



COBB COUNTY PURCHASING DEPARTMENT

1772 County Services Parkway
Marietta, Georgia 30008-4012
(770) 528-8400 /FAX (770) 528-1154
Email: purchasing@cobbcounty.org
www.purchasing.cobbcountyga.gov

IMPORTANT NOTICE – PLEASE READ CAREFULLY!!

ALL bids **MUST** be received at the Cobb County Purchasing Department.

BIDS MUST BE RECEIVED BEFORE 12:00 (NOON) ON BID OPENING DAY

Any bid received later than 12:00 (noon) will not be accepted. The County accepts no responsibility for delays in the mail. Bids are to be mailed or delivered to:

COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008-4012

**All bid prices shall be submitted on the Bid Form included in the bid/proposal.
Any revisions made on the outside of the envelope WILL NOT be considered.**

PLEASE CHECK bid specifications and advertisement for document requirements.

Documents/Forms listed below **MUST** be submitted when required.

Omission of these documents /forms will cause your bid/proposal to be declared **NON-RESPONSIVE**.

- **BID SUBMITTAL FORM**
 - ▶ *Official Signature is required on this form guaranteeing the quotation.*
- **CONTRACTOR AFFIDAVIT and AGREEMENT - Exhibit A**
 - ▶ *Affidavit **MUST** be signed, notarized and submitted with any bid requiring the performance of physical services. If the affidavit is not submitted at the time of the bid, bid will be determined non-responsive and will be disqualified.*
- **BID BOND**

If your firm is classified as a Disadvantaged Business Enterprise (DBE) please complete Exhibit B with bid response. A Disadvantaged Business Enterprise (DBE) is generally defined as a Female, Black American, Hispanic American and any other minority owned business.

All vendors are required to submit the ORIGINAL AND AT LEAST one (1) duplicated copy of any bid submitted to Cobb County. Please refer to your bid specifications to determine if more than one (1) copy is required. Non-submission of a duplicate copy may disqualify your bid/proposal.

A “**SEALED BID LABEL**” has been enclosed to affix to your bid. This label **MUST** be affixed to the outside of the envelope or package, **even if it is a “NO BID” response**. Failure to attach the label may result in your bid being opened in error or not routed to the proper location for consideration. No bid will be accepted after the date and time specified.

Thank you in advance for your cooperation.

ADVERTISEMENT FOR BIDS
COBB COUNTY PURCHASING DEPARTMENT

BID OPENING DATE: MAY 26, 2011

Sealed bids from qualified contractors will be receive before 12:00 NOON, May 26, 2011 in the Cobb County Purchasing Department, 1772 County Services Parkway, Marietta, GA 30008 for furnishing all labor, materials, equipment, appliances, etc. pursuant to the plans, specifications, condition and addenda for:

**SEALED BID # 11-5577
HVAC IMPROVEMENTS FOR R. L. SUTTON WRF**

**PRE-BID/PROPOSAL MEETING: MAY 10, 2011 @ 9:30 A.M.
R. L. SUTTON WATER RECLAMATION FACILITY
5175 SOUTH ATLANTA ROAD
SMYRNA, GEORGIA 30080**

No bids will be accepted after the 12:00 noon deadline.

Bids are opened at 2:00 p.m. at Cobb County Purchasing Department, 1772 County Services Parkway, 2nd Floor, Bid/Meeting Room, Marietta, GA 30008.

Proposals must be accompanied by bid security in the amount not less than five percent (5%) of the base bid. Performance Bond and Labor and Material Payment Bond, or other security instruments as allowed by law each in the amount equal to 100% of the contract sum will be required of the successful bidder. Bonds must be written by a surety company licensed to do business in the State of Georgia, have a "Best's" rating of "A" or better, appear on the current U.S. Treasury Department list of sureties that are acceptable on bonds for the federal government (circular 570), and have recommended bonds limits equal to or in excess of those required for this project; otherwise acceptable to the owner.

