of instructions for the installation, operation, care and maintenance of equipment and systems, including instructions for the ordering and stocking of spare parts for equipment installed under this contract. The lists shall include part number and suggested suppliers. Each set shall also include an itemized list of component parts that should be kept on hand and where such parts can be purchased.

C. Information Requirements: Information shall indicate possible problems with equipment and suggested corrective action. The manuals shall be indexed for each type of equipment. Each section shall be clearly divided from the other sections. A sub index for each section shall also be provided.

D. Instructions: The instructions shall contain information deemed necessary by the Engineer and include but not limited to the following:

1. Introduction:

a. Explanation of Manual and its use.

b. Summary description of the Electrical Systems.
c. Purpose of systems.

2. System:

a. Detailed description of all systems.
b. Illustrations, schematics, block diagrams, catalog cuts and other exhibits.

3. Operations:

a. Complete detailed, step by step, sequential description of all phases of operation for all portions of the systems, including start up, shutdown and balancing. Include posted instruction charts.

4. Maintenance:

a. Parts list and part numbers.
b. Maintenance and replacement charts and the Manufacturer's recommendations for preventive maintenance.
c. Trouble shooting charts for systems and components.
d. Instructions for testing each type of part.
e. Recommended list of on-hand spare parts.
f. Complete calibration instructions for all parts and entire systems.
g. General and miscellaneous maintenance notes.

5. Manufacturer's Literature:

a. Complete listing for all parts.
b. Names, addresses and telephone numbers.
c. Care and operation.
d. All pertinent brochures, illustrations, drawings, cuts, bulletins, technical data, certified performance charts and other literature with the model actually furnished to be clearly and conspicuously identified.
e. Internal wiring diagrams and Engineering data sheets for all items and/or equipment furnished under each Contract.
f. Guarantee and warranty data.

2.10 SERVICE AND METERING

A. Electrical metering and Electrical service is existing 120/240V single phase by TECO serving hangers.

2.11 TEMPORARY LIGHT AND POWER

A. Lighting: Temporary light shall be based on one 200-watt lamp covering each 1,000 square foot of floor area in the building. Each room 100 square foot and over shall have a minimum of one 100-watt lamp with guards. Provide power for motors up to 3/4 horsepower only. Provisions are to be made for electric welders, if required.

B. Outlets: Provide outlets located at convenient points so that extension cords of not over fifty (50) feet will reach work requiring artificial light or power.

C. Other Connections: Contractors of other trades shall furnish their own cords and sockets, as may be required for their work and shall also pay for cost of temporary wiring of construction offices and shanties used by them.

D. New Fixtures: Permanently installed lighting fixtures may be used for temporary lighting at the Contractor's option with the provision that cool white lamps for fluorescent, clear lamps for incandescent and marked temporary for other types shall be installed. At job completion, lamps shall be replaced with permanent lamps specified.

E. Wiring: Temporary electrical work shall be furnished and installed in conformity with the National Electrical Code and in accordance with the requirements of the local ordinances and shall be maintained in a workmanlike manner throughout their entire construction period and shall be removed after installation of the permanent electrical systems. Extension cords shall be GFCI protected or shall be fed from GFCI circuit breakers.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General: The installation of materials and equipment shall be performed in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a quality level of workmanship. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks.

B. Acceptable Workmanship: Acceptable workmanship is characterized by first-quality appearance and function, conforming to applicable standards of building system construction, and exhibiting a high degree of quality and proficiency which is judged by the Architect as equivalent as or better than that ordinarily produced by qualified industry tradesmen.

C. Performance: Personnel shall not be used in the performance of the installation of material and equipment that, in the opinion of the Engineer, are deemed to be careless or unqualified to perform the assigned tasks. Material and equipment installations not in compliance with the Contract Documents, or installed with substandard workmanship and not acceptable to the Architect, shall be removed and reinstalled by qualified craftsmen, at no change in the contract price.

3.2 PROTECTION AND CLEAN UP

A. Protection and Restoration: Suitably protect equipment provided under this Division during construction. Restore damaged surfaces and items to "like new" condition before a request for substantial completion inspection.

B. Handling: Materials shall be properly protected and Raceway openings shall be temporarily closed by the Contractor to prevent obstruction and damage. Post notice prohibiting the use of systems provided under this Contract, prior to completion of work and acceptance of systems by the Owner's representative. The Contractor shall take precautions to protect his materials from damage and theft.

C. Safeguards: The Contractor shall furnish, place and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment or systems provided under this contract.

D. Cleanup: Keep the job site free from debris and rubbish. Remove debris and rubbish from the site and leave premises in clean condition on a daily basis.

3.3 SYSTEMS GUARANTEE

A. General: Provide a one-year guarantee. This guarantee shall be by the Contractor to the Owner for any defective workmanship or material, which has been provided under this Contract at no cost to the Owner for a period of one year from the date of substantial completion of the System. The guarantee shall include lamps, for ninety days after date of Substantial Completion of the System. Explain the provisions of guarantee to the Owner at the "Demonstration of Completed System".

3.4 FINAL OBSERVATION

A. General: Work shall be completed, and forms and other information shall be submitted for acceptance one week prior to the request for final observation of the installation.

3.5 SPECIAL CONSIDERATIONS

A. Comply with special requirements imposed at site by Owner. This may include badging of employees, prohibition of smoking, special working hours, or special working conditions.

END OF SECTION 260500

CERTIFICATE OF COMPLETED DEMONSTRATION MEMO

Note to Contractor: Do not submit this form at the time Technical Information Brochure is submitted. Submit five copies of information listed below for checking at least one week before scheduled completion of the building. After information has been accepted and inserted in each brochure, give the Owner a Demonstration of the Completed Electrical Systems and have the Owner sign five copies of this form. Provide one signed copy for each brochure. After this has been done, a written request for a final inspection of the System shall be made.

Re: _____
(Name of Project)

_____
(Division Number and Name)

This memo is for the information of all concerned that the Owner has been given a Demonstration of the Completed Electrical Systems on the work covered under this Division. This conference consisted of the system operation, a tour on which all major items of equipment were pointed out, and the following items were given to the Owner;

(a) Owner's copy of Technical Information Brochure containing approved submittal sheets on all items, including the following; (To be inserted in the Technical Information Brochure after the correct tab).
    (1) Maintenance Information published by manufacturer on equipment items.
    (2) Printed Warranties by manufacturers on equipment items.
    (3) Performance verification information as recorded by the Contractor.
    (4) Check-out Memo on equipment by manufacturer's representative.
    (5) Written operating instructions on any specialized items.
    (6) Explanation of the one-year guarantee on the system.

(b) "As-Built" conditions as described in the record drawing specifications.
(c) A demonstration of the System in Operation and of the maintenance procedures which shall be required.

_____
(Name of General Contractor)

By: _____
(Authorized Signature, Title & Date)

_____
(Name of SubContractor)

By: _____
(Authorized Signature, Title & Date)

Brochure, Instruction, Prints, Demonstration & Instruction in Operation Received:

_____
(Name of Owner)

By: _____
(Authorized Signature, Title, Date)

cc: Owner, Architect, Engineer, Contractor, Sub Contractor and General Contractor
(List names as stated in cc: above)

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SECTION 260519 – WIRES AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 WIRES AND CABLES

A. Description: Provide a complete and continuous system of conductors as specified herein. All conductors shall be in accordance with the latest edition of the NEC.

1.3 QUALITY ASSURANCE

A. Qualifications: Manufacturers shall be regularly engaged in the manufacture of wire systems and fittings of types and sizes required, and whose products have been in satisfactory use in similar service for not less than five (5) years in the USA.

B. Compliance: Materials shall comply with the following codes and standards, as they apply to the different wire types specified herein.

1. UL:

   a. 44 – Rubber insulated wire and cables.

   b. 83 – Thermoplastic-Insulated Wires and Cables

   c. 486A – 80 - Wire Connectors and Soldering Lugs for Use with Copper Conductors

   d. 486B – Splicing Wire Connections

   e. 493 – Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables

2. NFPA:

   a. 70 NEC

3. Insulated Cable Engineers Association (ICEA)

1.4 SUBMITTALS

A. General: Submit product data on all different types of conductors specified.

PART 2 - PRODUCTS

2.1 GENERAL

A. Conductors: Branch circuit and feeder conductors for electric power shall be copper type. Utilize THHN/THWN insulation for branch circuits and THWN/XHHN insulation for feeders, unless specifically noted otherwise. Conductors #10 AWG and smaller shall be solid #8 AWG and larger shall be stranded. No aluminum wiring shall be permitted. All wire shall be sized as shown on the drawings. If no size is shown, wire shall be #12 AWG, except that branch "homeruns" over 50 ft. in length shall be #10 AWG for 120/208V circuits. Wire in vicinity of heat-producing equipment shall be type XHHW insulation. All wiring shall be manufactured in the USA and of 98 percent resistivity. #14 AWG minimum size conductors shall be used for fire alarm system. For any splices made in pull boxes below grade shall be the watertight gel type connection and UL approved.

B. Taps and Splices: All copper taps and splices in #8 AWG or smaller wire shall be fastened together by means of "wirenut" connectors (Ideal or accepted substitution). All taps and splices in wire larger than #8 AWG shall be made with compression type connectors and taped to provide insulation equal to wire. All taps and splices in manholes or in ground pull box shall be made with compression type connectors and covered with Raychem heavy wall cable sleeves (type CTE or WCS) with type "S" sealant cooling. Provide sleeve kits as per manufacturer's installation instructions. All electrical feeders will be run in continuous pieces without joints or splices.

C. Color Coding, General: All power feeders, grounding conductors and branch circuits #6 AWG and smaller shall be installed with color-coded wire with the same color used for a system throughout the building. Conductors above #6 AWG shall either be fully color-coded or shall have black insulation and be similarly color-coded with tape in all junction boxes and panels in accordance with NEC 310-12. Tape shall cover the conductor insulation within the box or panel in such a manner so as to allow standard markings to be readily observed.

D. Colors: Unless otherwise accepted, color-code shall be indicated in the Identification section of the specifications. All switch legs, other voltage system wiring, control and interlock wiring shall be color-coded other than those listed in the Identification Section of these specifications.

E. Submittals: Submit cut sheet on all major types of wires and cables including splicing tape and terminating/splicing lugs or connectors and cable sleeves.

2.2 MANUFACTURERS

A. General: Branch circuit and feeder conductors shall be as manufactured by one of the following: General Cable Co., Anaconda, Pirelli, Rome Cable Corporation, or American Insulated Wire Corporation.

PART 3 - EXECUTION

3.1 EXECUTION

A. General: All wiring shall be installed in raceways (power, low voltage and control wiring), unless otherwise indicated or specified under other Sections of this specification. Al wiring shall be installed per the latest edition of the NEC.

B. Connections: Conductors #10 and #12 AWG shall be connected with pre-insulated spring connectors encased in a steel shell and rated at not less than 105 degrees C. A minimum of 3/8-inch skirt shall cover the bare wires. The connector shall meet with UL approval for fixture and pressure work, and shall be "Scotch Lok" Type Y, R and B electrical spring connectors as manufactured by Ideal or approved equal.

C. Connector Manufacturers: Lugs and wire connectors shall be one of the following: Burndy Corporation, Thomas & Betts, Co., Appleton or ILSCO.

D. Equipment Installations: Neatly form, train and tie the cables in panelboards, cabinets, wireways, switches and equipment assemblies.

END OF SECTION 260519

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SECTION 260526 – GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section

1.2 GROUNDING ELECTRODES

A. General: Provide a grounding electrode system, as described in NEC 250, as specified herein and as indicated on plans (for applications required)

B. Ground Field / Ground Rods: The ground field shall consist of three 20 ft long vertically driven ground rods arranged in a triangular pattern spaced 20 feet apart. Additional ground rods shall be added as necessary to achieve the desired resistance.

C. Building Steel: The building steel shall be utilized as a grounding electrode, provided the steel is in direct contact with the earth or is otherwise effectively grounded.

D. Resistance: Grounding electrode resistance shall not exceed 10 ohms. Overall resistance of the entire grounding electrode system shall not exceed 5 ohms. Provide additional grounding electrodes as required to meet this value. Refer to Section 26 0080 for testing requirements.

1.3 GROUNDING ELECTRODE CONDUCTOR

A. Grounding Electrode Conductor: A main grounding electrode conductor, bare copper, sized per NEC, shall be run in PVC conduit from main service equipment to the grounding electrodes. This conductor shall also be bonded to the following:

1. Telecommunications service ground within 20’ of the electrical service
2. Lightning protection system.
3. Gas and other interior metal piping – refer to NEC.

1.4 SEPARATELY DERIVED GROUNDING SYSTEMS

A. Description: Provide a separately derived grounding system where indicated herein and as required by the National Electrical Code. Bond neutral and ground busses together.

B. Services: Provide a separately derived grounding system for all building electrical services and step-down transformers.

C. Multiple Buildings: Multiple buildings fed from the same electrical service shall be provided with separate grounding electrode systems, as required by the NEC and specified herein.

1.5 BONDING AND EQUIPMENT GROUNDING

A. Description of System: In general, all electrical equipment (metallic conduit, motor frames, panelboards, etc.) shall be bonded together with a green insulated copper system grounding conductor in accordance with specific rules of Article 250 of the NEC Equipment grounding conductors through the raceway system shall be continuous from main switch ground bus to panel ground bar of each panelboard, and from panel grounding bar of each panelboard to branch circuit equipment and devices.

B. Equipment Grounding Conductors: All raceways shall have an insulated copper system ground conductor run throughout the entire length of circuit installed within conduit in strict accordance with NEC. Grounding conductor shall be included in total conduit fill when determining conduit sizes, even though not included or shown on drawings.

C. Bonding: In addition to connections to grounding electrodes, the main service ground shall be bonded to the lightning protection system and other underground metal piping.

D. Bushings: Provide insulated grounding bushings on all metallic feeder conduits terminated within panelboards, switchboards or enclosed overcurrent devices. Provide insulated grounding bushings on all branch circuit conduits where concentric knockouts are used.

E. Connection to Other Systems: Provide all required grounding and bonding connections as specified herein and as required by the National Electrical Code.

F. Exterior: All exterior grade mounded equipment will have their enclosures grounded directly to a separate driven ground rod at the equipment in addition to the building ground connection.

1.6 SUBMITTALS

A. General: Submit product data on ground rods, ground wire, ground connectors, ground bars, and data on exothermic welds.

B. Lugs: Mechanical lugs or wire terminals will be used to ground wires together or to junction boxes and panel cabinets and will be manufactured by Anderson, Buchanan, Thomas and Betts Company, or Burney.

1.7 QUALITY ASSURANCE

A. Compliance: The entire ground system shall meet or exceed the minimum requirements NEC 250 and IEEE Std. 142 (green book).

PART 2 - PRODUCTS

2.1 GROUNDING ELECTRODE AND BONDING CONDUCTORS

A. General: Except as specified in C below, provide UL and NEC approved types of copper with THWN, THHN, or XHHW with green insulation or green tape on black insulation the entire length of conductor not in conduit.

B. Size: Grounding electrode conductors shall be sized as specified herein and on the drawings, but in no case shall be smaller than required by NEC 250.

C. Insulation: Conductors above ground shall be insulated, conductors run below grade shall be bare.

2.2 GROUNDING ELECTRODES

A. Ground Rods: Provide copper clad steel, 5/8 inch diameter by 20 feet long vertically driven ground rods. Use of multiple 10 feet sectional ground rods is acceptable.

2.3 CONNECTIONS

A. Bonding: One piece mechanical lugs or wire terminals, properly sized and approved by the local authority having jurisdiction shall be used to bond ground wires together or to junction boxes and panel cabinets. All contact surfaces will be thoroughly cleaned before connections are made to ensure good metal to metal contact.

B. Underground: All connections and bonds made underground and to building steel shall be exothermic weld type-connections.

2.4 INSPECTION WELLS

A. Location: Provide inspection wells for all ground rods covered by concrete, paving, or other permanent materials that prevent access to ground rods.

B. Description: Inspection well shall be provided with circular, flush traffic rated, grade mounted, twist lock traffic cover with the word “ground” (or similar) on the cover. Inspection test well shall allow clear access to the ground rod and exothermic weld connection of conductor to ground rod. Clearly mark ground rod locations on as-built drawings.

PART 3 - INSTALLATION

3.1 EXTERIOR

A. Connection: The main grounding electrode conductor shall be exothermically welded to ground rods and other main system electrodes.

3.2 TESTING

A. Testing: Provide testing as required in other sections of this specification, including but not limited to sections 26 05 00 and 26 00 80.

B. Reports: Submit impedance test reports for all separately derived services to the Engineer prior to project completion.

3.3 CONNECTIONS

A. Preparation: All contact surfaces shall be thoroughly cleaned before connections are made, to ensure good metal to metal contact.

END OF SECTION 260526

SECTION 260533 – RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION

A. General: Provide all supports, hangers and inserts required to mount raceways, pull boxes and other equipment provided under this Division.

B. Support: All items shall be supported from the structural portion of the building. Supports and hangers shall be of a type approved by Underwriters' Laboratories. Wire shall not be used as a support. Boxes and raceways shall not be supported or fastened to ceiling suspension wires or to ceiling channels. Do not install any devices supported by ceiling tiles.

C. Installation: The Contractor shall lay out and provide his work in advance of the laying of floors or walls, and shall provide all sleeves that may be required for openings through floors, walls, etc. Where plans call for raceway to be run exposed, provide all inserts and clamps for the supporting of conduit. Contractor shall confirm conduit sizes of existing installation and match accordingly.

D. Systems: Provide raceway system of empty raceways including terminal cabinets, backboards and outlets as described and specified herein.

E. Conduit: The contractor will prepare and submit coordinated review drawings to HCAA prior to any multiple raceway approved to be run exposed. Refer to section 3.6(A) below. Drawings to include raceway conditions, layout, elevations, coordination with other building system components. All raceways will be installed as close as possible to the structure and at the highest elevation possible.

1.3 QUALITY ASSURANCE

A. Qualifications: Manufacturers shall be regularly engaged in the manufacture of raceway systems and fittings of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years in the USA.

B. Aluminum Raceways: Aluminum raceways shall not be used unless specifically called for. Install with aluminum fittings only, when specified.

C. Compliance: Materials shall comply with the latest edition of the following standards as they apply to the different raceway types specified herein;

1. ANSI:

    a. ANSI C80.1: Rigid Steel Conduit (RSC)

b. ANSI C80.3: Electrical Metallic Tubing (EMT)

2. UL:

a. UL 1: Flexible Metal Conduit

b. UL 6: Rigid Steel Conduit (RSC)

c. UL 360: Liquid-Tight Flexible Metal Conduit

d. UL 514: Fittings for Metal Conduit

e. UL 651: Nonmetallic Conduit (PVC)

f. UL 797: Electrical Metallic Tubing (EMT)

g. UL 886: Fittings for Hazardous Locations

h. UL 1242: Intermediate Metal Conduit (IMC)

3. NEMA:

a. NEMA TC2: Rigid Nonmetallic Conduit (PVC)

b. NEMA TC3: Fittings for Rigid Nonmetallic Conduit (RNMC)

c. NEMA TC8: Utility Duct Type EB-35

d. NEMA RN1: Plastic Coated Metal Conduit

e. NEMA VE-1: Ladder Cable Tray

f. NEMA 8A, 8B, 8C, & 12A: Spine Cable Tray

4. Federal Specifications:

a. WW-C-581: Rigid Steel Conduit (RSC)

b. WW-C-563: Electrical Metallic Conduit (EMT)

c. WW-C-566: Flexible Steel Conduit

d. WW-C-581E: Intermediate Metallic Conduit (IMC)

e. WC-1094A: Nonmetallic Rigid Conduit (PVC)

f. WC-582A Conduit, Raceway, Metal and Fittings; surface

5. ASTM:

a. ASTM-F-512: Utility duct type EB-35

b. ASTM-A525 & ASTM-386: Tray manufacturers

1.4 SUBMITTALS

A. Products: Submit manufacturer's product data, including technical information on each type of raceway system;

B. Compliance: Product data shall show compliance with this section of the specifications, including U.L. label, manufacturer and manufacturer's written installation instructions.

1.5 RACEWAYS

A. General: Provide a complete and continuous system of raceways to maintain a protected path for wires and cables to distribute electric power, throughout the project, utilizing U.L. listed, labeled materials, and made in the USA.

B. Accessories: Provide raceway accessories of types, sizes, and materials, as specified herein complying with manufacturers published product information, which match and mate conduit and tubing.

C. Interior Minimum Size: Minimum conduit size for all systems (fire alarm, sound, controls, etc.) shall be 3/4 inch raceway minimum. All conduits will be UL listed and labeled. The minimum size conduit for power and lighting systems will be ‘3/4 inch conduit for all circuitry homerun from the panelboard. Conduits branching off of the homerun may be ‘1/2 inch conduit if it contains no more then 4 conductors (excluding the insulated grounding conductor) and phase conductors no larger then no. 12 AWG.

D. Site Underground Raceway: Unless otherwise noted, minimum underground raceways shall be 1 inch conduit. Homeruns from the branch circuit overcurrent device, through any control devices to the first exterior junction box or consumption device shall be 1 inch minimum.

E. System Raceway: Provide end bushings on all conduits.

F. Pull Strings: Provide pull strings in all empty raceways. Pull strings shall be nylon and shall be impervious to moisture. Pull strings installed in one inch and smaller conduits shall have a tensile strength of not less than 30 lbs. Pull strings installed in conduits larger than 1 inch shall a tensile strength not less than 200 lbs.

G. Conduit Bends: The use of NEC Table 344.24 Exception is not allowed.

1.6 LOCATIONS

A. Materials Above Grade: The following conduit types are to be installed above grade where specifically noted herein;

1. Electrical metallic tubing (thin wall)

2. Intermediate metallic conduit

3. Flexible metal conduit

4. Liquid-tight flexible metal conduit

5. Galvanized rigid steel conduit

B. Materials Below Grade: The following conduit types are to be installed below grade where specifically noted herein;

1. Rigid galvanized conduit (heavy wall)

2. Heavy wall schedule 40 PVC

C. Materials on Roofs: The following conduit types are to be installed on roofs where specifically noted herein;

1. Rigid steel conduit (PVC) coated

2. Rigid steel conduit

PART 2 - PRODUCTS

2.1 ELECTRICAL METALLIC TUBING

A. Fittings: Provide steel compression type fittings. Steel fittings shall be fitted with non-removable insulated throats, and male threaded ends provided with a locknut.

B. Locknuts: Provide locknuts for securing conduit to enclosures with sharp edges for digging into metal, and ridged outside circumference for proper fastening.

2.2 BUSHINGS

A. Bushings: Bushings shall be provided on all terminations, mounted on the ends of all EMT connectors 1-1/4 inches and larger and within all equipment.

B. Construction: Bushings shall have a flared bottom and ribbed sides, with smooth insides to prevent damage to cable insulation.

C. Insulating Ring: Mold a phenolic insulating ring into sizes 1-1/4 inches and larger.

D. Grounding: Provide a screw type grounding terminal on all sizes.

2.3 RIGID METAL CONDUIT

A. Conduit: Conduit ends shall have precision cut hi-torque threads. One end of the conduit shall have a coupling and the other shall be covered with a color-coded plastic thread protector. Conduit shall be manufactured in 10 foot lengths.

B. Fittings: Fittings shall be cut groove steel. Cast fittings are not acceptable.

2.4 FLEXIBLE STEEL CONDUIT

A. Conduit and Standards: A continuous length, spirally wound steel strip, zinc-coated, each convolution interlocked with following convolution into a helix form. Product shall meet Federal Specification WW-C-566 and UL 1242.

B. Fittings: Provide conduit fittings for use with flexible steel conduit of the threadless hinged clamp type, and a male threaded end provided with a locknut.

1. Straight terminal connectors shall be one piece body, female end with clamp and deep slotted machine screw for securing conduit.

2. 45 and 90 degree terminal angle connectors shall be 2 piece body, with removable upper section, female end with clamp and deep slotted machine screw for securing conduit.

2.5 LIQUID-TIGHT FLEXIBLE STEEL CONDUIT

A. Conduit: Plastic jacketed (PVC) liquid-tight flexible steel conduit with copper bonding conductor, and steel material galvanized inside and outside.

B. Fittings: Provide cadmium plated, malleable iron fittings with compression type steel ferrule and neoprene gasket sealing rings with insulated throat.

2.6 HEAVY WALL PVC CONDUIT (SCHEDULE 40)

A. Conduit: Schedule 40, 90 degrees C. UL rated, PVC conduit shall be composed of High Impact PVC (polyvinyl chloride C-2000 Compound), and shall conform to industry standards, and be UL listed in accordance with Article 347 of National Electrical Code for underground and exposed use. Materials must have tensile strength of 55 PSI, at 70 degrees F., flexural strength of 11,000 psi, compression strength of 8600 psi. Manufacturer shall have five years extruding PVC experience.

2.7 INTERMEDIATE METAL CONDUIT

A. Type: Intermediate metal conduit (IMC) shall be high frequency electro-welded into tube form to produce a high ductile conduit that can be easily bent with standard tools approved for IMC.

B. General: Conduit ends shall have precision cut hi-torque threads. One end of the conduit shall have a coupling and the other shall be covered with a color-coded plastic thread protector. Conduit shall be manufactured in 10 foot lengths.

C. Finish: The electro-galvanized zinc finish shall be corrosion resistant and shall not crack or flake. A chromate conversion coating shall be applied over the entire tube as an additional corrosive preventative. The interior shall be protected and lubricated with a special silicone hard finish enamel.

2.8 MALLEABLE IRON EXPANSION FITTINGS

A. Type: Conduit expansion fittings shall be malleable iron (hot dipped galvanized inside and outside).

B. Fittings: These fittings shall have a 4 inch expansion chamber to allow approximately 2 inch movement parallel to conduit run in either direction from normal.

C. Internal Bonding: Fittings shall have factory-installed packing and internal tinned copper braid packing to serve as a bonding jumper.

D. External Bonding: Unless the fitting used is listed by Underwriters Laboratories for use "without external bonding jumpers", an external copper bonding jumper shall be installed with each metal expansion fitting. One end of the fitting shall be clamped on each conduit entering fitting.

2.9 SUPPORTING DEVICES

A. Hangers: Hangers shall be made of durable materials suitable for the application involved. Where excessive corrosive conditions are encountered, hanger assemblies shall be protected after fabrication by galvanizing, or approved suitable preservative methods.

B. Materials: Insert anchors shall be installed on concrete or brick construction, with hex head machine screws. Recessed head screws shall be used in wood construction. An electric or hand drill shall be used for drilling holes for all inserts in concrete or similar construction. Installed inserts, brick, shall be near center of brick, not near edge or in joint. Drilled and tapped, and round head machine screws shall be used where steel members occur. All screws, bolts, washers, etc., used for supporting raceways or outlets shall be fabricated from rust-resisting metal, or accepted substitution. Gunpowder set anchors are not permitted.

C. Exterior: Supporting devices for exterior use shall be 316 stainless steel unless otherwise noted on drawings.

D. PVC Coated Conduit: Supporting devices for PVC coated conduit shall be as manufactured by the PVC coated conduit manufacturer and shall match in color and appearance.

2.10 GENERAL PURPOSE BOXES

A. General: Provide standard galvanized one-piece steel outlet boxes at all concealed outlets for electric lights, switches, convenience receptacles, telephone outlets, etc. Acceptable manufacturers shall be T&B, Steel City, Raco. Surface outlet boxes and conduit bodies shall be the heavy cast aluminum or iron with external raised hubs - Appleton, Crouse Hinds or Steel City or accepted substitution. Trim rings shall also be of one piece construction.

2.11 MANHOLES

A. Concrete strength: The design of concrete mixture shall be responsibility of the contractor as set forth under ASTM Standard C-94 for ready-mixed concrete. The concrete produced shall have a concrete strength at 28 days that shall be not less than 2500 PSI.

B. Concrete slump: The slump when tested in accordance with ASTM Standard C-143, shall not be more than 3 inches for vibrated concrete and 4 inches for non-vibrated concrete. Ready – mixed concrete shall be mixed and delivered to the project in accordance with ASTM Standard C-94, using Alternative No. 2 for the mix design. With each load of concrete delivered, the producer shall provide in duplicate before unloading at the site, delivery tickets of certification as required by ASTM C-94.

C. Mixing Option: At contractor's option, concrete may be mixed by volume at the project site in an accepted type bath mixer in the manner specified for stationary mixers in ASTM Standard C-94. The portions of cement, aggregate and water shall be selected to provide the characteristics indicted below for the compressive strength specified. Conformance with the strength requirements shall be as determined in accordance with ASTM Standard C-39.

D. Precast Option: Manholes may be of the precast type if accepted, submit drawings, calculations, and necessary detail to determine acceptability.

E. Brick: Brick used where indicated shall be sewer and manhole brick conforming to ASM C-32, Grade MS.

F. Mixture: Mortar shall be mixed in proportions of 1-part Portland Cement, ¼ part hydrated lime and between 2 ¼ and 3 parts and by volume. (At contractor's option, mortar may be mixed in the proportions of 1 part Portland Cement and between 4 ½ and 6 parts of sand by volume.)

G. Structural: Reinforcing bars shall be deformed and comply with either of the following ASTM Standards: Billet Steel Bars A-615 or Rail Steel Bars A-616.

H. Forming: Material for concrete forms shall be smooth boards exterior grade plywood or metal.

I. Drainage: Drainage Pipe and Fittings shall be cast-iron, extra strength. Drains shall be plain pattern in accordance with Specification W M-P-541.

J. Covers: Metal Frames, Covers, and Gratings, except as indicated or specified otherwise shall conform to Specification RR-F-621 and shall be of cast iron. Frames and covers of steel shall be welded by qualified welders in accordance with standard commercial practice. Steel covers shall be rolled steel floor plate having an accepted anti-slip surface. Steel gratings shall be welded construction and conform to the applicable requirements of Specification RR-G-66, Type 1.

K. Accessories: Pulling-in irons shall be steel bars bent in the form indicated, and case in the walls and floors. In the floor, they shall be centered above or below, and opposite the conduits entering the manhole. Pulling-in irons shall be projected into the manhole approximately 4 inches. Irons shall be zinc-coated after fabrications in accordance with

L. Specifications MiL-Z-17871. Cable Racks, including hooks and insulators, shall be installed in manhole and shall be sufficient to accommodate the present and future cables and shall be spaced not more than 18 inches apart horizontally. The wall bracket shall be Channel or T-Section steel. The hooks shall be of steel or malleable iron and shall be of the removable type. Insulators shall be dry-process glazed porcelain. The metal portion of racks shall be zinc-coated after fabrication in accordance with Specification MIL-Z-17871.

PART 3 - EXECUTION

3.1 CONDUITS

A. Unless noted otherwise, provide as a minimum 1 inch raceway from each of the following device locations to cable tray, j-hooks, or corridor ceiling cavity when cable tray. Provide insulated bushings at ends of all raceways.

1. Telephone
2. Cable TV
3. Call Box
4. CCTV
5. DDC
6. Data
7. Elevator Location Panel
8. Security

B. All fire alarm wiring shall be run in conduit.

C. Provide plenum-rated cable for all systems conductors.

D. All wiring above non-accessible ceilings shall be installed in raceways.

3.2 IDENTIFICATION OF BOXES

A. Tags: During installation of pull strings all pull strings shall be marked with vinyl tags indicating where the opposite end may be found.

3.3 BLANK PLATES

A. Plates: Unless otherwise noted all outlet boxes shall receive blank plates matching the finish of plates on electrical devices in the same room.

3.4 RACEWAY INSTALLATION

A. Support: All raceways shall be run in a neat and workmanlike manner and shall be properly supported and in accordance with the latest edition of the NEC. Supporting conduit and boxes with wire is not acceptable. All conduits for Garage shall be concealed where drop ceiling does not exist. Any exposed conduit viewable by the public must be approved by an owner's representative prior to installation. Exposed raceways, where allowed, shall be supported with clamp fasteners with toggle bolt on hollow walls, and with lead expansion shields on masonry. All conduits shall be securely fastened in place with at least one support per eight foot section. Support within one foot of changes in direction. All required hangers, supports and fastenings shall be provided at each elbow and at no more than one foot from the end of each straight run terminating at a box or cabinet. The use of perforated iron for supporting conduits shall not be permitted. The required strength of the supporting equipment and size and type of anchors shall be based on the combined weight of conduit, hanger and cables. Horizontal and vertical conduit runs may be supported by one-hole malleable straps, clamp-backs, or other accepted devices with suitable bolts, expansion shields (where needed) or beam-clamps for mounting to building structure or special brackets. Multiple runs of raceways will be routed together. Raceways will not be located within six inches of other system components (HVAC ducts, chilled water lines, sprinkler pipes, domestic water lines, etc.)

B. Hanger Installation: Where 2 or more raceways 1 inch or larger run parallel trapeze hangers may be used consisting of concrete inserts, threaded solid rods, washers, nuts and galvanized "L" angle iron, or Unistrut cross members. These raceways shall be individually fastened to the cross member of every other trapeze hanger with galvanized cast one hole straps, clamp backs, bolted with proper size cadmium machine bolts, washers and nuts. If adjustable trapeze hangers are used to support groups of parallel conduits, U-bolt type clamps shall be used at the end of a raceway run and at each elbow. J-bolts, or approved clamps, shall be installed on each third intermediate trapeze hanger to fasten each raceway.

C. Sealant: Provide a closed cell silicone foam sealant rated to provide a rating equal to the wall, ceiling, or floor assembly rating. Provide seals for the exterior of conduit penetrations consisting of a cast-in-place sleeve with a compressible rubber gasket between the conduit and the sleeve. Provide seals for the interior of the conduit penetrations consisting of gland type sealing bushing or closed cell silicone foam. Provide duct seal inside an appropriate seal-off fitting to seal the interior of the conduit system from water seepage or hazardous gases.

D. Routing: Raceways shall be run parallel to building walls wherever possible, exposed or concealed as specified, and shall be grouped in workmanlike fashion. Crisscrossing of conduits shall be minimized.

E. Location: All raceways except those from surface-mounted switches, outlet boxes or panels shall be run concealed from view. Surface mounted devices and equipment shall be specifically noted on the contract drawings. It is the intent that all raceways shall be run concealed unless specifically noted.

F. Protection: All raceway runs, whether terminated in boxes or not, shall be capped during the course of construction until wires are pulled in and covers are in place. No conductors shall be pulled into raceways until the raceway system is complete.

G. Coordination: All raceways shall be kept clear of mechanical equipment and plumbing fixtures to facilitate future repair or replacement of said fixtures without disturbing wiring. Except where it is necessary for control purposes, all raceways shall be kept away from items producing heat.

H. Arrangement: All raceways shall be run connecting outlet to circuits generally as shown on the drawings. Provide circuit connection arrangement shown. Actual final arrangement shall be in accordance with the record drawings section as specified herein.

I. Grounding: All branch circuit and feeder raceways shall have a copper system ground conductor within the conduit throughout the entire length of the circuit. All conduits shall be electrically continuous to establish redundant grounding.

1. Branch circuit raceways shall have an insulated equipment grounding conductor installed within the conduit raceway system.

2. Grounding conductor shall be included in total conduit fill determining conduit sizes, even though not shown on drawings.

3. Grounding conductors run with feeders may be bare.

J. Empty Raceways: Raceways which do not have conductors provided under this Division of the specifications shall be left with an acceptable nylon pullcord in raceway.

K. Manufacturer: Rigid Metallic Conduit, Electrical Metallic Tubing, Flexible Steel Conduit, Liquid-Tight Flexible Conduit, and PVC Conduit shall be manufactured within the United States, and each shall be as manufactured by one manufacturer.

L. Roof Installation: Raceway installations on roofs shall be kept to a bare minimum. Raceway shall be supported above roof at least 6 inches using approved raceway supporting devices. Supports shall be fastened to roof using roofing adhesive as specified in other sections of this specification.

M. Firewall Installation: Provide pull boxes, junction boxes, fire barrier at fire rated walls etc., as required by NEC Article 300 where required.

N. Dissimilar Metals: Avoid the use of dissimilar metals to reduce the possibility of electrolysis. Where dissimilar metals are in contact, coat all surfaces with corrosion inhibiting compound before assembling.

O. Seal off Fittings: Provide raceway seal offs wherever the raceway system enters a hazardous or wet area or areas of drastic temperature change such as coolers, freezers, etc. as required.

P. Identification: Provide appropriate identification as required by codes and as indicated on the drawings and in accordance with the methods specified herein.

Q. Anchors: Raceways shall be anchored down to prevent floating while pouring in concrete.

3.5 SITE UNDERGROUND CONDUIT INSTALLATION

A. General: All underground raceways (with exception of raceways installed under floor slab) shall be installed in accordance with Section 300-5 of the NEC except that the minimum cover for any raceway or duct bank shall be two feet, unless otherwise indicated.

B. Stubs: Spare raceway stubs shall be capped and accurately dimensioned on as-built drawings.

C. Separation: All raceways run underground, or stubbed above floor shall be separated with plastic interlocking spacers manufactured specifically for this purpose, or shall be strapped to Kindorf channel supported by raceway driven into ground or tied to steel.

D. Coating: Rigid metallic conduit installed underground shall be coated with waterproofing black mastic before installation, and all joints shall be recoated after installation.

3.6 RIGID METALLIC CONDUIT

A. Locknuts: Rigid steel box connections shall be made with double locknuts and bushings. Turn down on threads to solidly connect raceway to box or enclosure.

B. Bushings: Grounded insulated bushings shall be used on all rigid steel conduits terminating in panels, wire gutters, or cabinets. Bushing shall be impact resistant plastic molded in an irregular shape at the top to provide smooth insulating surface at top and inner edge. Material in these bushings must not melt or support flame.

3.7 PVC RACEWAYS

A. Floor Penetrations Exposed: Where PVC penetrates a floor in an exposed location from underground or in slab, a black mastic coated steel conduit elbow shall be used.

B. Location: No PVC shall be allowed anywhere except underground or in slab.

C. Ground Conductor Installation: All individual bare copper ground conductors (i.e. service, transformer, or lightning protection grounds) shall be installed in PVC raceway.

D. Joints: PVC joints shall be solvent welded. Threads shall not be permitted on PVC raceway and fittings, except for rigid steel to PVC couplings. Installation of PVC raceway shall be in accordance with manufacturer's recommendations.

E. Restrict Support: PVC raceway shall not be used to support fixture or equipment.

F. Bends: Field bends shall be made with an approved hotbox. Heating with flame and hand held dryers are prohibited.

3.8 FLEXIBLE CONNECTIONS

A. Vibrating Equipment Connection: All connections to motors or other vibrating equipment (except dry type transformers) or at other locations where required shall be made with not less than 12 inches of flexible liquid-tight steel conduit, using special type of connectors with strain relief fittings at both terminations of conduit, Kellems Type 074-09 Series or accepted

substitution.

B. Normal Type: Flex connectors shall have insulated throat and shall be T & B 3100 Series or accepted substitution.

C. Angle Type: Use angle connectors wherever necessary to relieve angle strain on flex conduit.

D. Transformer Connection: Connections to dry type transformers shall be made with flexible conduit.

3.9 EXPANSION FITTINGS

A. Installation: Provide expansion fittings in each conduit run wherever it crosses an expansion joint. Install the fitting on one side of the joint with its sliding sleeve end flush with joint, and with a length of bonding jumper in expansion equal to at least three times the normal width of joints.

B. Location: Provide expansion fittings in each conduit run which is mechanically attached to separate structures to relieve strain caused by shift on one structure in relation to the other.

3.10 ELECTRICAL METALLIC TUBING

A. Location: Install Electrical Metallic Tubing (thin wall) inside buildings, above the ground floor where not subject to mechanical injury.

B. Handling: All cut ends shall be reamed to remove rough edges.

END OF SECTION 260533

SECTION 260553 – ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of thissection.

1.2 DESCRIPTION

A. Extent: Electrical identification work as required by the Contract Documents or other specifications.

B. Types: Electrical identification work specified in the Contract Documents include the following;

1. Electrical power, control and communication conductors.

2. Conduits, boxes, etc.

3. Distribution Equipment.

4. Cabinets.

5. Equipment/system identification signs and tags.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacturer of electrical identification products of types required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. NEC Compliance: Comply with NEC as applicable to installation of identifying labels and markers for wiring and equipment.

C. UL Compliance: Comply with applicable requirements of UL Standard 969, "Marking and Labeling Systems", pertaining to electrical identification systems.

D. ANSI Compliance: Comply with applicable requirements of ANSI Standard A13.1, "Scheme for the Identification of Piping Systems", and ANSI Standard Z53.1 "Color Designation."

E. NEMA Compliance: Comply with applicable requirements of NEMA Standard No's. WC-1 and WC-2 pertaining to identification of power and control conductors.

F. ADA Compliance: All signage shall meet ADA standards. Identification for maintenance purposes shall be as specified herein.

G. Facility Compliance: All identification methods currently utilized by the owner’s standards shall be strictly adhered to, and shall take precedence over the identification requirements listed.

1.4 SUBMITTALS

A. General: Submit shop drawings of all identification materials to be used for this project. Submit one sample of each item with the shop drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SUPPLIERS OR MANUFACTURERS

A. General: Subject to compliance with requirements, manufacturers offering electrical identification products which may be incorporated in the work include, but not limited to, the following:

1. Alarm Supply Co, Inc.
2. Direct Safety Co.
3. Ideal Industries, Inc.
4. LEM Products, Inc.
5. Markal Company
6. National Band and Tag Co.
7. Panduit Corp.
8. Seton Name Plate Co.
9. Thomas and Betts Co.
10. Carlton Industries, Inc.

2.2 LANGUAGE

A. General: Provide all products in this section in English.

2.3 ELECTRICAL IDENTIFICATION MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than one single type is specified for an application, selection shall be at the installer's option, however, provide a single selection for each application.

B. Conduit System Markers: Provide manufacturer's standard pre-printed, flexible, permanent, conduit markers, extending 360 degrees around conduits. Markers shall be designed for attachment to conduit by adhesive, adhesive lap joint, matching adhesive plastic tape at each end of marker, or pretensioned Snap-On. Color shall match system printingrequirements.

C. Voltage Marking: Except as otherwise indicated, provide lettering which indicates voltage of the conductor(s) in conduit. Provide 4 inch minimum length with 7/8 inch minimum lettering for 2 inch and smaller conduit. Provide 8 inch minimum length with 1-1/4 inch minimum lettering for larger than 2 inch conduit. Provide one marker for each 20' section of conduit. Color shall match system printing requirements.

D. Cable/Conductor Identification Bands: Provide manufacturer's standard vinyl cloth self-adhesive cable/conductor markers of the wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification.

E. Plasticized Tags: Manufacturer’s standard preprinted or partially preprinted accident prevention and operation tags, of plasticized card stock with matt finish suitable for writing, approximately 3-1/4 x 5-5/8 inch, with brass grommets and wire fasteners, and with appropriate pre-printed wording including large size primary wording, e.g., DANGER, CAUTION, DO NOTOPERATE.

F. Baked Enamel Danger Signs: Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20 gauge steel; of standard red, black and white graphics; 14 x 10 inch size except where 10 x 7 inch is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording, and subsequent directive e.g. HIGH VOLTAGE, KEEP OUT; BURIED CABLE, DO NOT DIG; LIVE PARTS, DO NOT TOUCH SWITCH.

G. Engraved Plastic Laminate Nameplates: Provide engraving phenolic plastic laminate, in sizes and thicknesses indicated, engraved with 1/16 inch thick lines with square standard pica lettering and wording as specified herein, black face and white core plies (letter color) for normal systems, Kelly green and white for equipment, bright orange and white for critical, bright yellow and black for life safety, and red and white for fire alarm and where noted in the specifications. Punch for mechanical fastening, except where adhesive mounting is necessary because of substrate. Material thickness shall be 1/16 inch. Provide beveled edge in order to eliminate sharp corners. Provide self-tapping stainless steel round head screws. Provide contact type permanent adhesive where screws cannot or shall not penetrate the substrate. Adhesive nameplate shall be permanently installed. Titles shall be 1/2 inch high and all other lettering shall be 1/4 inch high.

H. Underground Type Plastic Line Marker: Manufacturer’s standard permanent, bright colored, continuous printed, metal backed plastic tape, intended for direct burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates the type of service or type of buried cable.

I. Junction Box Identification: Provide neat indelible felt tip, stenciled marking on junction box and pull box covers indicating panel and circuit numbers contained in the box. Letter sizes shall be 1 inch high minimum. Provide non-stenciled markings inside the junction box and on the exterior edge to match the cover markings.

2.4 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations, and other designations used in electrical identification work, with corresponding designations specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by the manufacturer and as required for proper identification and operation/maintenance of the electrical system equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

B. Size: System identification labeling consists of providing minimum 1/2 inch high stenciled black letters for raceway systems.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Installation: Install electrical identification products as indicated, in accordance with manufacturer's written instructions, as required by the NEC and as specified herein.

B. Coordination: Where identification is to be applied to surfaces which require a field finish application, install identification after completion of such application.

C. Regulations: Comply with governing regulations and requests of governing authorities for the identification of electrical work.

D. Hazards: Identify all rooms, spaces, and equipment that house potential electrical hazards, and label with appropriate signage or indicators.

3.2 RACEWAY SYSTEM IDENTIFICATION

A. Color Coding: All electrical conduits shall be identified by color-coding. Apply color-coded identification on electrical conduit in a neat and workmanlike manner. Utilize a stencil for application of paint.

B. Identification: Identify all raceways provided or utilized as part of this project as follows;

1. Apply bands 10 feet on center along the raceway system and at each side of walls or floors, and at branches from mains.

2. Identify the following services:

	Service	Label
a.	Low Voltage	120/208 Voltage
b.	Fire Alarm	Fire Alarm

3. Spot Painting on Rough-in:

a. Conduit, raceways, boxes, backboxes, panelboards, etc. shall be spot painted. Conduit shall be identified within 6 inches of the box or enclosure. The entire box and cover plate shall be painted.

b. Use following colors for color bands and for color coding:

System		Color
(1)	Normal Power	Silver
(2)	Miscellaneous Communications	Brown
(3)	Fire Alarm	Red

3.3 CABLE/CONDUCTOR IDENTIFICATION

A. General: Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet where conductors of more than one circuit or communication (such as color coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for the project's electrical work.

B. Color Coding: Color code all power and lighting cable. Use wire colored by integral pigmentation, making the wire 100 percent colored. Where not practicable or available (in larger conductor sizes), color code the wire by using colored plastic tape, painting the ends accessible at junction or pull boxes, or other method acceptable to the Engineer. Use the following chart as applicable;

	120/208
CONDUCTOR	VOLTS
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equip. Ground	Green

3.4 OPERATIONAL IDENTIFICATION AND WARNINGS

A. General: Provide identification and warning wherever reasonably required to ensure safe and efficient operation and maintenance of the electrical systems. Provide identification and warning identification if necessary for signage to help prevent misuse of electrical facilities by unauthorized personnel.

B. Plasticized signs: Install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for the intended purposes.

C. Locations: In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations indicated and at locations subsequently identified as constituting dangers for persons in or about the project.

D. Equipment Identification:

1. Nameplates: Install an engraved phenolic plastic laminate nameplate on each unit of electrical equipment in the building, including central or master unit of each electrical system unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text. Provide text matching terminology and numbering of the contract documents and shop drawings.

    a. Normal system shall be 1/2 inch high white lettering in a black field.

2. Locations: Provide nameplates for each unit of the following categories of electrical work:

    a. Switchboard, panelboards, electrical cabinets, and enclosures.

        (1) Provide a nameplate outside above the door (if equipped with one) listing its designation, voltage, source and circuit number.

    b. Access panel/doors to electrical facilities.

    c. Electrical panelboards.

    d. Transformers.

    e. Disconnect switches.

    f. Enclosed circuit breakers.

    g. Remote Annunciators

    h. Other similar equipment as designated by the Engineer.

3. Viewing: Install nameplates at locations indicated and where not otherwise indicated at a location for the best convenience of viewing without interference with operation and maintenance of equipment.

    a. Secure to substrate with rigid fasteners. Utilize adhesive where fasteners cannot penetrate substrate.

4. Names: The names or wording used for a particular machine shall be the same as the one used on all motor starters, disconnects and remote button stations nameplates for that machine.

END OF SECTION 260553

SECTION 262416 – PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. Description: Provide panelboards with main breaker or main lugs where shown on the drawings, of a dead front, distributed phase sequence design. Panelboards shall be equipped with thermal-magnetic molded case circuit breakers with frame and trip ratings as indicated in the schedules.

1.3 QUALITY ASSURANCE

A. ANSI: the latest edition of the Reference Standards for the American National Standards Institute shall apply as follows;

1. ANSI Y32.2 - Graphic Symbols for Electrical and Electronic Diagrams.

2. ANSI Z55.1 - (R1973) Gray finishes for Industrial Apparatus and Equipment.

B. NEMA: National Electrical Manufacturers Association shall apply as follows;

1. NEMA PB1-1984 Panelboards

2. NEMA PB1-57 Gutter space

C. NFPA: The latest edition of the National Fire Protection Association shall apply as follows;

1. NFPA 70, National Electrical Code (NEC).

D. UL: The latest edition of the Underwriters' Laboratories, Incorporated shall apply as follows;

1. UL Electrical Construction Materials List, panelboards-dead front type.

2. UL 67 Panelboard wiring gutter space, bus heat rise test.

3. UL 50 Cabinets - Rigidity and gauge of steel.

E. Listing: Panelboards shall be listed by Underwriters Laboratories and bear the UL or other nationally recognized testing laboratory label. Where required, panelboards shall be listed for use as service entrance equipment.