The Georgia Security and Immigration Compliance Act Affidavit form must be submitted with all bid packages involving the "performance of physical services" in order to be considered.

No proposal may be withdrawn for a period of sixty (60) days after date of bid opening, unless otherwise specified in the bid documents. Cobb County will consider the competency and responsibility of bidders in making the award. Cobb County reserves the right to reject any and all bids, to waive informalities and technicalities, to reject portions of the bids, and to award contracts in a manner consistent with the County and the laws governing the State of Georgia.

This solicitation and any addenda are available for download in PDF format on the Cobb County Purchasing website. www.purchasing.cobbcountyga.gov.

Advertise: April 29, 2011
May 6, 13, 20, 2011



BID SUBMITTAL FORM

SUBMIT BID/PROPOSAL TO:
COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008-4012

BID/PROJECT NUMBER: 11-5577
HVAC IMPROVEMENTS FOR R. L. SUTTON WRF
COBB COUNTY WATER SYSTEM

DELIVERY DEADLINE: MAY 26, 2011 BEFORE 12:00 (NOON) EST
(NO BIDS/PROPOSALS WILL BE ACCEPTED AFTER THIS DEADLINE).

BID OPENING DATE: MAY 26, 2011 @ 2:00 P.M. IN THE PURCHASING DEPARTMENT BID ROOM.

BUSINESS NAME AND ADDRESS INFORMATION:

Company name: _____

Contact name: _____

Company address: _____

E-mail address: _____

Phone number: _____ Fax number: _____

NAME AND OFFICIAL TITLE OF OFFICER GUARANTEEING THIS QUOTATION:

(PLEASE PRINT/TYPE) NAME TITLE

SIGNATURE OF OFFICER ABOVE: _____
(SIGNATURE)

TELEPHONE: _____ FAX: _____

BIDDER WILL INDICATE TIME PAYMENT DISCOUNT: _____

BIDDER SHALL INDICATE MAXIMUM DELIVERY DATE: _____

Bids received after the date and time indicated will not be considered. Cobb County reserves the right to reject any and all bids, to waive informalities, to reject portions of the bid, to waive technicalities and to award contracts in a manner consistent with the county and the laws governing the state of Georgia.

The enclosed (or attached) bid is in response to Bid Number 11-5577; is a firm offer, **as defined by section O.C.G.A. (s) 11-2-205 of the code of Georgia (Georgia laws 1962 pages 156-178)**, by the undersigned bidder. This offer shall remain open for acceptance for a period of 60 days calendar days from the bid opening date, as set forth in this invitation to bid unless otherwise specified in the bid documents.

NOTICE TO BIDDERS - - BID QUOTES MUST INCLUDE INSIDE DELIVERY CHARGES

Advertise Dates: APRIL 29, 2011
MAY 6, 13, 20, 2011

SEALED BID LABEL

SEALED BID ENCLOSED

DELIVER TO:
COBB COUNTY PURCHASING
1772 County Services Parkway
Marietta, GA 30008-4012

SEALED BID # 11-5577 DATE: May 26, 2011

BIDS MUST BE RECEIVED BEFORE 12:00 NOON

DESCRIPTION:

HVAC Improvements for R. L. Sutton WRF

PLEASE ATTACH LABEL TO OUTSIDE OF BID PACKAGE



Cobb County...Expect the Best!

"STATEMENT OF NO BID"

COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008

TO ALL PROSPECTIVE BIDDERS:

Because of the many requests to be placed on our vendors' list, we are continuously updating the list. While we want to include all bona fide vendors, we do not want to mail bids to those vendors who may no longer be interested in participating in our bidding process.

If you do not choose to respond to the attached Invitation to Bid/Request for Proposal, please fill out the form below indicating whether or not you want to be retained on our current vendor list.

Vendors who do not respond in any way (by either submitting a bid or by returning this form) over a period of one year may be removed from the current vendor list.

Vendors who do not wish to bid often return the entire bid package, sometimes at considerable postage expense. Returning the entire bid package is not necessary. Simply return this form.