1.4 SUBMITTALS

A. Shop drawings:

1. Product data shall be submitted on:

a. Panel

b. Cabinet

c. Bus

d. Construction

e. Dimensions

2. Shop drawings shall be submitted for every panel, and shall clearly indicate all of the following information:

a. U.L. Label

b. Each circuit breaker amperage rating, circuit number and position/location in panel

c. Electrical characteristics of panel

d. Main bus rating

e. Main device rating

f. Mounting type

g. Dimensions, (width, depth, height, weight)

h. Bus material

i. Interrupting capacity of minimum rated breaker

j. Panelboard classification

1.5 OVERCURRENT PROTECTIVE DEVICES - DESCRIPTION

A. Description of System: Connections of all items using electric power shall be included under this division of the specifications, including necessary wire, conduit, circuit protection, disconnects and accessories. Securing of roughing-in drawings and connection information for equipment involved shall also be included under this division. See other divisions for specifications for electrically operated equipment.

Provide overcurrent protection for all wiring and equipment in accordance with the NEC, all federal, state and local codes as required and/or as shown on the drawings.

1.6 OVERCURRENT PROTECTIVE DEVICES - SUBMITTALS

A. Shop drawings and product data: Shop drawings shall clearly indicate;

1. Frame sizes and interrupting capacity of all circuit breakers.

2. Horsepower ratings of rated voltage of fused switches and/or circuit breakers.

3. Size and type of fuses being provided.

4. Device is U.L. Listed, and bears the U.L. Label.

5. Device complies with these specifications, drawings, and applicable standards of NEMA, IEEE, ANSI, and ASA.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Equipment: The panelboard bus assembly shall be enclosed in a steel cabinet and shall be surface or flush mounted as shown in the schedules. The box shall be fabricated from galvanized steel with standard baked enamel finish. Panelboard front shall include a door and shall have a flush, cylinder tumbler-type lock with catch and spring-loaded stainless steel door pull. All panelboard locks shall be keyed alike. All panel cabinets shall be a minimum of 20 inches wide unless otherwise noted. Fronts shall have adjustable indicating trim clamps which shall be completely concealed when the doors are closed. Doors shall be mounted with completely concealed stainless steel hinges. Panel front shall not be removable with door in the locked position.

B. Bus: Panelboard bus structure and main lugs or main circuit breaker shall have current ratings as shown on the panelboard schedule. Bus shall be insulated and bus bar connections to the branch circuit breakers shall be of the "distributed phase" or phase sequence type. All current carrying parts of the bus structure shall be tin plated copper. A full size insulated neutral bus bar shall be provided. Provide system grounding tin plated copper bus bar bonded to the panelboard cabinet for connection of system grounding conductors. This bar shall be mechanically and electrically isolated from the neutral bar except where panelboard is used as service entrance equipment.

C. Molded Case Circuit Breakers: All panelboard branch circuit breakers shall be bolt-on thermal-magnetic molded case type. Breakers shall be 1, 2 or 3 pole with an integral crossbar to assure simultaneous opening of all poles in multi-pole circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and active handle indication. Handles shall have "ON", "OFF", and "TRIPPED" positions. Bolt-on circuit breakers shall be able to be installed in the panelboard without requiring additional mounting hardware.

D. Solid State Circuit Breakers: Provide solid state circuit breakers for all breakers 400 amperes and above. Breakers shall have adjustable settings for long time pickup, long time delay, short-time pickup and short time delay.

E. 120/208 Rating: 120/208 volt circuit breakers shall have interrupting ratings a minimum of 10,000 rms symmetrical amperes at 240 volts AC maximum unless otherwise noted.

F. Switching Type: Single pole, 15 and 20 ampere circuit breakers intended to switch fluorescent lighting loads on a regular basis shall carry the SWD marking.

G. Directories: A typed panelboard directory shall be provided for each panelboard and shall indicate the actual circuit number used, room name and type of load. Room names shall be the actual name or room number used not necessarily as shown on the drawing. Panel directories shall include all room numbers and names. Where panel schedules are indicated on the drawings as "receptacles or "lighting", etc., it shall be the responsibility of the Contractor to include the specific area served.

H. Bracing: Panelboard as a complete unit shall be braced for a minimum short circuit rating equal to or greater than the lowest breaker symmetrical interrupting capacity as shown on the schedule. However, all panelboards shall be fully rated. No series ratings are allowed.

I. Grounding: All panelboard cabinets shall have a system grounding bar bonded to the panelboard cabinet for connection of system grounding conductors. This bar shall be mechanically and electrically isolated from the neutral bar.

J. Stubs: Provide four 3/4 inch conduits from all flush mounted panels to adjacent accessible ceiling space and mark "for future use". Provide pull cord in all empty conduits and provide plastic end bushing.

K. Design Selection:

<u>120/208V</u>

Square "D", NQOD
Provide Bolt-on Breakers

PART 3 - EXECUTION

3.1 INSPECTION

A. General: Examine area to receive panelboard and assure that there is an adequate clearance to meet NEC requirements and normal maintenance issues.

B. Correction: Start work only after any unsatisfactory conditions has been corrected.

3.2 INSTALLATION

A. General: Provide panelboards in complete accordance with manufacturer's written instructions and all applicable codes.

B. Support: Panelboards shall be rigidly supported and installed per manufacturers recommended supporting instructions, with beams provided if necessary, to suit actual site conditions. Panels shall not be directly mounted to masonry walls. Use kindorf or similar channel.

C. Storage and Delivery: Panelboards shall be delivered to the site during that phase of panelboard installation in order to avoid storing panels on site where damage may occur. Replace any damaged parts prior to energizing panel. Cover panelboard to avoid damage to finish.

D. Mounting: Do not mount equipment directly to masonry or concrete walls. Provide two uni-strut spacers between wall and panelboard.

E. Operations and Maintenance Data: Manufacturer's instructions for tightening bus connections, cleaning, operation and maintenance.

3.3 QUALITY CONTROL

A. General: Field test prior to energization;

1. Megger check, and record all data, of phase to phase and phase to ground insulation levels.

2. Continuity.

3. Proper phase relationship.

3.4 CHECK-OUT MEMO

A. General: Submit check-out memo from panelboard representative.

END OF SECTION 262416

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Tampa, Florida

TPA LTPG ELEVATOR AC REPLACEMENT

INDEX OF DRAWINGS

DRAWING NUMBER	SHEET TITLE
	COVER SHEET AND INDEX OF DRAWINGS
M000	MECHANICAL SYMBOLS LEGEND
M001	MECHANICAL GENERAL NOTES
M101	MECHANICAL OVERALL PENTHOUSE PLAN
M201	MECHANICAL ENLARGED PENTHOUSE PLANS
M202	MECHANICAL ENLARGED PENTHOUSE PLANS
M203	MECHANICAL ENLARGED PENTHOUSE PLANS
M204	MECHANICAL ENLARGED PENTHOUSE PLANS
M301	MECHANICAL SECTIONS
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS
M503	MECHANICAL DETAILS
M601	MECHANICAL CONTROLS
M801	MECHANICAL SCHEDULES
E000	ELECTRICAL SYMBOL LEGEND
E101	ELECTRICAL OVERALL PENTHOUSE PLAN
E401	ELECTRICAL ENLARGED PLAN - QUAD A AND B
E402	ELECTRICAL ENLARGED PLAN - QUAD C AND D
E501	PARTIAL EXISTING ELECTRICAL ONE-LINE
E601	ELECTRICAL PICTURES - QUAD A WRIGHT BROTHERS (ORANGE)
E602	ELECTRICAL PICTURES - QUAD A WRIGHT BROTHERS (BROWN)
E603	ELECTRICAL PICTURES - QUAD A WRIGHT BROTHERS (PURPLE)
E604	ELECTRICAL PICTURES - QUAD A WRIGHT BROTHERS (GREEN)

Tampa International Airport®

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA INTERNATIONAL AIRPORT
TAMPA, FLORIDA

MAY 6TH, 2022

CONFORMED DOCUMENTS

HCAA PROJECT NUMBER: 6930 22

RS&H PROJECT NUMBER: 204.1880.038

PHASING PLAN

PHASE NO.	DURATION (DAYS)	ACTIVITY TYPE
1	30	PROCUREMENT: THIS PHASE CONSIST OF CONTRACTOR PROCUREMENT ALL ITEMS AND INFORMATION NECESSARY FOR THE COMPLETION OF THE PROJECT. THIS INCLUDES, BUT IS NOT LIMITED TO SUBMITTALS AND APPROVAL OF SHOP DRAWINGS, PROJECT SCHEDULE, SAFETY PLAN, CONTRACTOR REQUIRE PERMITING AND PROCUREMENT OF ALL EQUIPMENT NECESSARY FOR THE WORK.
2	117	PROJECT CONSTRUCTION: THIS PHASE CONSISTS OF ALL CONSTRUCTION ACTIVITY ASSOCIATED WITH THE PRJECT. THE CONTRACTOR HAS 117 DAYS TO COMPLETE ALL WORK ASSOCIATED WITH THIS PHASE.
2.1		MOBILIZATION AND GENERAL DEMOLITION: THIS PHASE CONSISTS OF THE MOBILIZATION OF ALL EQUIPMENT, MATERIALS, ETC. IT ALSO INCLUDES GENERAL SITE DEMOLITION AND PREPARATIONS FOR THE REPLACEMENT OF THE EXITING AIR HANDLERS.
2.2		GENERAL CONSTRUCTION: THIS PHASE CONSISTS OF THE COMPLETE EXISTING HVAC AT THE 4 LONG TERM PARKING GARAGE ELEVATOR PENTHOUSES, AS WELL AS ASSOCIATED DUCTWORK, COMPONENTS AND ACCESSORIES, AS IDENTIFIED IN THE CONTRACT DOCUMENTS.
2.3		COMMISSIONING: THIS PHASE CONSISTS OF SUBSTANTIAL COMPLETION INSPECTIONS, CONTROLS COMMISSIONING, AND OWNER INSPECTIONS. THE CONTRACTOR HAS 30 DAYS TO COMPLETE ALL WORK ASSOCIATED WITH THIS PHASE.
TOTAL	147	TOTAL PROJRCT DURATION (BUSINESS DAYS - EXCLUDING WEEKENDS AND HOLIDAYS

CONSTRUCTION DATA

PRIME CONTRACTOR: GIBSON AIR CONDITIONING AND REFRIGERATION, LLC.

MAJOR SUBCONTRACTORS AND/OR SUPPLIERS

TBD

WORK: COMMENCED TBD , COMPLETED TBD

COST: BID $ 230,755.00 FINAL $ TBD

PROJECT ENGINEER/INSPECTORS:

TBD

TBD

TLC ENGINEERING SOLUTIONS

EB #0000015

4890 W. Kennedy Blvd. - Suite 250
Tampa, Florida 33609
PH: 813.637.0110
www.tlc-engineers.com
TLC Number: 721128

SUBMITTED _____ DATE _____

Dominic J. Cacolici

P.E. No. 74491

HILLSBOROUGH COUNTY AVIATION AUTHORITY

TAMPA, FLORIDA

APPROVED _____ DATE _____

RS&H

Architectural, Engineering, Planning and Environmental Services

1715 N. Westshore Boulevard
Tampa, Florida 33607

www.rsandh.com
FL Cert Nos. AAC001886 EB0005620 LCC00210

ELECTRICAL SYMBOL LEGEND

BASIC MATERIALS

SYMBOL	DESCRIPTION
S_a^{WP}	SINGLE POLE SWITCH (SUBSCRIPT INDICATES ITEM CONTROLLED) WP - DENOTES WEATHER PROOF
	WALL MOUNTED OCCUPANCY SENSOR
	CEILING MOUNTED OCCUPANCY SENSOR
S_M	MANUAL MOTOR STARTER WITH OVERLOAD HEATERS
S_D	DIMMER SWITCH (1500 WATTS UNLESS OTHERWISE INDICATED)
	DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
WP	GFI RECEPTACLE. WP DENOTES WEATHERPROOF METALLIC IN-USE COVER (BOD - INTERMATIC).
	GFI RECEPTACLE MOUNTED ABOVE COUNTER
	TWO DUPLEX RECEPTACLES WITH COMMON COVER
	MOUNTED ABOVE COUNTER
	DUPLEX RECEPRACLE, CEILING MOUNTED
GND	GROUND BAR
J	JUNCTION BOX
J	WALL MOUNTED JUNCTION BOX, RECESSED U.O.N.
SPD	SURGE PROTECTIVE DEVICE
5	MOTOR CONNECTION, NUMBER DENOTES HORSEPOWER
30AR / NF	NON-FUSED DISCONNECT SWITCH, SIZE AS NOTED NF DENOTES NON-FUSED
30AR / 20AF	FUSED DISCONNECT AR DENOTES AMP RATING OF SWITCH AF DENOTES AMP FUSE SIZE
	BRANCH CIRCUIT PANELBOARD,UNDER 250 VOLTS, SURFACE MOUNTED
	BRANCH CIRCUIT PANELBOARD, OVER 250 VOLTS, SURFACE MOUNTED
	BRANCH CIRCUIT CONDUIT CONCEALED ABOVE CEILING OR IN WALL. CONDUIT SHALL INCLUDE PHASE, NEUTRAL AND GROUND CONDUCTORS AS REQUIRED FOR CIRCUITS (UNLESS OTHERWISE NOTED).

BASIC MATERIALS (CONT.)

SYMBOL	DESCRIPTION
	BRANCH CIRCUIT CONDUIT CONCEALED SLAB, UNDERGROUND OR UNDER FLOOR.
	BRANCH CIRCUIT CONDUIT EXPOSED
	GROUND OR GROUND ROD AS NOTED
UP	CONDUIT TURNING UP
DN	CONDUIT TURNING DOWN
	CONDUIT STUB
	CONDUIT CONTINUED
	FLEXIBLE CONDUIT
	EXISTING TO BE REMOVED
	EXISTING TO REMAIN
	EXISTING AFFECTED BY THIS PROJECT
	FUTURE
	NEW
T	TRANSFORMER

LIGHTING

SYMBOL	DESCRIPTION
	STRIP TYPE FIXTURE
A	FIXTURE DESIGNATION
	LIGHTING FIXTURE
#Z*a	# CIRCUIT NUMBER
	CIRCUIT AND CONTROLS DESIGNATION.
	Z CONTROL ZONE DESIGNATION (MAY NOT BE PRESENT)
	LIGHTING FIXTURE - COMPLETELY SHADED DENOTES LIGHT FIXTURE WITH EMERGENCY BATTERY PACK
	WALL MOUNTED LINEAR FIXTURE WITH WALL OUTLET BOX
	SUSPENDED LINEAR LED FIXTURE WITH EMERGENY BATTERY PACK
	EXIT LIGHT FIXTURE DIRECTION ARROWS AS SHOWN (SHADED QUADRANT INDICATES FACE(S) OF FIXTURE)
	WALL MOUNTED EXIT LIGHT FIXTURE
	BATTERY PACK WITH TWIN HEADS
	WALL MOUNTED LIGHTING FIXTURE
PC	PHOTOCELL

ELECTRICAL SHEET INDEX

Sheet Number	Sheet Name
E000	ELECTRICAL SYMBOL LEGEND
E101	ELECTRICAL OVERALL PENTHOUSE PLAN
E401	ELECTRICAL ENLARGED PLAN - QUAD A AND B
E402	ELECTRICAL ENLARGED PLAN - QUAD C AND D
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E602	ELECTRICAL PICTURES - QUAD B LINDBERG (BROWN)
E603	ELECTRICAL PICTURES - QUAD C JANNUS (PURPLE)
E604	ELECTRICAL PICTURES - QUAD D GODDARD (GREEN)

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT.

CODE REFERENCES

A. REQUIREMENTS: ALL MATERIALS AND TYPES OF CONSTRUCTION COVERED IN THE SPECIFICATIONS WILL BE REQUIRED TO MEET OR EXCEED APPLICABLE STANDARDS OF MANUFACTURER, TESTING, PERFORMANCE, AND INSTALLATION ACCORDING TO THE REQUIREMENTS OF UL, ANSI, NEMA, IEEE, AND NEC REFERENCED DOCUMENTS WHERE INDICATED AND THE MANUFACTURER'S RECOMMENDED PRACTICES. REQUIREMENTS INDICATED ON THE CONTRACT DOCUMENTS THAT EXCEED BUT ARE NOT CONTRARY TO GOVERNING CODES SHALL BE FOLLOWED.

B. LABELS: MATERIALS AND EQUIPMENT SHALL BE NEW AND FREE OF DEFECTS, AND SHALL BE U.L. LISTED, BEAR THE U.L. LABEL OR BE LABELED OR LISTED WITH AN APPROVED, NATIONALLY RECOGNIZED ELECTRICAL TESTING AGENCY. WHERE NO LABELING OR LISTING SERVICE IS AVAILABLE OR DESIRED FOR CERTAIN TYPES OF EQUIPMENT, TEST DATA SHALL BE SUBMITTED TO VALIDATE THAT EQUIPMENT MEETS OR EXCEEDS AVAILABLE STANDARDS.

C. ALL WORK AND EQUIPMENT UNDER THIS DIVISION SHALL BE IN STRICT COMPLIANCE WITH THE CODES, STANDARDS AND PRACTICES LISTED HEREIN, AND THEIR RESPECTIVE DATES ARE FURNISHED AS THE MINIMUM LATEST REQUIREMENTS.

1. STATE OF FLORIDA.
2. 2017 LIFE SAFETY CODE - NFPA 101
3. UNDERWRITERS LABORATORIES, INC. PUBLICATIONS
4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).
5. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
6. 2017 NATIONAL ELECTRICAL CODE - NFPA 70
7. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE).
8. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA).
9. REQUIREMENTS OF LOCAL POWER COMPANY.
10. 2020 FLORIDA BUILDING CODE.
11. HILLSBOROUGH COUNTY.
12. CITY OF TAMPA.

ELECTRICAL GENERAL NOTES

1. NEW CONDUCTORS SHALL BE COPPER AWG AND MANUFACTURED IN THE USA. PROVIDE THHN-2 FOR BRANCH CIRCUIT WIRING. SOLID CONDUCTOR FOR #10 AND SMALLER AND STRANDED FOR #8 AND LARGER.
2. REFER TO THE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.
3. THE EXCLUSIVELY DEDICATED SPACE EXTENDING FROM FLOOR TO STRUCTURAL CEILING WITH A WIDTH AND DEPTH OF THE PANELBOARD OR SWITCHBOARD MUST BE CLEAR OF ALL PIPING, DUCTS, EQUIPMENT FOREIGN TO THE ELECTRICAL EQUIPMENT.
4. COORDINATE OUTLET BOX LOCATIONS WITH MASONRY TO MINIMIZE CUTTING OF BRICK OR BLOCK.
5. ALL MOUNTING HEIGHTS TO CENTERLINE OF ITEM UNLESS OTHERWISE NOTED. VERIFY ALL OUTLET LOCATIONS ON THE JOB PRIOR TO ROUGH-IN.
6. CONDUIT RUN WITH CONDUCTORS AS INDICATED & GROUND WIRE SIZED PER N.E.C 250-122. CONDUIT SIZE AS REQUIRED.
7. WHEN INCREASED CONDUCTOR SIZES ARE SHOWN ON THE PLANS, THE LARGER CONDUCTOR SIZE SHALL BE USED THROUGHOUT THE LENGTH OF THE CIRCUIT, INCLUDING NEUTRAL AND GROUND. CONDUCTOR REDUCED TO MATCH RATING OF DEVICE OR EQUIPMENT WITHIN 10' AT THE END OF THE RUN.
8. EACH BRANCH CIRCUIT RACEWAY SHALL HAVE A FULL LENGTH EQUIPMENT GROUND CONDUCTOR. THE LENGTH OF THE CIRCUIT IN ADDITION TO THE PHASE, NEUTRAL AND EQUIPMENT GROUND CONDUCTORS.
9. ALL BRANCH CIRCUIT HOMERUNS SHALL BE ROUTED IN 3/4"C. MINIMUM UNLESS OTHERWISE NOTED ON PLANS.
10. ALL BRANCH CIRCUIT CONDUITS SHALL CONTAIN A MINIMUM OF (2) #12AWG WIRES, PLUS A MINIMUM OF #12AWG GROUND WIRE UNLESS OTHERWISE NOTED. ALL BRANCH AND FEEDER CIRCUITS SHALL HAVE INDIVIDUAL NEUTRAL CONDUCTORS.
11. CONTRACTOR SHALL UPSIZE FEEDER AND BRANCH CIRCUIT WIRE SIZE AS REQUIRED TO COMPENSATE VOLTAGE DROP FROM LENGTHENING OF CIRCUITS DUE TO FIELD ROUTING. FINAL INSTALLATION SHALL MEET FLORIDA BUILDING CODE REQUIREMENT OF MAXIMUM BRANCH CIRCUIT VOLTAGE DROP OF:

   * MAXIMUM OF 5% TOTAL VOLTAGE DROP BETWEEN FEEDER AND BRANCH CIRCUIT.
12. CONTRACTOR SHALL LABEL ALL DEVICES WITH SOURCE AND CIRCUIT NUMBER FOR SWITCH AND RECEPTACLES WITHIN PROJECT SCOPE.
13. EQUIPMENT SHALL BE OF MATERIALS SUITABLE FOR AND RATED FOR THE ENVIRONMENT IN WHICH THEY ARE TO BE INSTALLED.
14. WORKING CLEARANCES FOR ELECTRICAL EQUIPMENT SHALL BE IN COMPLIANCE WITH NEC 110.
15. ALL PANELS MODIFIED DURING RENOVATION SHALL BE PROVIDED WITH A NEW TYPE WRITTEN DIRECTORY.
16. CONTRACTOR SHALL CONFIRM VOLTAGE SUPPLIED WITH EQUIPMENT PRIOR TO CONNECTION.
17. PHASE WORK TO MINIMIZE ELECTRICAL PANEL SHUT DOWNS FOR MODIFICATIONS WITHIN THE SCOPE OF THE PROJECT. COORDINATE ANY PANEL SHUT DOWN REQUIREMENTS WITH OWNER A MINIMUM OF ONE WEEK IN ADVANCE.

RACEWAY EXPECTATIONS:

PVC: USE FOR UNDERGROUND, BELOW GRADE OR WITHIN CONCRETE SLAB APPLICATIONS.

EMT: USE WITHIN INTERIOR SPACES ONLY WHERE ROOM IS ENTIRELY CLOSED FROM EXTERIOR ELEMENTS. STEEL COMPRESSION FITTINGS WITH INSULATED THROAT.

GRC: USE WHERE EXPOSED TO EXTERIOR WEATHER ELEMENTS. THIS INCLUDES OPEN AREAS WITH COVER THAT ARE EXPOSED TO EXTERIOR CONDITIONS. ROOF APPLICATIONS WILL HAVE GRC WITH PVC COATING.

METAL FLEX: USE FOR INTERIOR APPLICATIONS AT TRANSFORMER, MOTOR CONNECTIONS, OR LIGHT FIXTURE APPLICATIONS.

LIQUID SEAL TITE: USE FOR EXTERIOR APPLICATIONS AT TRANSFORMER, MOTOR CONNECTIONS, OR LIGHT FIXTURE APPLICATIONS.

MC/AC: NOT PERMITTED ANYWHERE.

GENERAL CONDITIONS:

UTILIZE NEMA 4X STAINLESS STEEL BOX FOR ABOVE GRADE APPLICATIONS. DISCONNECT SWITCHES AT EXTERIOR SHALL BE NEMA 4X STAINLESS STEEL.
DISCONNECT SWITCHES AT INTERIOR SHALL BE NEMA 1.
INSTALLER TO VERIFY ANY EXISTING UTILITY LOCATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

TO THE BEST OF THE ARCHITECT'S OR ENGINEER'S KNOWLEDGE THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY RONALD LESLIE O'BRIEN, EOR. ON THE DATE ADJACENT TO THE SEAL USING A SHA AUTHENTICATION CODE.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND THE SHA AUTHENTICATION CODE MUST BE VERIFIED ON ANY ELECTRONIC COPY.

RONALD LESLIE O'BRIEN
LICENSE
No. 65501
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

CONFORMED DOCUMENTS

Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

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COA 15
TLC No.: 721128
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REVISIONS | BY | DATE

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

RS&H

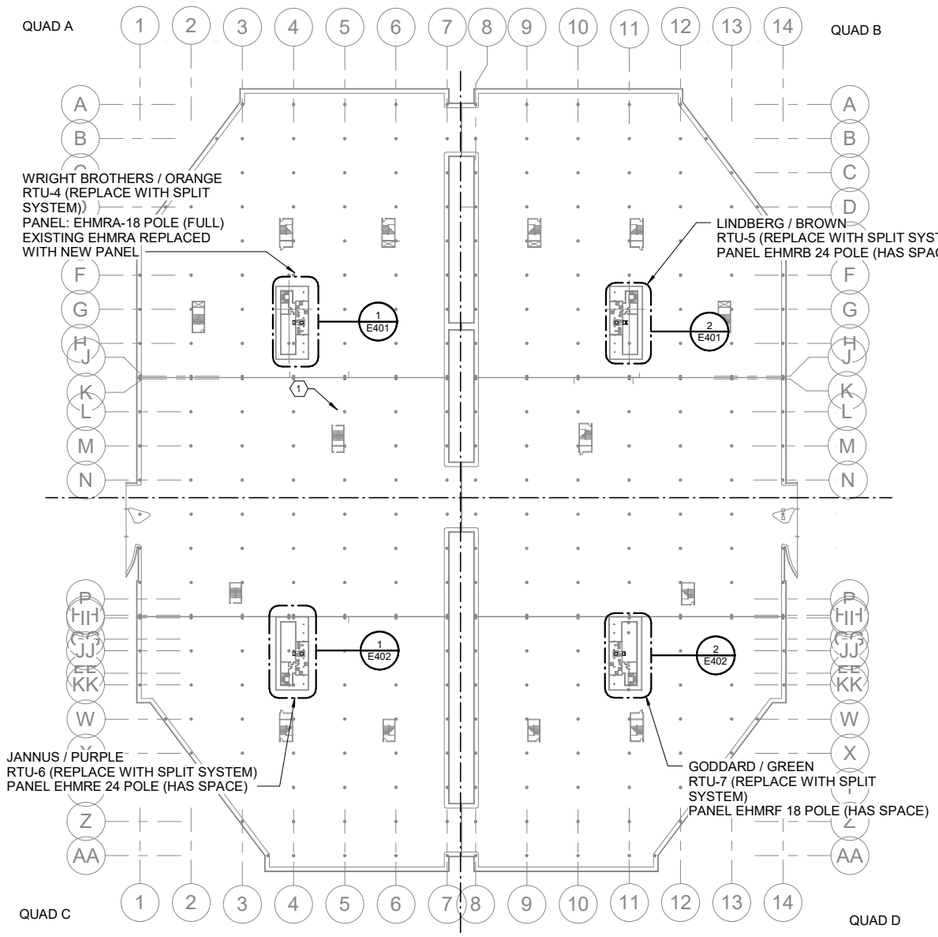
Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL SYMBOL LEGEND

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

SHEET NO.: E000



KEYNOTES

1 APPROXIMATE LOCATION OF BRANCH ELECTRICAL ROOM WITH EXISTING PANEL EDPA (LEVEL 1)

N

1 ELECTRICAL PENTHOUSE PLAN

64 0 64 128

SCALE: 1/64" = 1'-0"

CONFORMED DOCUMENTS

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY RONALD LESLIE O'BRIEN, EOR, ON THE DATE ADJACENT TO THE SEAL USING A SHA AUTHENTICATION CODE.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND THE SHA AUTHENTICATION CODE MUST BE VERIFIED ON ANY ELECTRONIC COPY.

RONALD LESLIE O'BRIEN LICENSE No. 65501 STATE OF FLORIDA PROFESSIONAL ENGINEER

Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

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DATE	REVISIONS	BY

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

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RS&H, Inc.
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www.rsandh.com
FL Reg. #AA000886
EB0005420 LC0000210

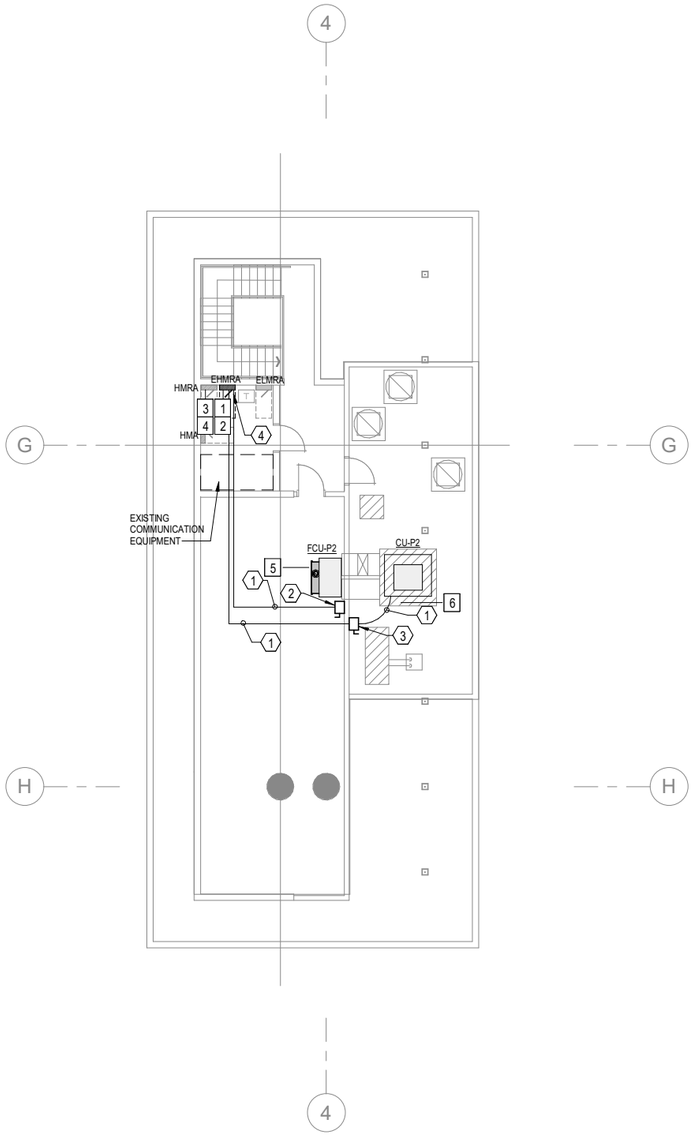
Tampa International Airport

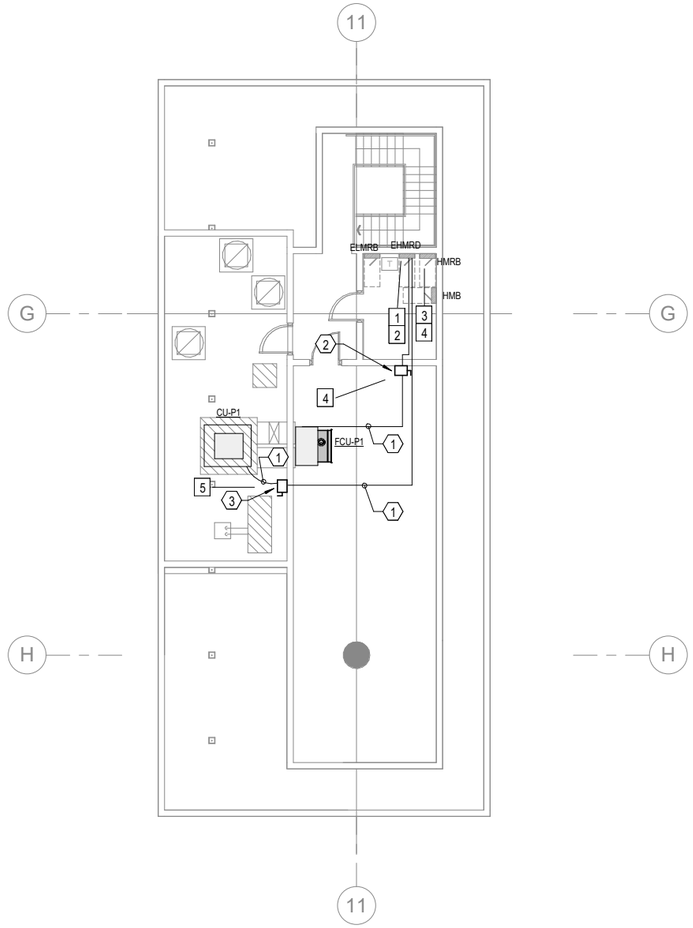
PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY - TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL OVERALL PENTHOUSE PLAN

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

E101
SHEET NO.:





N

1 ELECTRICAL PENTHOUSE PLAN - QUAD A WRIGHT BROTHERS / ORANGE

GENERAL NOTES (ORANGE):

1. DEMOLITION: REMOVE EXISTING CONDUCTOR FROM PANEL HMRA FOR RTU-4 AND ALSO REMOVE CONDUIT WHERE POSSIBLE.
2. RENOVATION: NEW SPLIT SYSTEM SERVED FROM EXISTING GENERATOR POWERED PANEL.
3. REFER TO SHEET E601 FOR ADDITIONAL INFORMATION.

KEYED NOTES:

1. (3)#10, (1)#10EG IN 3/4" CONDUIT.
2. 30 AMP FRAME, 3 POLE, 600V, NEMA 1 NON FUSED DISCONNECT SWITCH.
3. 30 AMP FRAME, 3 POLE, 600V, NEMA 4X STAINLESS STEEL, FUSE TO NAMEPLACE DISCONNECT SWITCH.
4. REPLACE EXISTING PANEL WITH NEW 480V, 3 PHASE, 225A, 30 POLE PANELBOARD AND LABEL (MATCH EXISTING ELECTRICAL CHARACTERISTICS, AIC, VOLTS, AMPS, ETC). THE ROOM HAS NO SPACE FOR ADDITIONAL PANEL SO EXISTING PANEL WILL NEED TO BE REPLACED. COORDINATE ALL DOWNTIMES WITH AUTHORITY PRIOR TO REPLACEMENT.

N

2 ELECTRICAL PENTHOUSE PLAN - QUAD B LINDBERG / BROWN

GENERAL NOTES (BROWN):

1. DEMOLITION: REMOVE EXISTING CONDUCTOR FROM PANEL HMRB FOR RTU-5 AND ALSO REMOVE CONDUIT WHERE POSSIBLE.
2. RENOVATION: NEW SPLIT SYSTEM SERVED FROM EXISTING GENERATOR POWERED PANEL.
3. REFER TO SHEET E602 FOR ADDITIONAL INFORMATION.

KEYED NOTES:

1. (3)#10, (1)#10EG IN 3/4" CONDUIT.
2. 30 AMP FRAME, 3 POLE, 600V, NEMA 1 NON FUSED DISCONNECT SWITCH.
3. 30 AMP FRAME, 3 POLE, 600V, NEMA 4X STAINLESS STEEL, FUSE TO NAMEPLACE DISCONNECT SWITCH.

16 0 16 32

SCALE: 1/16" = 1'-0"

CONFORMED DOCUMENTS

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PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL ENLARGED PLAN - QUAD A AND B

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RONALD LESLIE O'BRIEN
LICENSE
No. 65501
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

E401
SHEET NO.:

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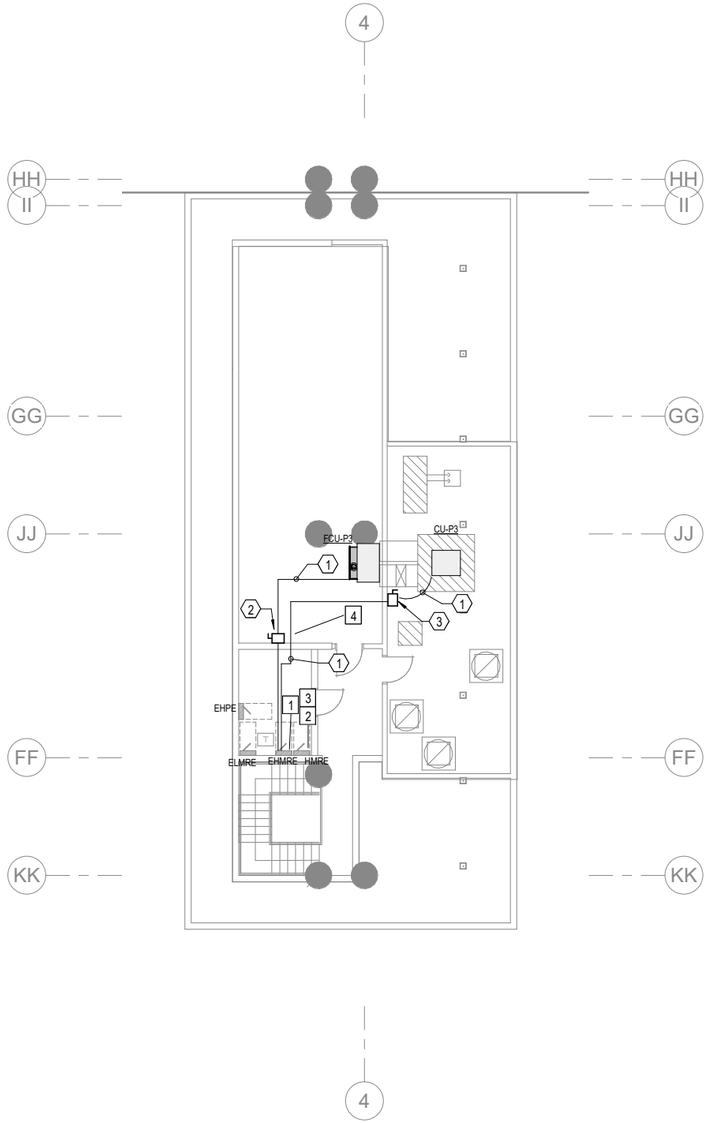
TLC No.:721128
THINK. LISTEN. CREATE.



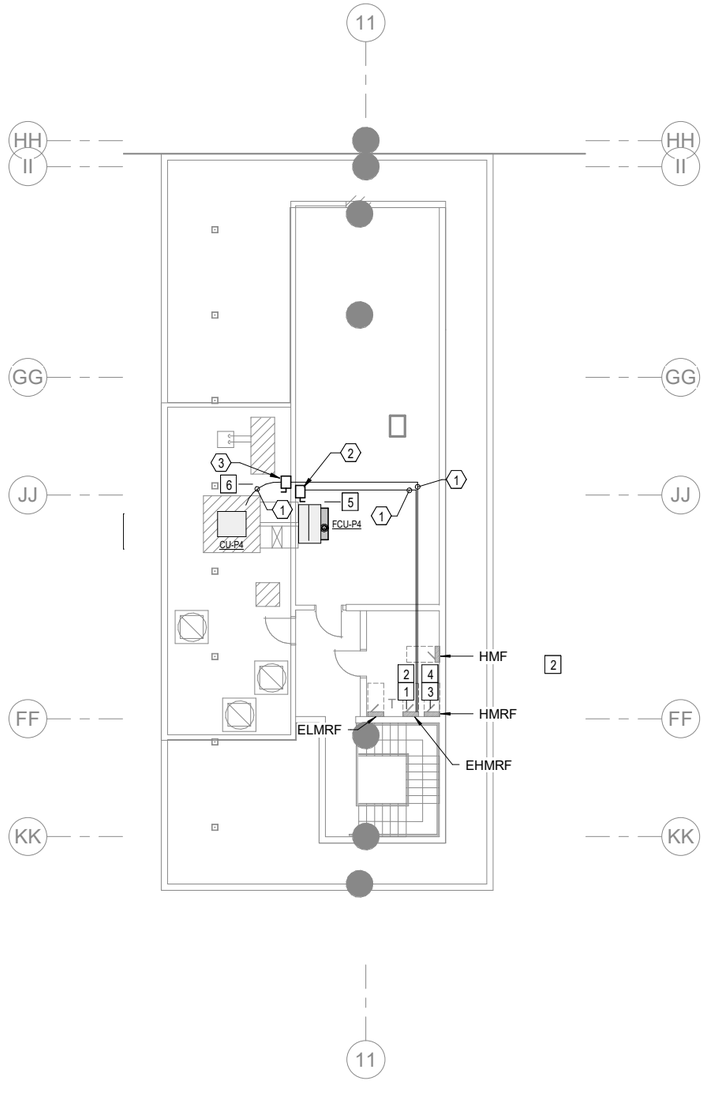
1 ELECTRICAL PENTHOUSE PLAN - QUAD C JANNUS / PURPLE

GENERAL NOTES (PURPLE):

1. DEMOLITION: REMOVE EXISTING CONDUCTOR FROM PANEL HMRE FOR RTU-6 AND ALSO REMOVE CONDUIT WHERE POSSIBLE.
2. RENOVATION: NEW SPLIT SYSTEM SERVED FROM EXISTING GENERATOR POWERED PANEL.
3. REFER TO SHEET E603 FOR ADDITIONAL INFORMATION.

KEYED NOTES:

1. (3)#10, (1)#10EG IN 3/4" CONDUIT.
2. 30 AMP FRAME, 3 POLE, 600V, NEMA 1 NON FUSED DISCONNECT SWITCH.
3. 30 AMP FRAME, 3 POLE, 600V, NEMA 4X STAINLESS STEEL, FUSE TO NAMEPLACE DISCONNECT SWITCH.



2 ELECTRICAL PENTHOUSE PLAN - QUAD D GODDARD / GREEN

GENERAL NOTES (GREEN):

1. DEMOLITION: REMOVE EXISTING CONDUCTOR FROM PANEL HMRF FOR RTU-7 AND ALSO REMOVE CONDUIT WHERE POSSIBLE.
2. RENOVATION: NEW SPLIT SYSTEM UNIT SERVED FROM EXISTING GENERATOR POWERED PANEL.
3. REFER TO SHEET E604 FOR ADDITIONAL INFORMATION.

KEYED NOTES:

1. (3)#10, (1)#10EG IN 3/4" CONDUIT.
2. 30 AMP FRAME, 3 POLE, 600V, NEMA 1 NON FUSED DISCONNECT SWITCH.
3. 30 AMP FRAME, 3 POLE, 600V, NEMA 4X STAINLESS STEEL, FUSE TO NAMEPLACE DISCONNECT SWITCH.

16 0 16 32
SCALE: 1/16" = 1'-0"

CONFORMED DOCUMENTS

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RONALD LESLIE O'BRIEN LICENSE No. 65501 STATE OF FLORIDA PROFESSIONAL ENGINEER

Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

DATE	REVISIONS	BY

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

Tampa International Airport

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EB0005420 LC0000210

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL ENLARGED PLAN - QUAD C AND D

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

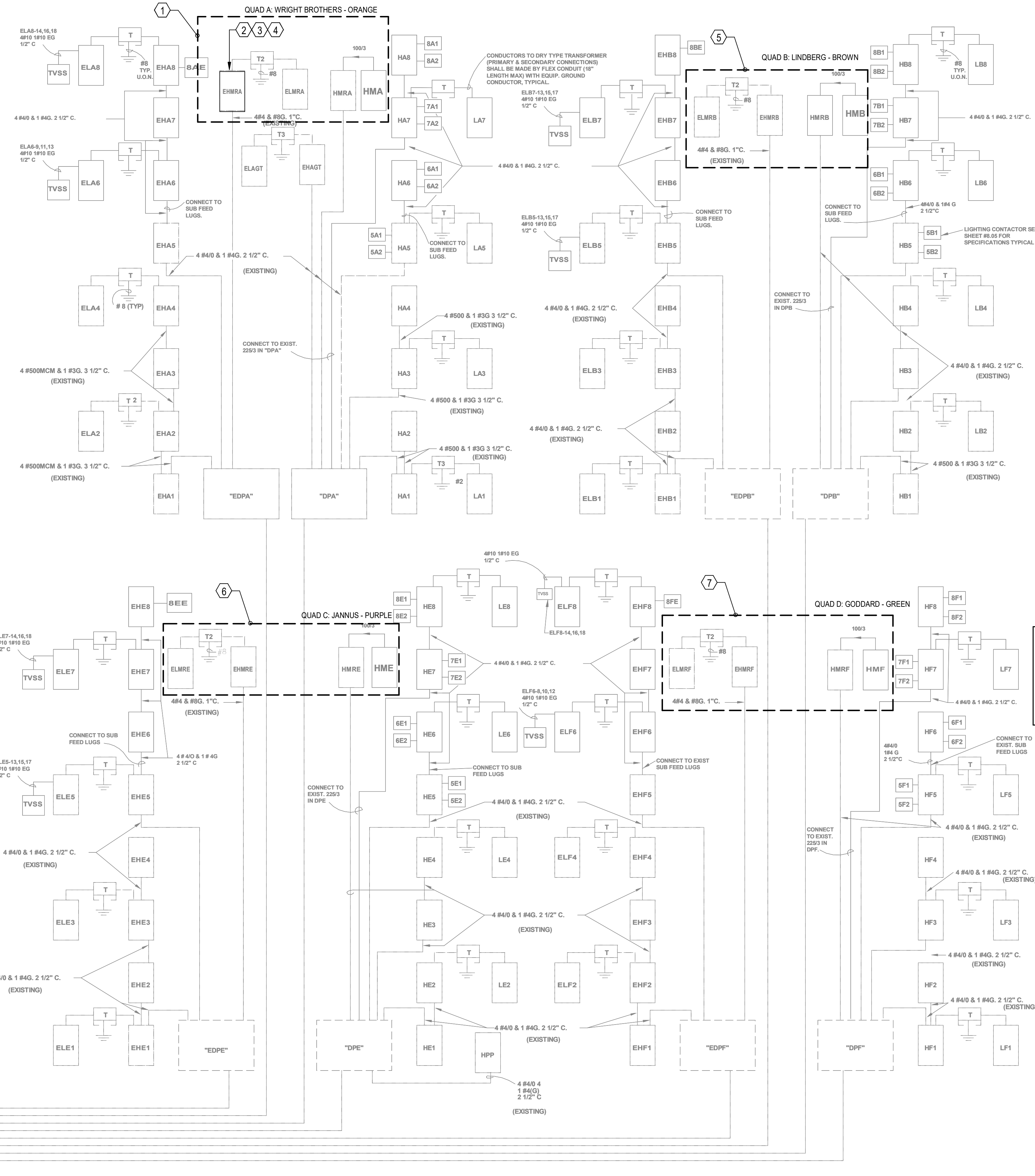
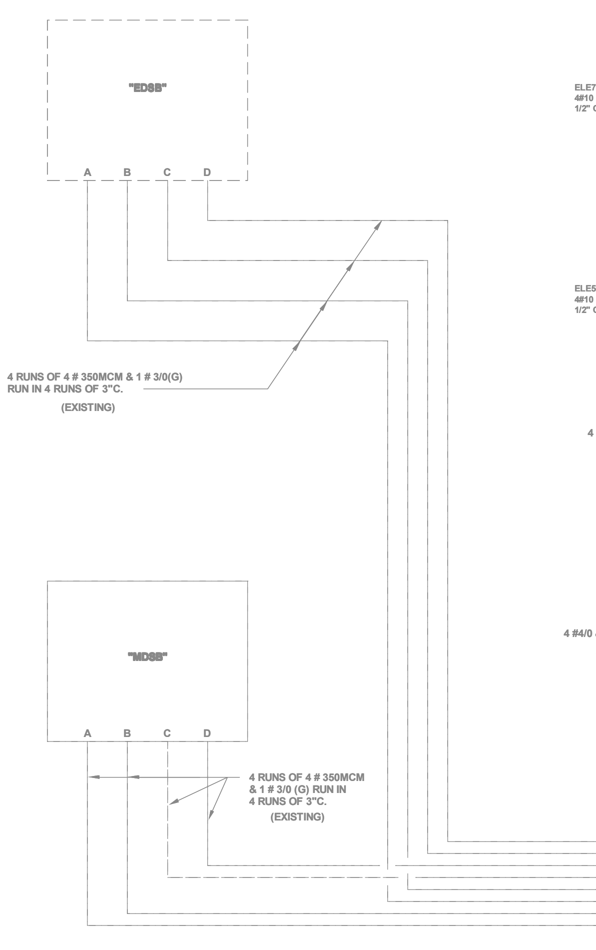
E402
SHEET NO.:

GENERAL NOTES:

1. ALL ITEMS SHOWN ON THIS SHEET ARE EXISTING TO REMAIN UNLESS OTHERWISE NOTED. THIS IS SHOWN FOR REFERENCE ONLY.
2. WIRE SIZES SHOWN ARE FROM AS-BUILT DOCUMENTS AND SHOWN FOR REFERENCE ONLY.