Thank you for your cooperation.
Cobb County Purchasing Department

"STATEMENT OF NO BID"
SEALED BID NUMBER 11-5577
HVAC IMPROVEMENTS FOR R. L. SUTTON WRF

If you do not wish to respond to the attached Invitation to Bid/Request for Proposal, please complete this form and mail/fax to: **Cobb County Purchasing Department, Attention: Sealed Bid Department, 1772 County Services Parkway, Marietta, GA. Fax # 770-528-1154**

I do not wish to submit a bid/proposal on this solicitation.

I wish to be retained on the vendor list for this commodity or service: Yes_____ No _____

Please PRINT the following:

Company

Representative

You are invited to list reasons for your decision not to bid: _____



Cobb County...Expect the Best!

INVITATION TO BID

**SEALED BID # 11-5577
HVAC IMPROVEMENTS FOR R. L. SUTTON WRF**

BID OPENING DATE: MAY 26, 2011

**PRE-PROPOSAL CONFERENCE: MAY 10, 2011 @ 9:30 A.M. (E.S.T.)
R. L. SUTTON WATER RECLAMATION FACILITY
5175 SOUTH ATLANTA ROAD
SMYRNA, GEORGIA 30080**

BIDS ARE RECEIVED IN THE
COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GEORGIA 30008
BEFORE 12:00 (NOON) BY THE BID OPENING DATE

BIDS WILL BE OPENED IN THE COBB COUNTY PURCHASING DEPARTMENT
BID/MEETING ROOM AT 2:00 P.M.

**VENDORS ARE REQUIRED TO SUBMIT THE ORIGINAL AND 1 COPY OF BID
(UNLESS OTHERWISE SPECIFIED IN BID SPECIFICATIONS)**

N.I.G.P. COMMODITY CODE:91036

NAME: _____

ADDRESS: _____

REPRESENTATIVE: _____

PHONE: _____ FAX: _____

E-MAIL _____

NOTE: The Cobb County Purchasing Department will not be responsible for the accuracy or completeness of the content of any Cobb County Invitation to Bid or Request for Proposal or subsequent addenda thereto received from a source other than the Cobb County Purchasing Department.

**Invitation to Bid
HVAC Improvements for R. L. Sutton Water Reclamation Facility
Cobb County Water System
Sealed Bid #11-5577**

Introduction

Sealed bids for furnishing all services, materials, labor, tools, equipment, and incidentals necessary for the implementation of the project for the R. L. Sutton HVAC Improvement will be received by the COBB COUNTY BOARD OF COMMISSIONERS, herein referred to as "Owner", at the offices of the Purchasing Department, 1772 County Services Parkway, Marietta, Georgia 30008, **until 12:00 Noon (local time) on May 26, 2011**. The project name and project number must be shown on the outside of the proposal envelope. No proposals will be accepted after the 12:00 noon deadline.

Bids will be opened at 2:00 PM (local time) on May 26, 2011, in the Cobb County Purchasing Department, 1772 County Services Parkway, 2nd Floor Bid Opening/Meeting Room, Marietta, GA 30008.

Submit an original and one (1) copies of this ITB to:
Cobb County Purchasing Department
1772 County Services Parkway
Marietta, Georgia 30008

Written inquiries regarding this ITB must be addressed to:
Cobb County Purchasing Department
1772 County Services Parkway
Marietta, Georgia 30008
Fax: 770-528-1154
Email: purchasing@cobbcounty.org

Deadline for question submittal is **Tuesday, May 17, 2011 by 5:00 p.m.** Responses to all written inquiries will be answered in the form of an addendum.

A Pre-Bid Meeting will be held at the conference room at the R. L. Sutton Water Reclamation Facility, located at 5175 South Atlanta Road, Smyrna, GA 30080 at 9:30 AM on May 10, 2011.