KEYED NOTES:

1. QUAD A: WRIGHT BROTHERS - ORANGE. EXISTING PANEL EHMRA IS 18 POLE AND FULL. THE EXISTING PANEL EHMRA WILL BE REMOVED AND REPLACED WITH NEW 30 POLE PANELBOARD.
2. DISCONNECT EXISTING CONDUIT / CONDUCTORS FROM EXISTING PANEL AND RECONNECT WITH NEW PANELBOARD.
3. REPLACE PANEL WITH MINIMAL DOWNTIME. COORDINATE WITH THE AUTHORITY PRIOR TO PANEL REPLACEMENT.
4. REFER TO SHEET E601 FOR NEW PANEL SCHEDULE.
5. QUAD B: LINDBERG - BROWN. EXISTING PANEL EHMRB IS 24 POLE AND HAS SPACE FOR (2) 3 POLE BREAKERS FOR NEW SPLIT SYSTEM. REFER TO SHEET E602.
6. QUAD C: JANNUS - PURPLE. EXISTING PANEL EHMRE IS 24 POLE AND HAS SPACE FOR (2) 3 POLE BREAKER FOR NEW SPLIT SYSTEM AIR UNIT. REFER TO SHEET E603.
7. QUAD D: GODDARD - GREEN. EXISTING PANEL EHMRF IS 18 POLE. REMOVE (6) 20/A BREAKERS AND PROVIDE (2) NEW 3 POLE BREAKERS FOR NEW SPLIT SYSTEM AIR UNIT. REFER TO SHEET E604.

1 PARTIAL ELECTRICAL EXISTING RISER DIAGRAM

LOAD SUMMARY (GENERATOR LOAD STATUS)

RECENT ELEVATOR REPLACEMENT AT EACH QUAD REDUCED GENERATOR LOAD (16 TOTAL ELEVATORS - ORIGINAL 50 HP MOTOR HOIST REDUCED TO 36 HP WITH ELEVATOR UPGRADE).

WITH THE NEW ELEVATOR MACHINE ROOM SPLIT AIR CONDITION UNIT ADDED TO GENERATOR, THE NEW LOAD ADDED TO GENERATOR DOES NOT EXCEED ORIGINAL GENERATOR LOAD PRIOR TO THE REDUCED HOIST MOTOR LOADS DURING ELEVATOR REPLACEMENTS.

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REVISIONS	DATE	BY

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TAMPA, FLORIDA

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Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

CONFORMED DOCUMENTS

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
PARTIAL EXISTING ELECTRICAL ONE LINE

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

E501
SHEET NO.:

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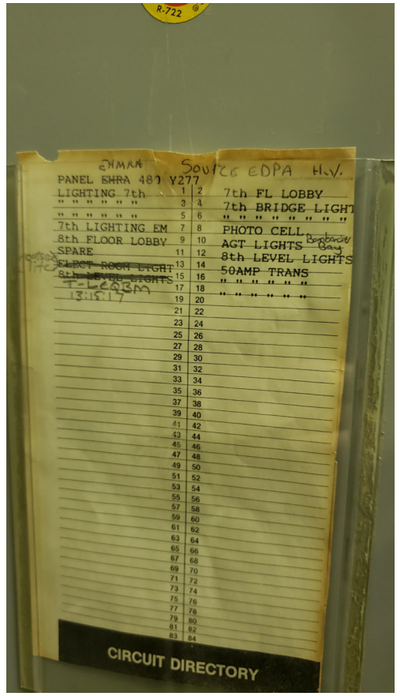
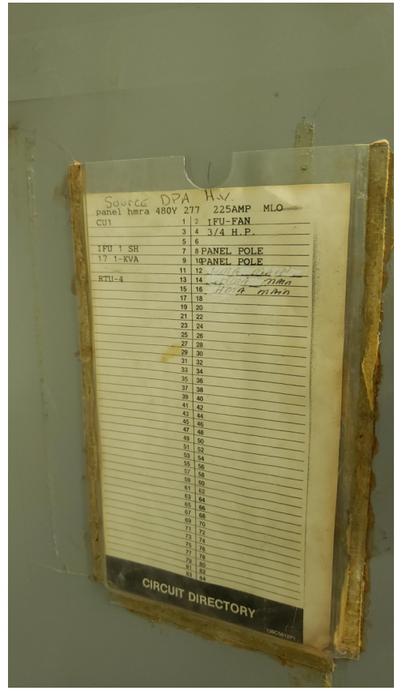
1. PANEL EHMREA
2 EXISTING 18 POLE PANEL TO BE REPLACED WITH NEW 30 POLE PANEL.
3. SEE SHEET E101 FOR PANEL EDPA SERVING THIS PANEL (80A/3) AND COORDINATE ALL DOWN TIME WITH AUTHORITY PRIOR TO PANEL CHANGE OUT.



1. PANEL SCHEDULE FOR EHMRA
2. UPDATE PANEL SCHEDULEAND INCLUDE NEW (2) 15A/3 BREAKERS.

1. PANEL HMRA
2. RELABLE 50A/3 BREAKER FOR RTU-4 AS SPARE



1. PANEL SCHEDULE FOR HMRE
2. RELABEL 13,15,17 AS SPARE BREAKER

1. INTERIOR WALL AT NEW FCU LOCATION AND ROOM FOR NEW DISCONNECT AT WALL FOR FCU.

1. EXTERIOR WALL AT NEW CU LOCATION AND WALL AREA FOR NEW DISCONNECT AT WALL FOR CU.

WRIGHT BROTHERS (ORANGE)

NEW PANEL

Name: EHMRA

MAIN BREAKER: ____ AMPS 30 POLE
MAIN LUGS: 225 AMPS
K.A.I.C. : MATCH AMPS
SURFACE MTD: X
FLUSH MTD: ____

3 PHASE
4 WIRE
208Y/120V
X 480Y/277V
240/120V

Project Name: A LTPG AIT CON REPLACEMENT
Project Number: 721128
Fed From: EDPA

NOTES	CKT NO	IDENTIFICATION	CODE	LOAD/PHASE (KVA) A	B	C	CIRCUIT BREAKER TRIP	POLES	POLES	TRIP	LOAD/PHASE (KVA) A	B	C	CODE	IDENTIFICATION	CKT NO	NOTES
	1	EXISTING KIGHTING 7TH FLOOR	L	0.4			20	1	1	20	0.7			L	EXISTING 7TH FLOOR LOBBY	2	
	3	EXISTING LIGHTING 7TH FLOOR	L		0.7		20	1	1	20		0.4		L	EXISTING BRIDGE LIGHTING	4	
	5	EXISTING LIGHTING 7TH FLOOR	L			0.5	20	1	1	20			0.9	L	EXISTING BRIDGE LIGHTING	6	
	7	EXISTING LIGHTING 7TH FLOOR EM	L	0.4			20	1	1	20	0.6			L	EXISTING PHOTOCELL	8	
	9	EXISTING LIGHTING 8TH FL LOBBY	L		0.9		20	1	1	20		0.9		L	EXISTING ATG LIGHTING	10	
	11	SPARE					20	1	1	20			0.8	L	EXISTING 8TH FLOOR LIGHTING	12	
	13	EXISTING T-LEQBM COMM EQUIP	O	3.4			45	3	3	50	5.2			O	EXISTING T-ELMRA PANEL (RECEPTS)	14	
	15	* ------	O		3.4		-	-	-	-		5.2		O	------	16	
	17	------	O			3.5	-	-	-	-			5.2	O	------	18	
	19	FCU-P2	M	2.6			15	3	1	20					SPACE	20	
	21	------	M		2.6		-	-	1	20					SPACE	22	
	23	------	M			2.6	-	-	1	20					SPACE	24	
	25	CU-P2	M	2.4			15	3	1	20					SPACE	26	
	27	------	M		2.4		-	-	1	20					SPACE	28	
	29	------	M			2.4	-	-	1	20					SPACE	30	
				9.2	10.0	9.0					6.5	6.5	6.9				

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	7.2	1.25	1.00	9.0
RECEPTACLES (R)	0.0	---	NEC	0.0
LARGEST MOTOR (M)	7.8	1.25	1.00	9.8
ALL OTHER MOTORS (M)	7.2	1.00	1.00	7.2
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	25.9	1.00	1.00	25.9
ELEVATOR (V)	0.0	1.00	1.00	0.0
SPARES (S)	0.0	1.00	1.00	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
X-RAY (X)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

TOTAL CONNECTED LOAD: 48.1 KVA
TOTAL DEMAND LOAD: 51.9 KVA
DEMAND AMPS: 62.4 AMPS

PERCENT IMBALANCE: 5 %

CONFORMED DOCUMENTS

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Ronald Leslie O'Brien, P.E.
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DATE	REVISIONS	BY

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TAMPA, FLORIDA

Tampa International Airport

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FL Reg. No. 00000886
EB0005420 LC0000210

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
400 GEORGE J. BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL PICTURES - QUAD A WRIGHT BROTHERS (ORANGE)

DESIGNED: Designer
DRAWN: Author
CHECKED: Checker
HCAA NO.: 6930 22
JOB NO.: 204.1880.038
DATE: MAY 6TH 2022

E601
SHEET NO.:

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TLC No.:721128
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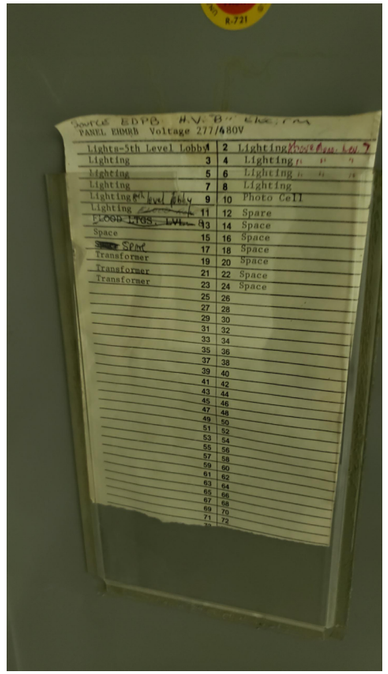
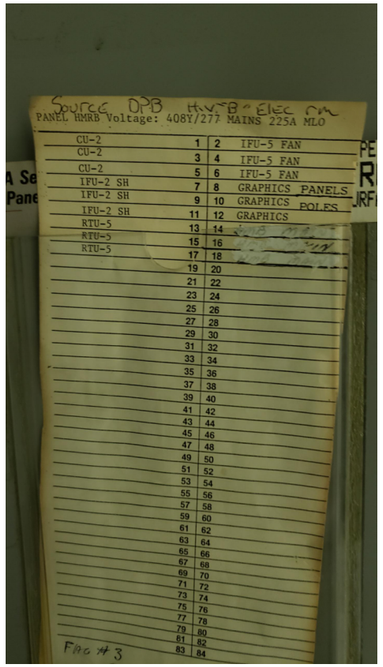
DATE		REVISIONS	BY

1 1. PANEL EHMREB
2 ADD (1) 15A/3 FOR NEW INTERIOR FOR FCU-P1 AND (1) 15A/3 BREAKER FOR EXTERIOR CU-P1 TO NEW PANEL.

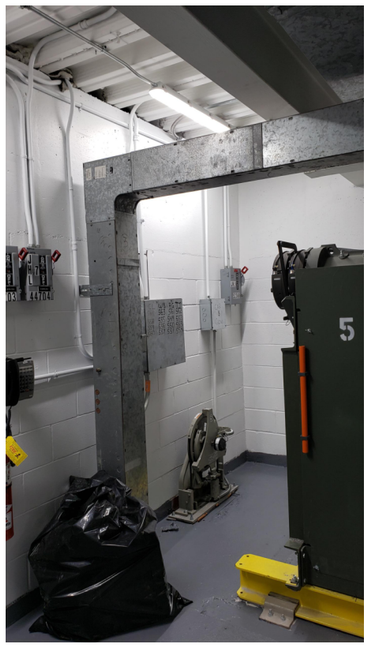


2 1. PANEL SCHEDULE FOR EHMRE
2. UPDATE PANEL SCHEDULE WITH NEW (2) 15A/3 BREAKERS.

3 1. PANEL HMRB
2. RELABLE 50A/3 BREAKER FOR RTU-5 AS SPARE



4 1. PANEL SCHEDULE FOR HMRE
2. RELABEL 13,15,17 AS SPARE BREAKER



5 1. INTERIOR WALL AT NEW FCU LOCATION AND ROOM FOR NEW DISCONNECT AT WALL FOR FCU.

6 1. EXTERIOR WALL AT NEW CU LOCATION AND WALL AREA FOR NEW DISCONNECT AT WALL FOR CU.

EXISTING GENERAL ELECTRIC SERIES A PANEL

EXISTING PANEL

Name: EHMRB

MAIN BREAKER: ____ AMPS 24 POLE
MAIN LUGS: 200 AMPS
K.A.I.C. : MATCH AMPS
SURFACE MTD: X
FLUSH MTD: ____

3 **PHASE**
4 **WIRE**
____ **208Y/120V**
X **480Y/277V**
____ **240/120V**

Project Name: TPA LTPG A/C REPLACEMENT
Project Number: 721128
Fed From: EDPB

NOTES	CKT NO	IDENTIFICATION	CODE	LOAD/PHASE (KVA) A	B	C	CIRCUIT BREAKER TRIP	POLES	POLES	TRIP	LOAD/PHASE (KVA) A	B	C	CODE	IDENTIFICATION	CKT NO	NOTES
1	1	LIGHTING	L	0.9			20	1	1	20	0.8			L	LIGHTING	2	1
1	3	LIGHTING	L		0.9		20	1	1	20		0.5		L	LIGHTING	4	1
1	5	LIGHTING	L			0.9	20	1	1	20			0.9	L	LIGHTING	6	1
1	7	LIGHTING	L	0.8			20	1	1	20	0.8			L	LIGHTING	8	1
1	9	LIGHTING	L		0.9		20	1	1	20		0.2		L	PHOTOCELL	10	1
1	11	LIGHTING	L			0.7	20	1	1	20					SPARE	12	
1	13	LIGHTING	L	0.7			20	1	3	15	2.4			O	FCU-P1	14	2
	15	SPARE					20	1	-	-		2.4		O	------	16	
	17	SPARE					20	1	-	-			2.4	O	------	18	
1	19	X-FMR ELMRB (RECEPTS, CAM)	O	5.6			45	3	3	15	2.6			O	CU-P1	20	2
	21	------	O		5.6		-	-	-	-		2.6		O	------	22	
	23	------	O			5.6	-	-	-	-			2.6	O	------	24	
				8.0	7.4	7.2					6.6	5.7	5.9				

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	9.0	1.25	1.00	11.3
RECEPTACLES (R)	0.0	---	NEC	0.0
LARGEST MOTOR (M)	0.0	1.25	1.00	0.0
ALL OTHER MOTORS (M)	0.0	1.00	1.00	0.0
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	31.8	1.00	1.00	31.8
ELEVATOR (V)	0.0	1.00	1.00	0.0
SPARES (S)	0.0	1.00	1.00	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
X-RAY (X)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

TOTAL CONNECTED LOAD: 40.8 KVA
TOTAL DEMAND LOAD: 43.1 KVA
DEMAND AMPS: 51.8 AMPS

PERCENT IMBALANCE: 10 %

NOTES:
1. EXISTING BREAKER TO REMAIN
2. NEW BREAKER

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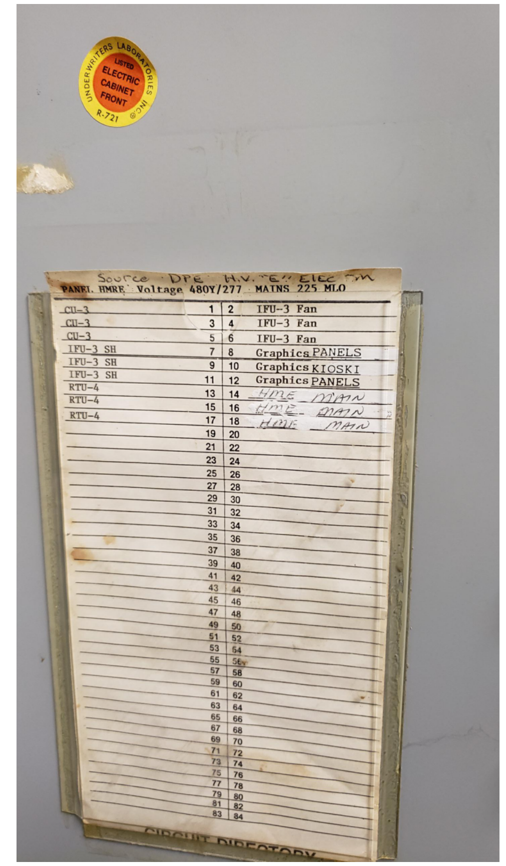
PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
400 GEORGE J. BEAN PKWY., TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL PICTURES - QUAD B
LINDBERG (BROWN)

DESIGNED:	Designer
DRAWN:	Author
CHECKED:	Checker
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

E602
SHEET NO.:



1 1. PANEL EHMRE
2 ADD (1) 15A/3 FOR NEW INTERIOR FOR FCU-P3 AND (1) 15A/3 BREAKER FOR EXTERIOR CU-P3 TO NEW PANEL.

2 1. PANEL HMRE
2. RELABLE 50A/3 BREAKER FOR RTU-7 AS SPARE

3 1. PANEL SCHEDULE FOR HMRE
2. RELABEL 13,15,7 AS SPARE BREAKER

4 1. INTERIOR WALL AT NEW FCU LOCATION AND ROOM FOR NEW DISCONNECT AT WALL FOR FCU.

5 1. EXTERIOR WALL AT NEW CU LOCATION AND WALL AREA FOR NEW DISCONNECT AT WALL FOR CU.

EXISTING GENERAL ELECTRIC SERIES A PANEL

EXISTING PANEL

Name: EHMRE

MAIN BREAKER: ____ AMPS 24 POLE 3 PHASE
MAIN LUGS: 200 AMPS 4 WIRE
K.A.I.C. : EXIST AMPS 208Y/120V
SURFACE MTD: X X 480Y/277V
FLUSH MTD: ____ 240/120V

Project Name: TPA LTPG A/C REPLACEMENT
Project Number: 721128
Fed From: EDPE

NOTES	CKT NO	IDENTIFICATION	CODE	LOAD/PHASE (KVA)			CIRCUIT BREAKER				LOAD/PHASE (KVA)			CODE	IDENTIFICATION	CKT NO	NOTES
				A	B	C	TRIP	POLES	POLES	TRIP	A	B	C				
1	1	LIGHTING	L	0.9			20	1	1	20	0.9			L	LIGHTING	2	1
1	3	LIGHTING	L		0.9		20	1	1	20		0.8		L	LIGHTING	4	1
1	5	LIGHTING	L			0.6	20	1	1	20			0.8	L	LIGHTING	6	1
1	7	LIGHTING	L	0.8			20	1	1	20	0.9			L	LIGHTING	8	1
1	9	LIGHTING	L		0.9		20	1	1	20		0.9		L	LIGHTING	10	1
1	11	LIGHTING	L			0.9	20	1	1	20			0.9	L	LIGHTING	12	1
	13	SPACE					20	1	3	15	2.4			M	FCU-P3	14	2
	15	SPACE					20	1	-	-		2.4		M	------	16	
	17	SPACE					20	1	-	-			2.4	M	------	18	
1	19	X-FMR ELHMRE	O	2.4			30	3	3	15	2.6			M	CU-P3	20	2
	21	------	O		2.4		-	-	-	-		2.6		M	------	22	
	23	------	O			2.4	-	-	-	-			2.5	M	------	24	
				4.1	4.2	3.9					6.8	6.7	6.6				

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	10.2	1.25	1.00	12.8
RECEPTACLES (R)	0.0	---	NEC	0.0
LARGEST MOTOR (M)	7.7	1.25	1.00	9.6
ALL OTHER MOTORS (M)	7.2	1.00	1.00	7.2
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	7.2	1.00	1.00	7.2
ELEVATOR (V)	0.0	1.00	1.00	0.0
SPARES (S)	0.0	1.00	1.00	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
X-RAY (X)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

TOTAL CONNECTED LOAD: 32.3 KVA
TOTAL DEMAND LOAD: 36.8 KVA
DEMAND AMPS: 44.3 AMPS

PERCENT IMBALANCE: 4 %

NOTES:
1. EXISTING BREAKER TO REMAIN
2. NEW BREAKER

CONFORMED DOCUMENTS

TLC ENGINEERING SOLUTIONS
4890 W Kennedy Blvd, Suite 250
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DATE	△	REVISIONS	BY

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

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Tampa, Florida 33607-3999
813-289-5550
www.rsandh.com
FL.Cert.Nos. AAC001886 EB0005620 LC000210

Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL PICTURES - QUAD C JANNUS (PURPLE)

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY RONALD LESLIE O'BRIEN, EOR. ON THE DATE ADJACENT TO THE SEAL USING A SHA AUTHENTICATION CODE.

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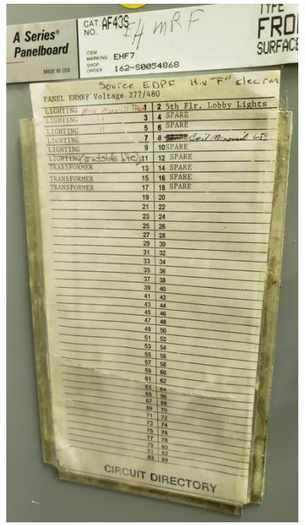
RONALD LESLIE O'BRIEN
LICENSE
No. 65501
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Ronald Leslie O'Brien, P.E.
FL Reg. No.: #65501

DESIGNED: Designer
DRAWN: Author
CHECKED: Checker
HCAA NO.: 6930 22
JOB NO.: 204.1880.038
DATE: MAY 6TH 2022

E603
SHEET NO.:



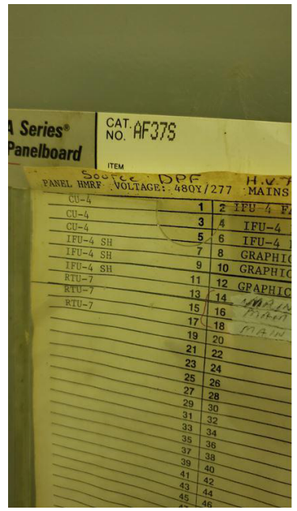
1. 1. PANEL SCHEDULE FOR EHMRF

2

1. PANEL EHMRF IS 18 POLE AND FULL. ALL BREAKERS ARE IN THE "ON" POSITION. (15) 20A/1, (1) 30A/3 BREAKER.
2. REMOVE (6) 20A/1 BREAKERS.
3. ADD (1) 15A/3 FOR NEW INTERIOR FOR FCU-P4 AND (1) 15A/3 BREAKER FOR EXTERIOR CU-P4 TO NEW PANEL.

3

1. PANEL HMRF (50A/3 RTU-7 WILL REPLACE TO SPARE).

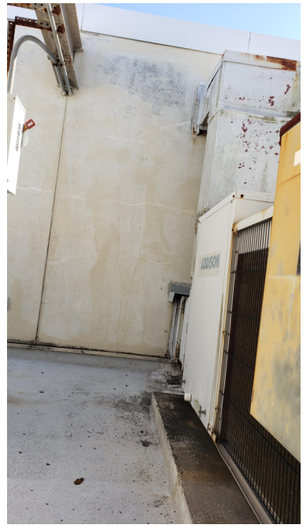


4

1. PANEL SCHEDULE FOR HMRF CURRENTLY SERVING RTU-7 ON NORMAL). DISCONNECT RTU-7 AND LABEL AS SPARE.

5

1. INTERIOR WALL AT NEW FCU LOCATION AND ROOM FOR NEW DISCONNECT AT WALL FOR FCU.



6

1. EXTERIOR WALL AT NEW CU LOCATION AND WALL AREA FOR NEW DISCONNECT AT WALL FOR CU.

EXISTING GENERAL ELECTRIC SERIES A PANEL

EXISTING PANEL

Name: EHMRF

MAIN BREAKER:		AMPS		POLE	3 **PHASE**
MAIN LUGS:	200	AMPS			4 **WIRE**
K.A.I.C. :	MATCH	AMPS			**208Y/120V**
SURFACE MTD:	X				X **480Y/277V**
FLUSH MTD:					**240/120V**

Project Name: A LTPG AIT CON REPLACEMENT
Project Number: 721128
Fed From: EDPF

NOTES	CKT NO	IDENTIFICATION	CODE	LOAD/PHASE (KVA) A	B	C	CIRCUIT BREAKER TRIP	POLES	POLES	TRIP	LOAD/PHASE (KVA) A	B	C	CODE	IDENTIFICATION	CKT NO	NOTES
1	1	LIGHTING - MONIRAIL AREA	L	0.7			20	1	1	20	0.7			L	LIGHTING - 5TH FL LOBBY	2	1
1	3	LIGHTING - MONIRAIL AREA	L		0.9		20	1	1	20					SPARE	4	
1	5	LIGHTING - MONIRAIL AREA	L			0.7	20	1	1	20			0.9	L	LIGHTING - MONIRAIL	6	2
1	7	LIGHTING	L	0.9			20	1	3	15	2.4			O	FCU-P4	8	3
1	9	LIGHTING	L		0.5		20	1	-	-		2.4		O	------	10	
1	11	LIGHTING	L			0.8	20	1	-	-			2.4	O	------	12	
1	13	X-FORMER ELMRF	O	4.4			20	1	3	15	2.6			O	CU-P4	14	3
	15	------	O		4.4		20	1	-	-		2.6		O	------	16	
	17	------	O			4.4	20	1	-	-			2.6	O	------	18	
				6.0	5.8	5.9					5.7	5.0	5.9				

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	6.1	1.25	1.00	7.6
RECEPTACLES (R)	0.0	---	NEC	0.0
LARGEST MOTOR (M)	0.0	1.25	1.00	0.0
ALL OTHER MOTORS (M)	0.0	1.00	1.00	0.0
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	28.2	1.00	1.00	28.2
ELEVATOR (V)	0.0	1.00	1.00	0.0
SPARES (S)	0.0	1.00	1.00	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
X-RAY (X)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

TOTAL CONNECTED LOAD: 34.3 KVA
TOTAL DEMAND LOAD: 35.8 KVA
DEMAND AMPS: 43.1 AMPS

PERCENT IMBALANCE: 8 %

NOTES:
1. EXISTISTING TO REMAIN.
2. RELOCATE EXISTING CIRCUIT POLE 8 TO EXISTING BREAKER POLE 6
3. NEW BREAKER

CONFORMED DOCUMENTS

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RONALD LESLIE O'BRIEN LICENSE No. 65501 STATE OF FLORIDA PROFESSIONAL ENGINEER

Ronald Leslie O'Brien, P.E.
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EB0005420 LC0000210

Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
400 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
ELECTRICAL PICTURES - QUAD D GODDARD (GREEN)

DESIGNED:	RLO
DRAWN:	JNB
CHECKED:	RLO
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

E604
SHEET NO.:

HVAC SYMBOL LEGEND

SYMBOL	DESCRIPTION
	-CEILING DIFFUSER, ROUND NECK (CEILING DIFFUSERS ARE 4-WAY THROW UNO)
	-CEILING RETURN
	-CEILING EXHAUST
	-CEILING DIFFUSER, RECTANGULAR OR SQUARE NECK (CEILING DIFFUSERS ARE 4-WAY THROW UNO)
1	-REVISION REFERENCE
1 / M-1	-DETAIL REFERENCE: TOP-DETAIL#, BOTTOM-DRAWING# SHOWN ON
T	-THERMOSTAT/TEMPERATURE SENSOR
H	-HUMIDISTAT/HUMIDITY SENSOR
	-DUCT SMOKE DETECTOR
	-CONNECT TO EXISTING
	-DEMOLISH TO POINT INDICATED
M	-MOTORIZED CONTROL DAMPER
TS	-TEMPERATURE SENSOR
P	-PRESSURE SENSOR
BD	-BACKDRAFT DAMPER
0	-NEUTRAL RELATIVE PRESSURE
+	-POSITIVE RELATIVE PRESSURE
-	-NEGATIVE RELATIVE PRESSURE
1	-SHEET NOTE CALLOUT
	-CEILING MOUNTED ACCESS DOOR
	-SQUARE THROAT ELBOW W/TURNING VANES
	-RADIUS ELBOW
	-RECTANGULAR/ROUND BRANCH TAKE-OFF OR ROUND/ROUND BRANCH TAKE-OFF
	-EXHAUST DUCT UP THROUGH SLAB W/ FAN ON ROOF ABOVE
	-EXHAUST FAN ON ROOF W/ DUCT DOWN THROUGH ROOF

SYMBOL	DESCRIPTION
	-FIRE DAMPER (WITH ACCESS PANEL)
	-FIRE & SMOKE DAMPER (WITH ACCESS PANEL)
	-EXISTING FIRE DAMPER TO REMAIN
	-EXISTING FIRE & SMOKE DAMPER TO REMAIN
SA-1	-SOUND ATTENUATOR
M	-MOTOR OPERATED CONTROL DAMPER (MOD)
FM	-AIR FLOW MEASURING STATION
	-MANUAL BALANCING DAMPER
	-ACCESS DOORS, VERTICAL OR HORIZONTAL
	-STAINLESS STEEL DUCTWORK
	-FLEXIBLE CONNECTION
12x8Ø	-NEW FLAT OVAL DUCT
24x12	-NEW DUCTWORK, FIRST DIMENSION IS SIDE SHOWN
24x12	-EXISTING DUCTWORK TO REMAIN
24x12	-EXISTING DUCTWORK TO BE REMOVED
24x12 DOWN / UP W/IN FLOOR	-DUCT ELBOW, POSITIVE PRESSURE (SUPPLY), FIRST DIMENSION INDICATES SIDE TO WHICH ARROW IS POINTING
	-DUCT ELBOW, EXHAUST
	-DUCT ELBOW, NEGATIVE PRESSURE, RETURN
	-DUCT ELBOW UP THROUGH ROOF OR SLAB ABOVE
	-RECTANGULAR DUCT SECTION UP, POSITIVE PRESSURE, SUPPLY OR OUTSIDE AIR
	-RECTANGULAR DUCT SECTION UP, NEGATIVE PRESSURE, RETURN
	-RECTANGULAR DUCT SECTION UP, EXHAUST
	-ROUND DUCT SECTION UP
	-FLAT OVAL DUCT SECTION UP

SYMBOL	DESCRIPTION
	-TERMINAL UNIT, VARIABLE/CONSTANT AIR VOLUME WITH ELECTRIC HEAT
UP DN	-CHANGE OF ELEVATION
	-FLEXIBLE DUCT
	-TRANSITION, CONCENTRIC
	-TRANSITION, ECCENTRIC
10x8 8"	-TRANSITION, SQUARE TO ROUND
	-SQUARE THROAT TEE
12x8	-RADIUS TEE
	-RECTANGLE-TO-ROUND TAKE-OFF
	-STANDARD BRANCH TAKE-OFF
	-SPIN-IN TAKE-OFF

HVAC ABBREVIATIONS

SYMBOL	DESCRIPTION
AFD	-ADJUSTABLE FREQUENCY DRIVE
AFF	-ABOVE FINISHED FLOOR
AFR	-ABOVE FINISHED ROOF
AHU	-AIR HANDLING UNIT
AP	-ACCESS PANEL
BOP	-BOTTOM OF PIPE
BHP	-BRAKE HORSEPOWER
BTU	-BRITISH THERMAL UNIT
CL	-CENTER LINE
CFM	-CFM (CUBIC FEET PER MINUTE)
CD	-CEILING DIFFUSER
CT	-COOLING TOWER
CV	-CONSTANT AIR VOLUME
ΔP	-CHANGE IN PRESSURE
ΔT	-CHANGE IN TEMPERATURE
CFM	-CUBIC FEET PER MINUTE
CU	-CONDENSING UNIT
DDC	-DIRECT DIGITAL CONTROLS
DN	-DOWN
EAT	-ENTERING AIR TEMPERATURE
ESP	-EXTERNAL STATIC PRESSURE
EWT	-ENTERING WATER TEMPERATURE
FCU	-FAN COIL UNIT
FD	-FIRE DAMPER
FF	-FINAL FILTERS
FLA	-FULL LOAD AMPS
FPM	-FEET PER MINUTE
GPM	-GALLONS PER MINUTE
KW	-KILOWATT
LAT	-LEAVING AIR TEMPERATURE
LWT	-LEAVING WATER TEMPERATURE
LD	-LINEAR DIFFUSER
MBH	-THOUSAND BTUs PER HOUR
MCA	-MINIMUM CIRCUIT AMPS
MOCP	-MAXIMUM OVER CURRENT PROTECTION
MOD	-MOTOR OPERATED CONTROL DAMPER (MOD)
NC	-NORMALLY CLOSED
NO	-NORMALLY OPEN
NTS	-NOT TO SCALE
OA	-OUTSIDE AIR
OAL	-OUTSIDE AIR LOUVER
PRV	-PRESSURE REDUCING VALVE
PRS	-PRESSURE REDUCING STATION
PSI	-POUNDS PER SQUARE INCH
PSIG	-PSI GAUGE
PTAC	-PACKAGED TERMINAL AIR CONDITIONER
PVC	-POLYVINYL CHLORIDE PIPE
RA	-RETURN AIR
RHC	-REHEAT COIL
RHP	-ROOFTOP HEAT PUMP
RPM	-REVOLUTIONS PER MINUTE
RS/L	-REFRIGERANT SUCTION & LIQUID LINES
RTU	-ROOFTOP AIR HANDLING UNIT
SA	-SUPPLY AIR
SP	-STATIC PRESSURE
TSP	-TOTAL STATIC PRESSURE
UNO	-UNLESS NOTED OTHERWISE
V/PH	-VOLTS/PHASE
VAV	-VARIABLE AIR VOLUME
VFD	-VARIABLE FREQUENCY DRIVE

HVAC PIPING SYMBOL LEGEND

SYMBOL	DESCRIPTION
CHWS	-CHILLED WATER SUPPLY
CHWR	-CHILLED WATER RETURN
HWR	-HOT WATER RETURN
HWS	-HOT WATER SUPPLY
	-TEE, OUTLET DOWN
	-TEE, OUTLET UP
D D	-45° PIPE RISE (R) / DROP (D)
	-PIPE ANCHORS
	-CONCENTRIC REDUCER
	-ECCENTRIC REDUCER

SYMBOL	DESCRIPTION
	-FLOW DIRECTION
	-GATE VALVE
	-BALL VALVE
	-CALIBRATING BALANCING VALVE
	-UNION
	-STRAINER
	-FLEX CONNECTION

SYMBOL	DESCRIPTION
EQUIP.	- P-TRAP
	-VALVE ON RISER
	-CAP
	-CONNECTION, BOTTOM
	-CONNECTION, TOP
	-COUPLING
	-ELBOW, 90°
	-ELBOW, 45°
	-ELBOW, TURNED DOWN
	-ELBOW, TURNED UP

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT

HVAC EQUIPMENT TAGS

TAG (A 200) CFM -AIR DISTRIBUTION DEVICE

VARIABLE/CONSTANT AIR VOLUME TERMINAL UNITS

TERMINAL UNIT TYPE
VTU - VARIABLE TERMINAL UNIT
CTU - CONSTANT TERMINAL UNIT
PTU - PARALLEL TERMINAL UNIT
STU - SERIES TERMINAL UNIT

VTU-1-1 — AHU NUMBER, TERMINAL NUMBER

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EB0025420 LC0000215

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL SYBMOLS LEGEND

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY DOMINIC J. CACOLICI, EOR. ON THE DATE ADJACENT TO THE SEAL USING A SHA AUTHENTICATION CODE.

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DANIEL S. VAUGHN
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No. 86788
STATE OF
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PROFESSIONAL ENGINEER

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

CONFORMED DOCUMENTS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M000
SHEET NO.:

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HVAC GENERAL NOTES

1. DIMENSIONS SHALL BE FIELD-VERIFIED AND COORDINATED PRIOR TO PROCUREMENT OR FABRICATION. COORDINATE THE WORK WITH OTHER TRADES INVOLVED. FIELD MODIFICATIONS SUCH AS OFFSETS IN PIPING OR DUCTWORK (INCLUDING DIVIDED DUCTWORK) NEEDED DUE TO OBSTRUCTIONS OR INTERFERENCES SHALL BE PROVIDED AT NO ADDITIONAL COST. COORDINATE NEW WORK WITH EXISTING ELEMENTS SUCH AS THE BUILDING STRUCTURE AND ARCHITECTURAL FEATURES, SPRINKLER PIPING, LIGHTS, PLUMBING, AND ELECTRICAL CONDUIT.
2. DUCT CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARD.
3. PROVIDE AIR TURNING VANES IN ALL 90 DEGREE RECTANGULAR DUCT ELBOWS.
4. DUCT SIZES AND ALL OPENINGS THROUGH BUILDING CONSTRUCTION SHALL SUIT EQUIPMENT FURNISHED.
5. COORDINATE DIFFUSER, GRILLE AND REGISTER LOCATIONS WITH BUILDING STRUCTURE AND EQUIPMENT OF ALL TRADES.
6. ALL EQUIPMENT, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED AND/OR SPECIFIED. PROVIDE ADDITIONAL SUPPORTS AS REQUIRED TO PROVIDE A VIBRATION-FREE, RIGID INSTALLATION.
7. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.
8. ACCESS PANELS IN DUCTWORK AND CEILINGS SHALL BE PROVIDED WHERE REQUIRED FOR OPERATION, BALANCING OR MAINTENANCE OF ALL MECHANICAL EQUIPMENT.
9. ALL DUCTWORK IS SHOWN SCHEMATICALLY. PROVIDE ALL TRANSITIONS, TURNING, VANES, ELBOWS, FITTINGS, ETC., TO ALLOW SMOOTH FLOWS. ALL SPLIT DUCT FITTINGS SHALL TRANSITION TO FULL SIZE OF THE SUM OF BOTH BRANCHES, UPSTREAM OF SPLIT.
10. VERIFY FINISH WITH OWNER PRIOR TO PURCHASING GRILLES, REGISTERS, DIFFUSERS, LOUVERS, AND OTHER AIR DISTRIBUTION DEVICES.
11. PROVIDE TRANSITIONS AT DIFFUSER NECKS AS REQUIRED TO MATCH SIZES OF FLEX DUCTS TO BE CONNECTED.
12. INTERRUPTIONS TO EXISTING SERVICES SHALL BE SCHEDULED FOR TIMES OTHER THAN NORMAL OPERATING HOURS (SUCH AS NIGHTS AND WEEKENDS). SUCH INTERRUPTIONS TO SERVICES SHALL NOT BE MADE WITHOUT THE PRIOR WRITTEN CONSENT OF THE OWNER'S REPRESENTATIVE AND PROPER COORDINATION WITH OTHER TRADES. PRE-WORK SHALL BE PERFORMED TO MAKE THE SHUTDOWN PERIOD AS BRIEF AS POSSIBLE.
13. ALL EQUIPMENT, DUCTWORK, ETC., TO BE REMOVED SHALL REMAIN PROPERTY OF THE OWNER OR DISPOSED OF LEGALLY, AS DIRECTED BY OWNER.
14. MAINTAIN CLEARANCE OF A MINIMUM OF 6" BETWEEN DUCTWORK, PIPING, EQUIPMENT, ETC., AND ALL FIRE RATED AND FIRE/SMOKE RATED PARTITIONS, TO ALLOW FOR INSPECTIONS OF RATED WALLS.
15. DUCT RUNOUTS TO DIFFUSERS SHALL MATCH THE SIZE OF THE DIFFUSER NECK.
16. SLEEVE AND SEAL ALL PIPING PENETRATIONS THROUGH BUILDING PARTITIONS. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS IN CHILLED WATER AND HOT WATER PIPING.
17. ALL WORK SHALL COMPLY WITH CURRENTLY ADOPTED FEDERAL, STATE, AND LOCAL CODES. CURRENTLY
    A. ADOPTED CODES FOR THE STATE OF FLORIDA ARE AS FOLLOWS:
        1) FLORIDA BUILDING CODE, 7TH EDITION
        2) FLORIDA MECHANICAL CODE, 7TH EDITION
        3) NFPA 90A, STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND
        4) NFPA 90B, STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR-CONDITIONING SYSTEMS

HVAC SCOPING NOTES

THE HVAC SCOPE FOR THIS CONTRACT INVOLVES THE REPLACEMENT OF THE EXISTING ROOFTOP UNITS, SERVING THE LONG TERM PARKING GARAGE ELEVATOR MACHINE ROOMS, AT THE TAMPA INTERNATIONAL AIRPORT. THE EXISTING ROOFTOP UNITS WILL BE REPLACED WITH NEW SPLIT SYSTEM FAN COILS. THE SCOPE ALSO ENTAILS THE REROUTING OF EXISTING DUCTWORK AND ACCESSORIES.

NO.	DATE	REVISIONS	BY

HILLSBOROUGH COUNTY
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TAMPA, FLORIDA

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EB0005420 LC0000210

Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL GENERAL NOTES

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DANIEL S. VAUGHN
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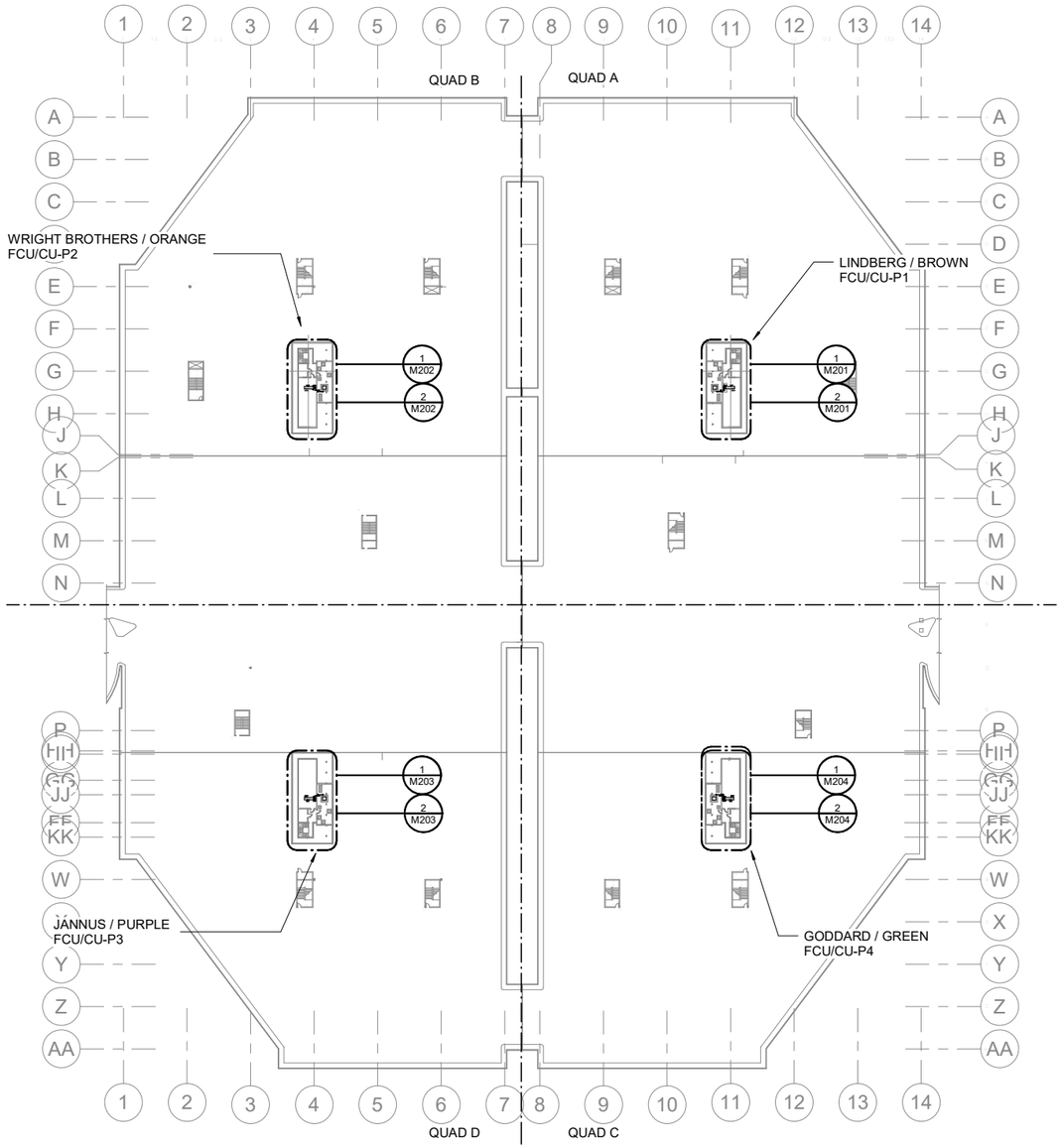
No. 86788
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

CONFORMED DOCUMENTS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M001
SHEET NO.:



N 1 MECHANICAL PENTHOUSE PLAN

N 64 0 64 128

SCALE: 1/64" = 1'-0"

CONFORMED DOCUMENTS

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EB0005420 LC0000210

Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4200 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL OVERALL PENTHOUSE PLAN

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PROFESSIONAL ENGINEER

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M101
SHEET NO.:

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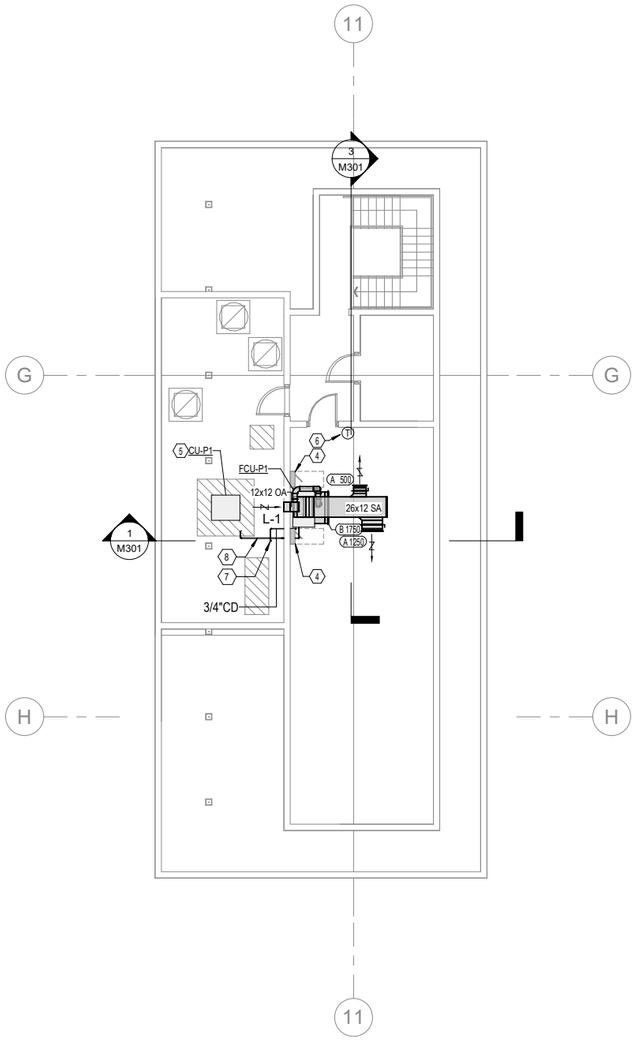
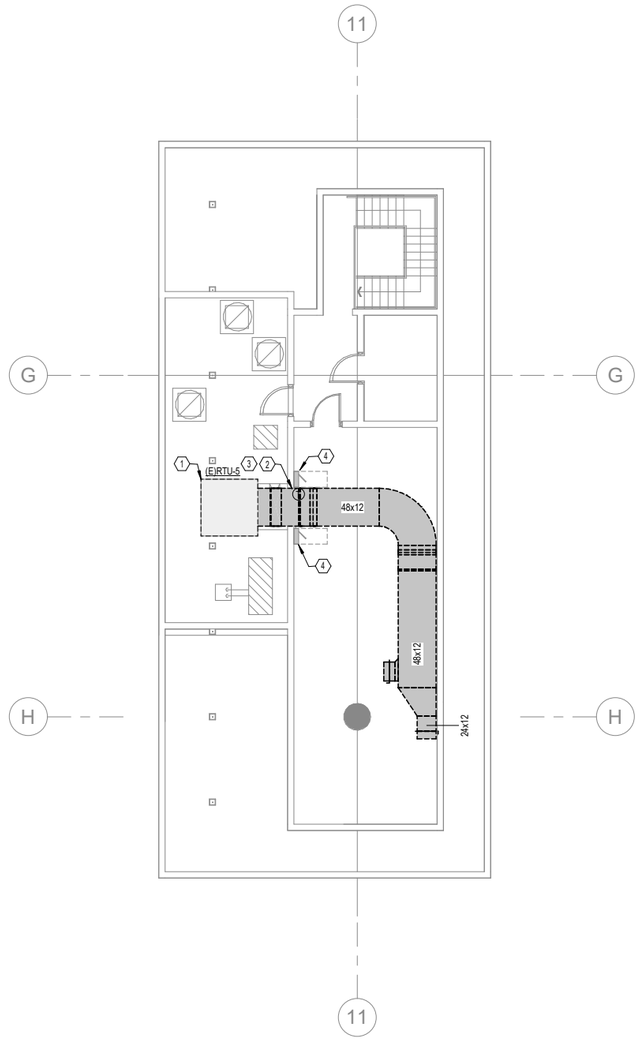


2 LINDBERG PENTHOUSE PLAN - ENLARGED MECHANICAL PLAN



1 LINDBERG PENTHOUSE PLAN - ENLARGED DEMOLITION PLAN

GENERAL NOTES:

1. THE PROJECT SCOPE COVERS ALL FOUR (4) PENTHOUSES (LINDBERG, WRIGHT BROTHERS, JANNUS, AND GODDARD).

KEYNOTES

1 REMOVE EXISTING ROOFTOP UNIT AND ALL ASSOCIATED DUCTWORK AND ACCESSORIES. EXISTING CONCRETE EQUIPMENT PAD SHALL REMAIN. RETAIN EXISTING JCI THERMOSTAT, FIRE ALARM RELAY AND ASSOCIATED WIRING FOR RELOCATION UNDER NEW WORK.