A tour of the R. L. Sutton Water facility will be conducted immediately after the pre-bid meeting. Additional site visits may be coordinated through Mr. Micheal Smith at the R. L. Sutton WRF. He can be reached at 404-609-6050

PROJECT DESCRIPTION

This project involves the modifications and improvements to HVAC related components at the R. L. Sutton Water Reclamation Facility, including the replacement of chilled water coils to serve DMAU-2; replacing and relocating the split system air conditioning for ILS Electrical Building; and the replacement of the gas make-up units of the headwork and other related work. The work is considered a single project and shall be bid accordingly. Bidders shall bid a single dollar amount for work satisfying the specifications set forth in the attached Project Manual.

Each proposal must be accompanied by a bid bond prepared on accepted form, duly executed by the offeror, in the amount of five per cent (5%) of the proposal.

The successful offeror for this contract will be required to furnish a satisfactory performance bond and labor and material payment bond, each in the amount of one hundred percent (100%) of the proposal.

**SECTION 15000
HVAC GENERAL**

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Refer to Division 1 - General Requirements and any and all Supplementary or Special Requirements, all of which apply to work described in Division 15 – HVAC as if written in full herein.
- B. The scope of work described in these Specifications and/or indicated on the Drawings shall include the furnishing of all materials, equipment, appurtenances, accessories, connections, labor, etc. required and/or necessary to completely install, clean, inspect, adjust, test, balance and leave in safe and proper operating condition all HVAC systems. All HVAC work shall be accomplished by workmen skilled in the various trades involved.
- C. The Drawings and Specifications are complementary to each other and what is called for by one shall be as binding as if called for by both. If a discrepancy exists between the Drawings and Specifications, the higher implied cost shall be included in the bid, and the Architect shall be notified of the discrepancy in writing.

1.02 CODES AND STANDARDS

- A. All HVAC work shall conform to all ordinances and regulations of the City, County and State where the work will take place, including the requirements of all authorities having jurisdiction. The following codes, standards and references shall be observed as a minimum:
 - 1. The 2006 International Codes
 - 2. State Amendments to the Code
 - 3. National Fire Protection Association (NFPA) Standards and Guidelines
 - 4. Local and State Fire Marshal requirements
 - 5. Local Building and Inspection Department requirements
 - 6. American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)
 - 7. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) Manuals
 - 8. Underwriters Laboratories Inc. (UL)
 - 9. Americans with Disabilities Act (ADA)
- B. If Code or other requirements exceed the provisions shown on the Contract Documents, the Engineer shall be notified in writing. Where requirements of the Contract Documents exceed Code requirements, work shall be furnished and installed in accordance with the Contract Documents. Any work done contrary to these requirements shall be removed and replaced at the Contractor's expense.

1.03 WORK INCLUDED

The HVAC Systems installed and work performed under this Division of the Specifications shall include, but not necessarily be limited to:

A. Airside Systems

1. Equipment: Heating and ventilating units, dedicated outdoor air units, split systems, etc.
2. Ductwork and Accessories: including sheet metal, flexible ductwork, etc.

B. Refrigerant Systems

1. Equipment: Condensing units
2. Piping, Tubing and Accessories: including pipe, refrigerant tubing, valves, solenoids, thermal expansion valves, pipe and equipment drains, condensate drains, etc.

C. Equipment, Ductwork and Piping Supports

1. Equipment Mounts: Concrete housekeeping pads, equipment rails, miscellaneous steel, etc.
2. Hangers and Support Devices: including inserts, hanger rods, unistrut, cross-bracing, anchor bolts, pipe anchors, restraints, etc.
3. Vibration Isolation and seismic restraint: including inertia bases, flexible couplings, expansion devices, snubbers, springs, waffle pads, seismic restraints, etc.

D. Insulation

1. Ductwork Insulation: including exterior duct wrap, internal duct liner, fire wrap, etc.
2. Piping and Equipment Insulation: including preformed, board and wrap.

E. Miscellaneous HVAC Equipment: Unit heaters, wall heaters, roof hoods, heat tracing, etc