2 PATCH EXISTING 48X20 LOW WALL PENETRATION WITH LIKE IN KIND MATERIALS TO EXISTING WALL.

3 PATCH EXISTING 48X12 HIGH WALL PENETRATION WITH LIKE IN KIND MATERIALS TO EXISTING WALL. COORDINATE EXTENT OF WALL PATCH WITH LOUVER INSALLATION UNDER NEW WORK.

4 EXISTING ELECTRICAL EQUIPMENT.

5 INSTALL CONDENSING UNIT ON EXISTING CONCRETE EQUIPMENT PAD, RETAINED FROM DEMOLITION. PROVIDE HURICAINE SUPPORTS, PER THE WIND RESTRAINT REQUIREMENTS DETAIL ON SHEET M502.

6 REINSTALL EXISTING JCI THERMOSTAT AND FIRE ALARM RELAY AT THIS LOCATION. EXTEND EXISTING WIRING TO NEW THERMOSTAT/FIRE ALARM RELAY LOCATION AND RECONNECT.

7 TERMINATE NEW CONDENSATE PIPING TO EXISTING HUB DRAIN. PROVIDE INDIRECT CONNECTION WITH MINIMUM 2" AIR GAP, PER THE FLORIDA PLUMBING CODE, 7TH EDITION (2020).

8 ROUTE REFRIGERANT PIPING ALONG THE TOP OF THE EXISTING MECHANICAL ROOF DECK. COORDINATE REFRIGERANT CHARGE AND LINE SIZES WITH MANUFACTURER RECOMMENDATIONS. PROVIDE PIPING ROOF SUPPORTS, PER DETAIL 2 ON SHEET M503.

N
8 0 8 16
SCALE: 1/16" = 1'-0"

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Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

DATE	REVISIONS	BY

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Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J. BEAN PKWY., TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL ENLARGED PENTHOUSE PLANS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M201
SHEET NO.:

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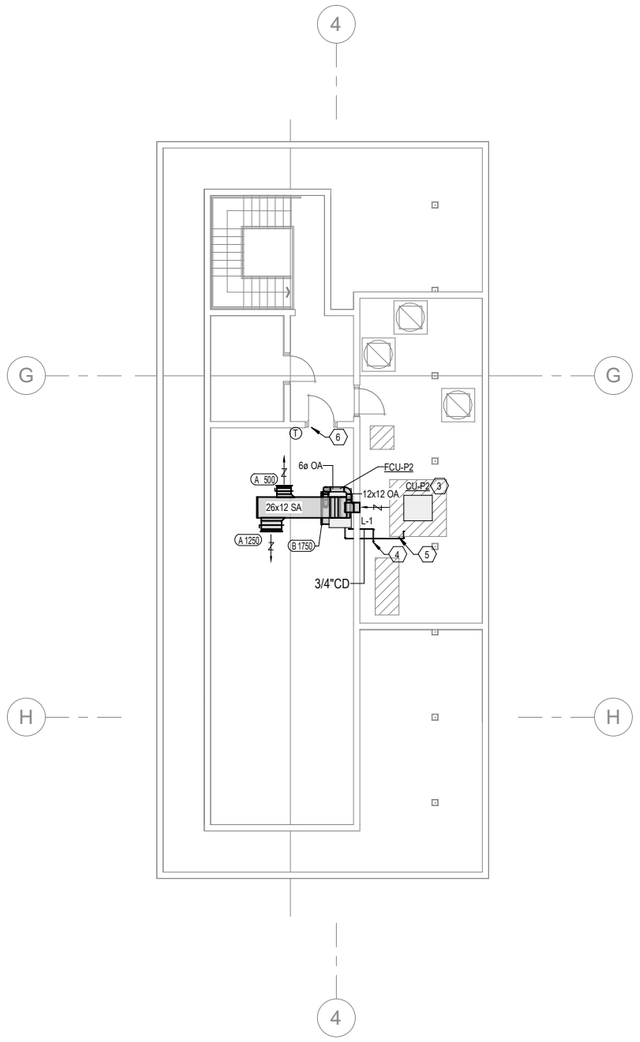
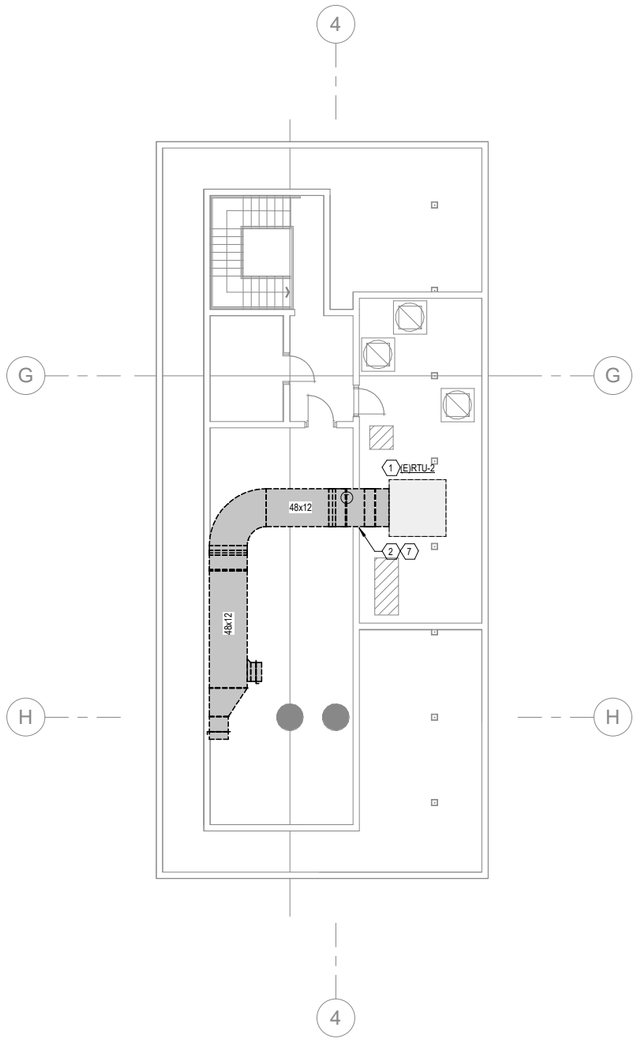


2 WRIGHT BROTHERS PENTHOUSE PLAN - ENLARGED PLAN



1 WRIGHT BROTHERS PENTHOUSE PLAN - ENLARGED DEMOLITION PLAN

GENERAL NOTES:

1. THE PROJECT SCOPE COVERS ALL FOUR (4) PENTHOUSES (LINDBERG, WRIGHT BROTHERS, JANNUS, AND GODDARD).

KEYNOTES

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PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL ENLARGED PENTHOUSE PLANS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M202
SHEET NO.:

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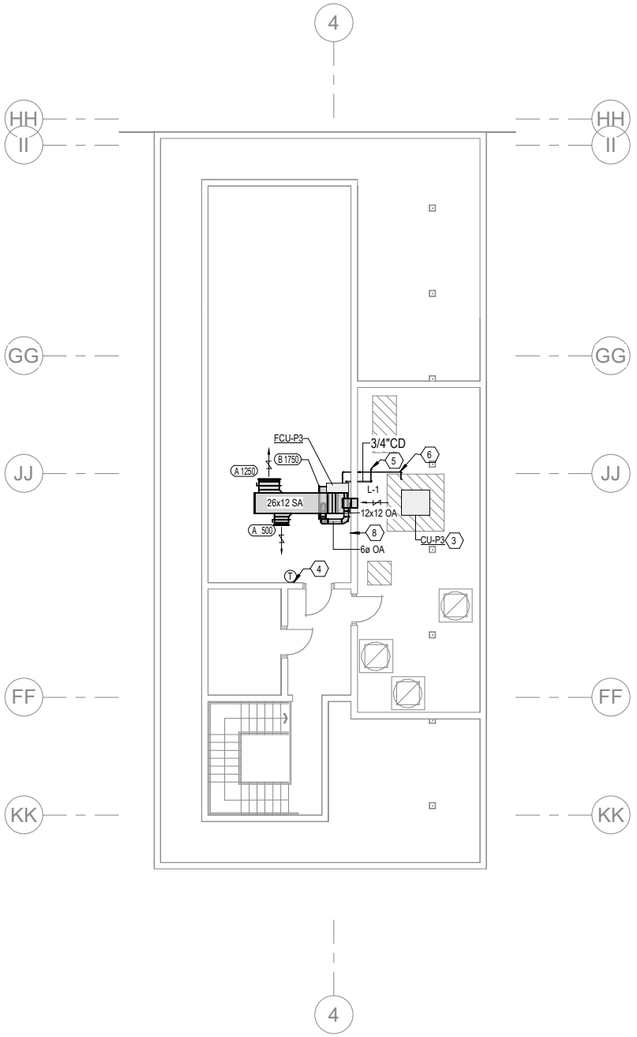
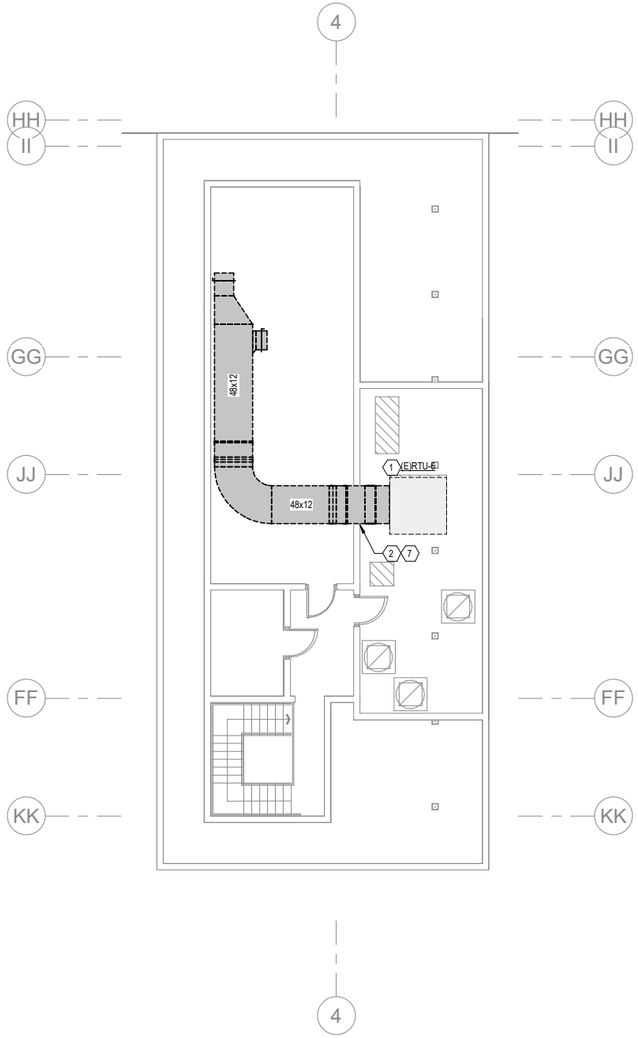


2 JANUS PENTHOUSE PLAN - ENLARGED PLAN



1 JANUS PENTHOUSE PLAN - ENLARGED DEMOLITION PLAN

GENERAL NOTES:

1. THE PROJECT SCOPE COVERS ALL FOUR (4) PENTHOUSES (LINDBERG, WRIGHT BROTHERS, JANNUS, AND GODDARD).

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Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
400 GEORGE J. BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL ENLARGED PENTHOUSE PLANS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M203
SHEET NO.:

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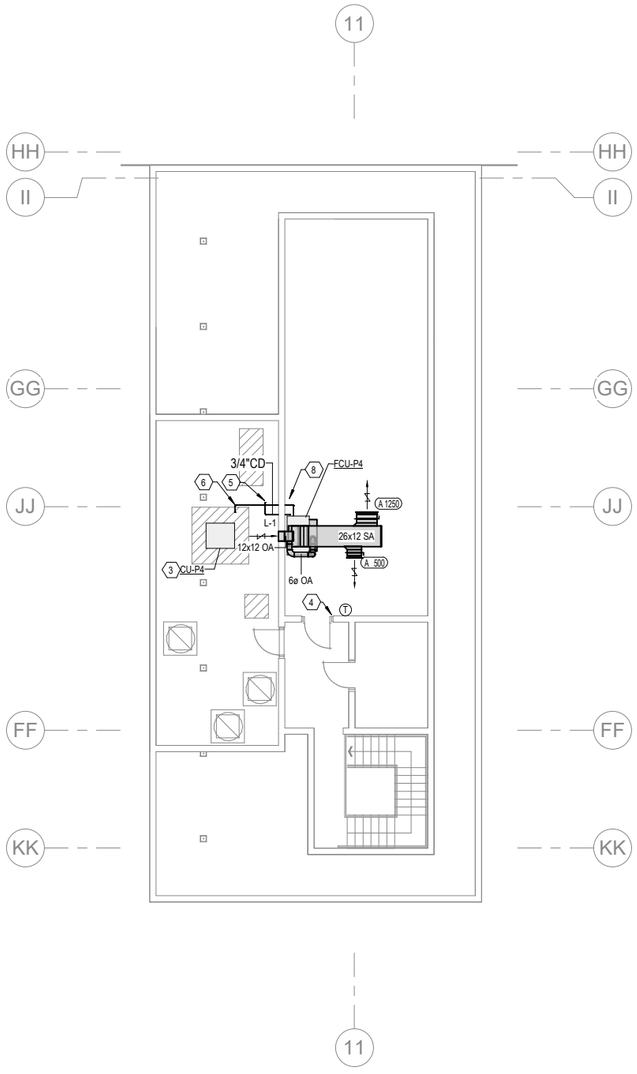
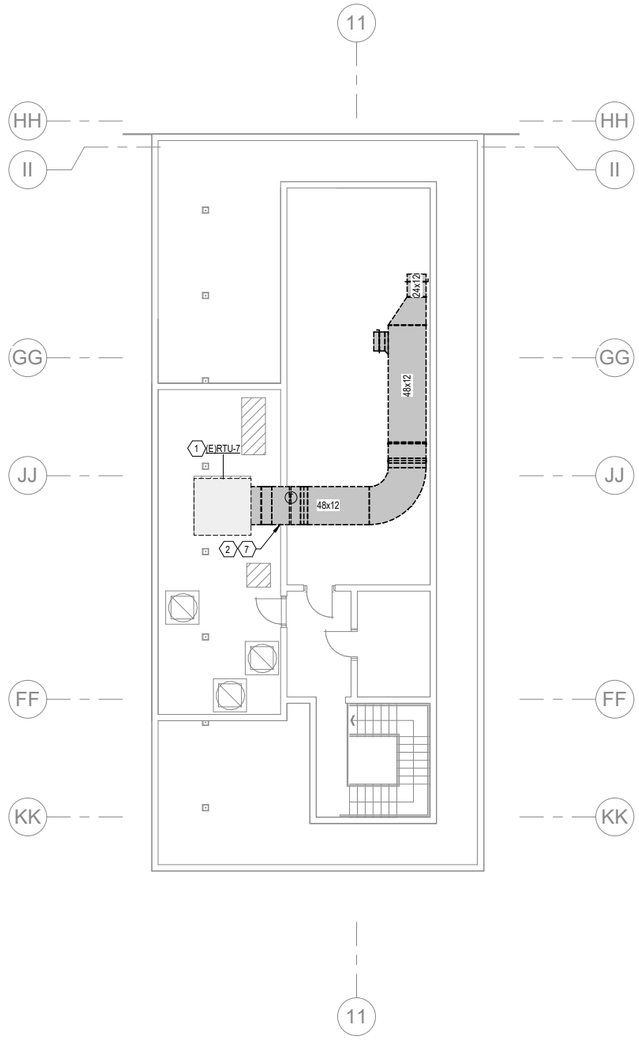


2 GOODDARD PENTHOUSE PLAN - ENLARGED PLAN



1 GOODDARD PENTHOUSE PLAN - ENLARGED DEMOLITION PLAN

GENERAL NOTES:

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Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL ENLARGED PENTHOUSE PLANS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

SHEET NO.: M204

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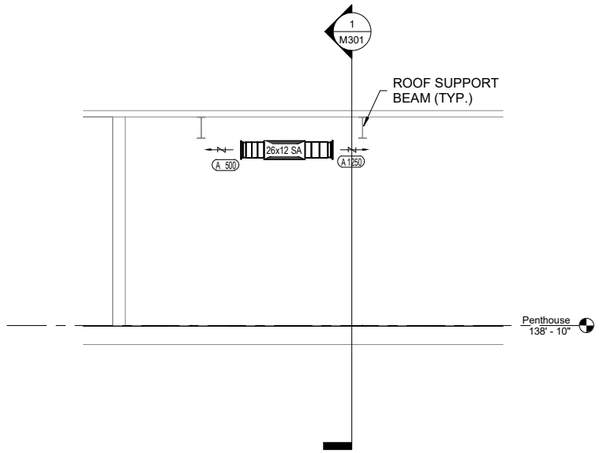
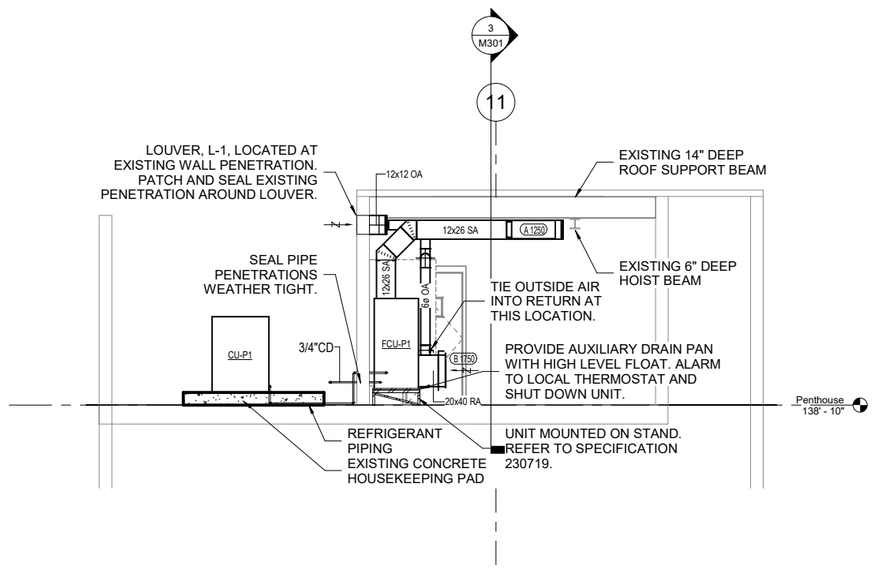


3 MECHANICAL SECTION 3



1 MECHANICAL ROOM SECTION 1

4 0 4 8
SCALE: 1/8" = 1'-0"

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Tampa International Airport

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4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL SECTIONS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M301
SHEET NO.:

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BY	REVISIONS	DATE

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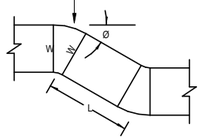
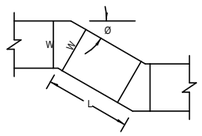
PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL DETAILS

TYPE RE 1
RADIUS
ELL



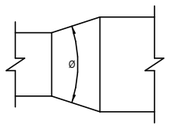
OFFSET TYPE 3 - RADIUSED



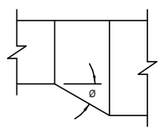
OFFSET TYPE 2 - MITERED

- FOR L<X, MAX ANGLE 15°
- FOR X<L<2X, MAX ANGLE 30°
- FOR 2X<L<3X, MAX ANGLE 45°
- FOR L>3X, NO ANGLE RESTRICTION (STANDARD ELBOWS GOVERN)

TYPICAL RECTANGULAR OFFSETS

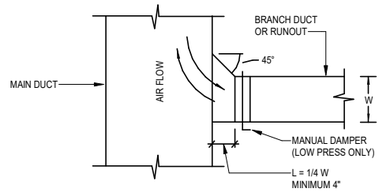


CONCENTRIC TRANSITION
Ø MAX = 45° DIVERGING, 60° CONVERGING

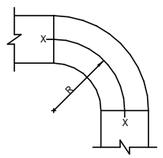


ECCENTRIC TRANSITION
Ø MAX = 30°

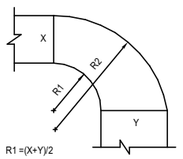
TYPICAL RECTANGULAR TRANSITIONS



TYPICAL RECTANGULAR BRANCH



TYPE RE 1 - RADIUS

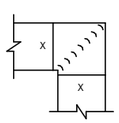


R1 =(X+Y)/2
R2 =X+Y

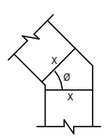
TYPE RE 5 - DUAL RADIUS

- TYPE RE 1 RADIUS ELLS SHALL BE USED IN ALL LOCATIONS WHERE SPACE PERMITS
- NOT RESTRICTED TO 90° - USE FOR ALL ANGLES
- LONG RADIUS (>1500 FPS): CENTERLINE RADIUS (R)=2(X)
- STANDARD (1000-1500 FPS): CENTERLINE RADIUS (R)=1.5(X)
- SHORT RADIUS (<1000 FPS): CENTERLINE RADIUS (R)=(X)

TYPICAL RADIUSED RECTANGULAR DUCT ELBOWS



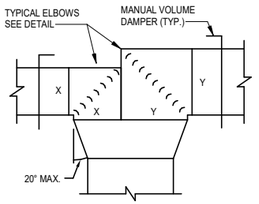
TYPE RE 2 - SQUARE THROAT



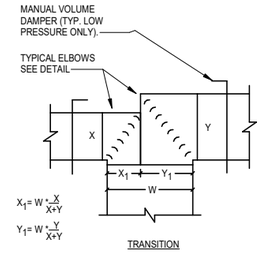
TYPE RE 6 - MITERED

- FOR USE ONLY WHERE SPACE DOES NOT PERMIT USE OF A RADIUSED ELL
- NOT RESTRICTED TO 90° - USE FOR ALL ANGLES
- PROVIDE DOUBLE THICKNESS VANES PER SMACNA DUCT CONSTRUCTION STANDARDS
- VANES SHALL BE UTILIZED IN ALL MITERED ELLS GREATER THAN 45° WHEN VELOCITY EXCEEDS 750 FPS
- FOR VERY LOW VELOCITY (<750 FPS) VANES MAY BE OMITTED

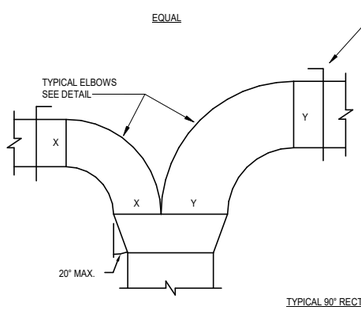
TYPICAL MITERED RECTANGULAR DUCT ELBOWS



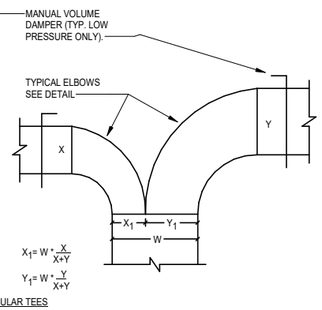
EQUAL



TRANSITION



EQUAL



TRANSITION

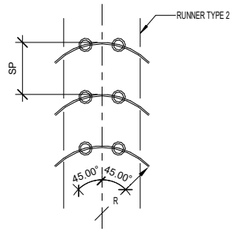
TYPICAL 90° RECTANGULAR TEES

NOTE:
MANUAL VOLUME DAMPER REQUIRED WHERE BRANCH SERVES MULTIPLE DIFFUSERS/GRILLES.

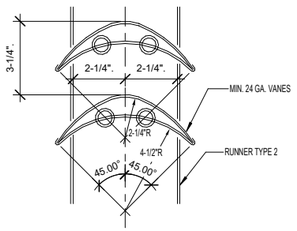
RECTANGULAR DUCT FITTINGS
No Scale

2

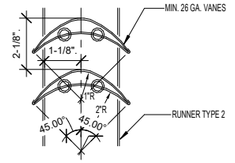
SINGLE VANE SCHEDULE			
	R (RADIUS)	SP	GAUGE
SMALL	2" (51 mm)	1-1/2" (38 mm)	24 (0.70 mm)
LARGE	4-1/2" (114 mm)	3-1/4" (83 mm)	22 (0.85 mm)



SINGLE VANE

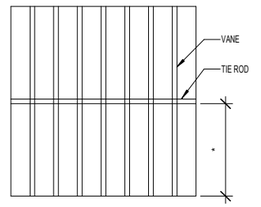


Large



Small

DOUBLE VANE



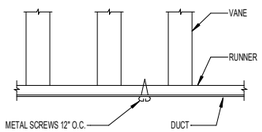
* MAXIMUM UNSUPPORTED VANE LENGTH

SMALL SINGLE VANE36"
LARGE SINGLE VANE 36"
SMALL DOUBLE VANE 48"
LARGE DOUBLE VANE 72"

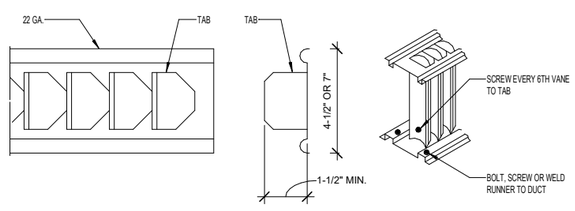
NOTE:
INSTALL VANES IN SECTIONS OR USE TIE RODS TO LIMIT THE UNBRACED VANE LENGTH

NOTES:

1. VANES SHALL BE SECURELY FASTENED TO RUNNERS
2. ALL VANES SHALL BE SECURE AND STABLE IN INSTALLED OPERATING POSITION.



VANE SUPPORT



RUNNER TYPE 1

NOTE:
SEE MECHANICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.

TURNING VANES
No Scale

1

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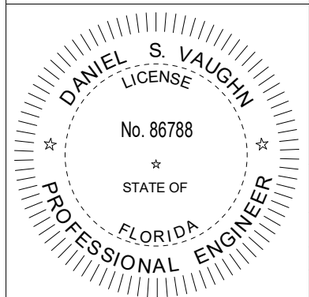

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

M501
SHEET NO.:

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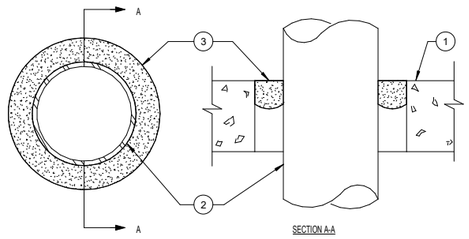


(Ref UL System #C-AJ-1027, 1997)

Notes:

1. Floor or Wall Assembly-Min 4-1/2 in. thick lightweight (100-150 pcf) concrete. Wall assembly may also be constructed of any UL Classified Concrete Blocks*. Max dia.of circular through-opening is 12-1/4 in. *See Concrete Block (Cazt) category in fire resistance Directory for names of manufacturers.
2. Steel Pipe or Conduit-Nom 10 in. dia. (or smaller) Schedule 10S (or heavier) steel pipe, nominal 6 in. dia. (or smaller) rigid steel conduit or nom 4 in. dia. (or smaller) steel EMT. Max. one steel pipe per through-opening. Max. annular space between pipe or conduit and edge of through-opening not to exceed 3/4 in. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly.
3. Fill, Void or Cavity Material*-Putty-Moldable putty material kneaded by hand and packed tightly into annular space, flush with top surface of floor. In wall assemblies, required putty thickness to be installed symmetrically on both sides of wall. The min. putty thickness and maximum through-opening sizes for the 2 and 3 Hr. Fire-Rated are specified in the following table:

Max. Through - Opening Sizes	Min. Fill Material Thickness	Fire Rating
6-1/4" in.	1/2" in.	2 hr.
12-1/4" in.	1" in.	3 hr.

FIRE RATE WALL PENETRATION
No Scale

6

WIND RESTRAINT REQUIREMENTS:

1. ALL ROOF- AND GROUND-MOUNTED MECHANICAL EQUIPMENT (GRAVITY AND POWERED VENTILATORS, ROOFTOP A/C UNITS, CONDENSING UNITS, FAN EQUIPMENT, ENERGY RECOVERY VENTILATORS, ETC.) SHALL BE FABRICATED TO RESIST THE EFFECTS OF WIND. WIND LOADS SHALL BE BASED ON A WIND SPEED OF 180 MPH, ACTING NORMAL TO THE BUILDING FACE DESIGN ROOF- AND GROUND-MOUNTED MECHANICAL EQUIPMENT, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING STRUCTURAL AND WIND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

2. ALL ROOF- AND GROUND-MOUNTED MECHANICAL EQUIPMENT (GRAVITY AND POWERED VENTILATORS, ROOFTOP A/C UNITS, CONDENSING UNITS, FAN EQUIPMENT, ENERGY RECOVERY VENTILATORS, ETC.) SHALL BE ANCHORED TO RESIST THE EFFECTS OF WIND. WIND LOADS SHALL BE BASED ON A WIND SPEED OF 180 MPH, ACTING NORMAL TO THE BUILDING FACE. DESIGN ROOF- AND GROUND-MOUNTED MECHANICAL EQUIPMENT ANCHORAGE, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING STRUCTURAL AND WIND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED. CONTRACTOR SHALL PREPARE WIND-RESTRAINT DETAILS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.

3. DESIGN ANALYSIS AND CALCULATIONS: PROVIDE TO SUPPORT SELECTION AND ARRANGEMENT OF WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE AND SHEAR LOADS. PROVIDE REACTIONS AT CONNECTION POINTS TO THE BUILDING STRUCTURE.

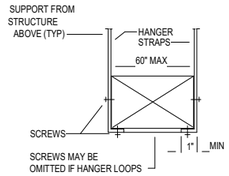
4. FABRICATION AND ARRANGEMENT DETAILS: DETAIL ATTACHMENTS OF RESTRAINTS TO THE RESTRAINED ITEMS AND TO THE STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND SPACING. IDENTIFY COMPONENTS, LIST THEIR STRENGTHS, AND INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE STRUCTURE DURING WIND EVENTS. INCLUDE FABRICATION REQUIREMENTS OF THE EQUIPMENT CURB AND ITS ABILITY TO SUPPORT THE LATERAL LOAD IMPARTED BY THE EQUIPMENT DURING A WIND EVENT.

5. PREAPPROVAL AND EVALUATION DOCUMENTATION: PROVIDE, BY AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM RATINGS OF RESTRAINT ITEMS AND THE BASIS FOR APPROVAL (TESTS OR CALCULATIONS).

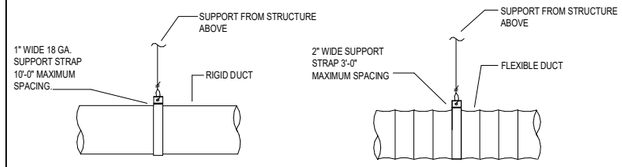
6. WIND RESTRAINT QUALIFICATION CERTIFICATES: PROVIDE, FROM THE MANUFACTURER, FOR ALL ROOF- AND GROUND- MOUNTED MECHANICAL EQUIPMENT. INCLUDE DIMENSIONED OUTLINE DRAWINGS OF EQUIPMENT UNIT, IDENTIFYING CENTER OF GRAVITY AND LOCATION AND DESCRIPTION OF MOUNTING AND ANCHORAGE PROVISIONS. INCLUDE DETAILED DESCRIPTION OF EQUIPMENT ANCHORAGE DEVICES ON WHICH THE CERTIFICATION IS BASED AND THEIR INSTALLATION REQUIREMENTS.

WIND RESTRAINT REQUIREMENTS
No Scale

4



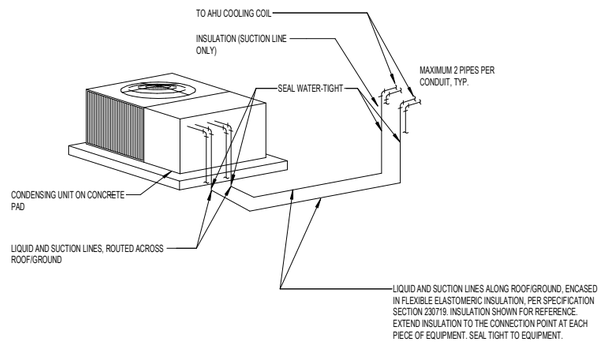
NOTE: STRAP HANGER SIZE (WIDTH x THICKNESS) AND MAXIMUM HANGER SPACING SHALL COMPLY WITH REQUIREMENTS OF SECTION IV SMACNA HVAC DUCT CONSTRUCTION STANDARDS.



STRAP HANGER - ROUND DUCT

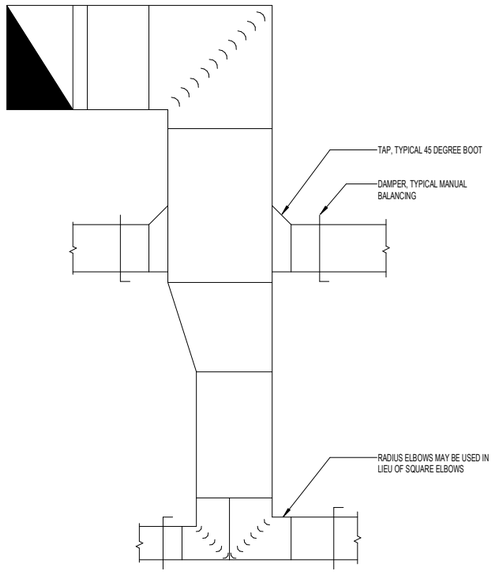
TYPICAL DUCT SUPPORT
No Scale

2



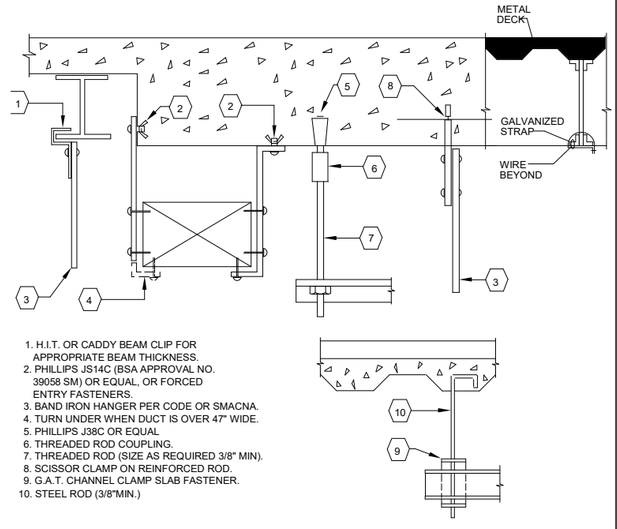
REFRIGERANT PIPING DIAGRAM
No Scale

5



TYPICAL PRESSURE DUCTWORK
No Scale

3



1. H.I.T. OR CADDY BEAM CLIP FOR APPROPRIATE BEAM THICKNESS.
2. PHILLIPS JS14C (BSA APPROVAL NO. 39058 SM) OR EQUAL, OR FORCED ENTRY FASTENERS.
3. BAND IRON HANGER PER CODE OR SMACNA.
4. TURN UNDER WHEN DUCT IS OVER 47" WIDE.
5. PHILLIPS J38C OR EQUAL.
6. THREADED ROD COUPLING.
7. THREADED ROD (SIZE AS REQUIRED 3/8" MIN).
8. SCISSOR CLAMP ON REINFORCED ROD.
9. G.A.T. CHANNEL CLAMP SLAB FASTENER.
10. STEEL ROD (3/8"MIN.)

METHOD OF HANGING DUCTWORK
No Scale

1

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DANIEL S. VAUGHN
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No. 86788
STATE OF
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PROFESSIONAL ENGINEER

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

DATE		REVISIONS	BY

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Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL DETAILS

DESIGNED:	DSV
DRAWN:	DSV
CHECKED:	DJC
HCAA NO.:	6930 22
JOB NO.:	204.1880.038
DATE:	MAY 6TH 2022

SHEET NO.: M502

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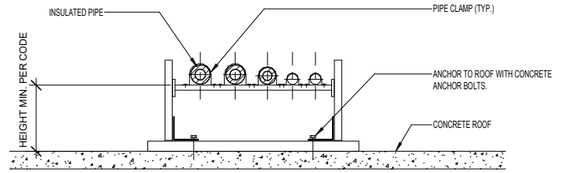
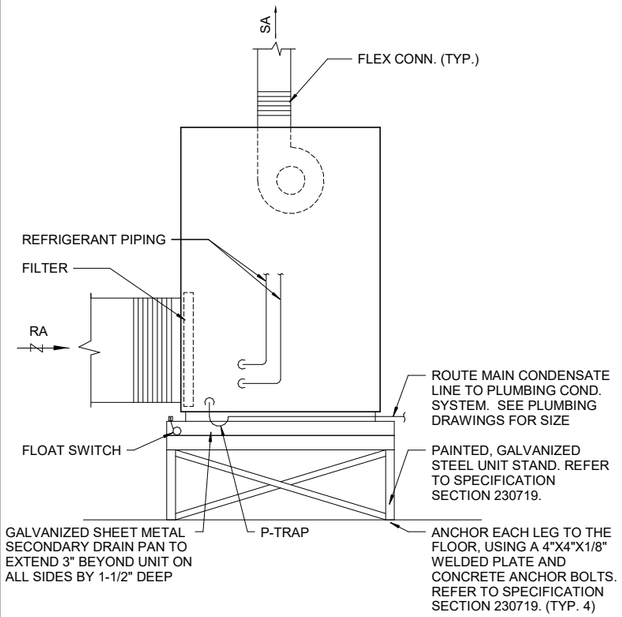


PIPE SUPPORT ON ROOF
No Scale — 2



VERTICAL STAND MOUNTED FAN COIL INSTALLATION
No Scale — 1

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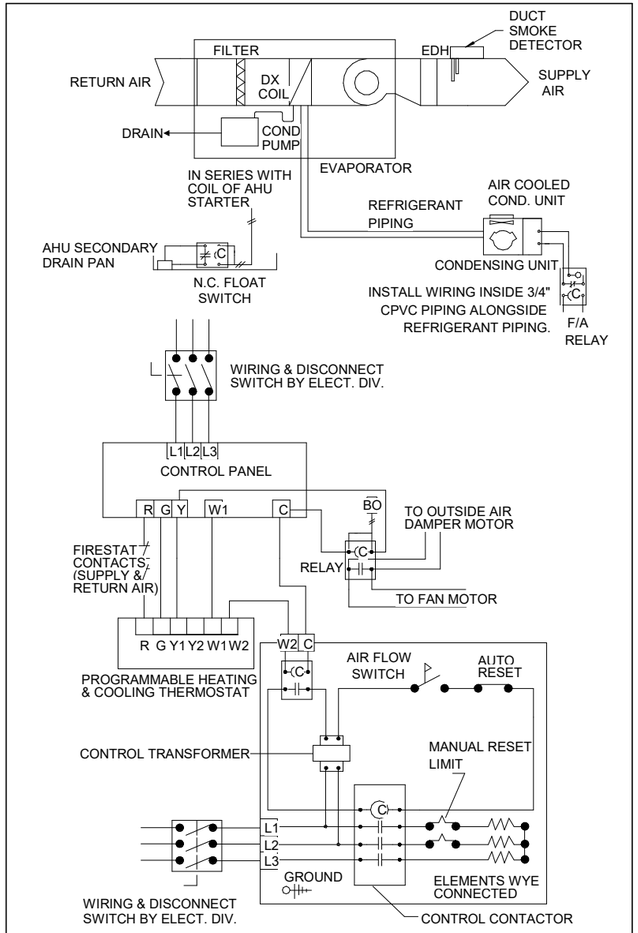

TYPICAL DUCTED SPLIT DX SYSTEM HEAT PUMP WIRING DIAGRAM
(CONVENTIONAL DUCTED SPLIT SYSTEM SIMILAR)

SEQUENCE OF OPERATION

THE DUCTED SPLIT SYSTEM IS NOT A PART OF THE DDC SYSTEM

THE SUPPLY FAN AND CONDENSING UNIT SHALL SHUT DOWN WHENEVER ANY AUTOMATIC OR MANUAL FIRE ALARM DEVICE IS PLACED INTO ALARM BY THE BUILDING FIRE ALARM CONTROL PANEL. UPON FIRE ALARM PANEL BEING RESET TO NORMAL OPERATION, THE SYSTEM SHALL AUTOMATICALLY RESUME SCHEDULED OPERATION. THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY DURING NORMAL OPERATION.

THE SUPPLY FAN AND CONDENSING UNIT SHALL SHUT DOWN WHENVER THE AUXILIARY DRAIN PAN HIGH LEVEL ALARM DEVICE IS PLACED INTO ALARM. UPON MANUAL RESET OF THE ALARM, THE SYSTEM SHALL AUTOMATICALLY RESUME SCHEDULED OPERATION.

SPACE TEMPERATURE TO BE CONTROLLED THROUGH A MICROPROCESSOR CONTROL SYSTEM W/REMOTEMOUNTED SPACE TEMPERATURE SENSOR.

AHU DX COOLING STANDALONE CONTROL DIAGRAM — **1**
No Scale

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JOB NO.:	204.1880.038
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M601
SHEET NO.:

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Condensing Unit Schedule Heat Pump

PLAN MARK	BASIS OF DESIGN MFGR	MODEL	TYPE	AREA SERVED	NUM. OF FANS	NUMBER OF COMP.	COOLING DATA TOTAL COOLING RATING (BTU/H)	SEER AT AHRI CONDITIONS	AMBIENT AIR TEMP (COOLING MODE) DEG. ºF)	AMBIENT AIR TEMP (HEATING MODE) DEG. ºF)	HEAT PUMP DATA COP AT 47°F	MCA	MOCP	ELECTRICAL DATA VOLTS	PHASE	WEIGHT (LB)	REFRIG.
CU-P1	CARRIER	25HCE460AP06	HEAT PUMP	LINDBERGE ELEV MECH ROOM	1	1	60,000	14	95	39	3.7	11	15	480	3	200	R-410A
CU-P2	CARRIER	25HCE460AP06	HEAT PUMP	WRIGHT BROTHERS ELEV MECH ROOM	1	1	60,000	14	95	39	3.7	11	15	480	3	200	R-410A
CU-P3	CARRIER	25HCE460AP06	HEAT PUMP	JANUS ELEV MECH ROOM	1	1	60,000	14	95	39	3.7	11	15	480	3	200	R-410A
CU-P4	CARRIER	25HCE460AP06	HEAT PUMP	GODDARD ELEV MECH ROOM	1	1	60,000	14	95	39	3.7	11	15	480	3	200	R-410A

NOTES:
1. PROVIDE SEA COAST CONDENSER COIL COATING, WITH MINIMUM 5000 HOUR SALT SPRAY RATING, BY MODINE OR EQUAL.
2. COORDINATE REFRIGERANT CHARGE AND LINE SIZES WITH LINE LENGTHS AND MANUFACTURER'S RECOMMENDATIONS.
3. DISCONNECT BY ELECTRICAL.
4. MOUNT CONDENSER UNIT ON EXISTING CONCRETE HOUSEKEEPING PAD.
5. REFER TO WIND RESTRAINT REQUIREMENTS DETAIL, ON SHEET M502, FOR WIND RESTRAINT REQUIRMENTS.

Fan Coil Unit Schedule DX

PLAN MARK	BASIS OF DESIGN MFGR	MODEL	TYPE	AREA SERVED	AIRFLOW TOTAL CFM	OA CFM	FAN DATA EXT. SP (IN. WG)	MOTOR HP	COOLING COIL DATA EAT DB	EAT WB	LAT DB	LAT WB	CAPACITY SEN. BTU/H	CAPACITY TOTAL BTU/H	HEAT PUMP CAPACITY	EAT(db)	LAT(db)	AUXILIARY HEATING COIL EAT(db)	LAT (db)	HEATING ELEMENT KW	SCR CONTROL	FILTER DATA MIN. MERV	TYPE	ELECTRICAL DATA MCA	MOP	VOLTS	PHASE	WEIGHT (LBS)
FCU-P1	CARRIER	FB4CNP061	SINGLE ZONE CAV	LINDBERGE ELEV MECHANICAL ROOM	1,750	100	0.5	0.75	76	63	57	56	42,620	53,580	54500.0 Btu/h	70 °F	88 °F	70 °F	88 °F	10 KW	No	8	1" PLEATED	12	15	480	3	100
FCU-P2	CARRIER	FB4CNP061	SINGLE ZONE CAV	WRIGHT BROTHERS ELEV MECHANICAL ROOM	1,750	100	0.5	0.75	76	63	57	56	42,620	53,580	54500.0 Btu/h	70 °F	88 °F	70 °F	88 °F	10 KW	No	8	1" PLEATED	12	15	480	3	100
FCU-P3	CARRIER	FB4CNP061	SINGLE ZONE CAV	JANUS ELEV MECHANICAL ROOM	1,750	100	0.5	0.75	76	63	57	56	42,620	53,580	54500.0 Btu/h	70 °F	88 °F	70 °F	88 °F	10 KW	No	8	1" PLEATED	12	15	480	3	100
FCU-P4	CARRIER	FB4CNP061	SINGLE ZONE CAV	GODDARD ELEV MECHANICAL ROOM	1,750	100	0.5	0.75	76	63	57	56	42,620	53,580	54500.0 Btu/h	70 °F	88 °F	70 °F	88 °F	10 KW	No	8	1" PLEATED	12	15	480	3	100

NOTES:
1. PROVIDE WITH EC FAN MOTOR.
2. UTILIZE EXISTING JCI THERMOSTAT FOR CONTROL. REFER TO CONTROL SEQUENCE ON SHEET M601.
3. PROVIDE AUXILIARY CONDENSATE DRAIN PAN, WITH HIGH LEVEL FLOAT AND ALARM TO THERMOSTAT.

AIR DISTRIBUTION SCHEDULE

PLAN MARK	CFM	NECK SIZE	FACE SIZE	DESCRIPTION	ADDITIONAL REQUIREMENTS
A	0-720 721-1280	16x10 26x10	FACE SIZE EQUALS NECK SIZE PLUS 2".	BASIS OF DESIGN: PRICE-620D COLOR: AS SELECTED BY ARCHITECT MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: YES DOUBLE DEFLECTION, 3/4" BLADE SPACING, FRONT BLADES PARALLEL TO LONG DIMENSION	SIDEWALL/DUCT SUPPLY REGISTER SURFACE-MOUNT: BORDER TYPE F DUCT-MOUNT: SPRIAL DUCT FRAME W/MVD
B	0-3000	48X20	FACE SIZE EQUALS NECK SIZE PLUS 2".	BASIS OF DESIGN: PRICE-630 COLOR: AS SELECTED BY ARCHITECT MATERIAL: ALUMINUM OPPOSED BLADE DAMPERS: YES DOUBLE DEFLECTION, 3/4" BLADE SPACING, FRONT BLADES PARALLEL TO LONG DIMENSION	SIDEWALL RETURN/TRANSFER REGISTER SURFACE-MOUNT: BORDER TYPE F

NOTES:
1. BRANCH DUCTWORK SHALL BE RAN FULL SIZE OF DIFFUSER/GRILLE NECK SIZE UNLESS OTHERWISE NOTED.
2. DIFFUSER/GRILLE SHALL BE PAINTED WITH FACTORY WHITE FINISH.

LOUVER SCHEDULE

MARK	TYPE	MANUFACTURER	MODEL	L X W (IN.)	AIRFLOW	MAX VELOCITY	APD (IN. WG.)	FREE AREA (SF)	NOTES
L1	INTAKE	GREENHECK	EVH-501D	12 X 12	100 CFM	300	.01	.33	1-3

NOTES:
1. PROVIDE WITH BAKED ENAMEL OR KYNAR FINISH. COLOR TO MATCH EXTERIOR BUILDING COLOR.
2. COMPLY WITH AMCA 540 AND 550, AS WELL AS ALL OTHER FLORIDA STATUTES FOR HIGH WIND.
3. PROVIDE WITH MINIMUM 12" DEEP DUCT PLENUM AT INTERIOR SIDE OF LOUVER.

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY DOMINIC J. CACOLICI, EOR. ON THE DATE ADJACENT TO THE SEAL USING A SHA AUTHENTICATION CODE.

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DANIEL S. VAUGHN LICENSE No. 86788 STATE OF FLORIDA PROFESSIONAL ENGINEER

CONFORMED DOCUMENTS

Daniel S. Vaughn, P.E.
FL Reg. No.: #86788

REVISIONS | BY | DATE

HILLSBOROUGH COUNTY AVIATION AUTHORITY
TAMPA, FLORIDA

RS&H, Inc.
1715 N. Westshore Blvd., Suite 500
Tampa, Florida 33607-4599
813-289-5530
www.rsandh.com
FL Cert. of Auth. #00000886
EB0005420 LC0000210

Tampa International Airport

PROJECT NAME
TPA LTPG ELEVATOR AC REPLACEMENT
4000 GEORGE J BEAN PKWY, TAMPA, FLORIDA 33607

SHEET TITLE
MECHANICAL SCHEDULES

DESIGNED: DSV
DRAWN: DSV
CHECKED: DJC
HCAA NO.: 6930 22
JOB NO.: 204.1880.038
DATE: MAY 6TH 2022

M801
SHEET NO.: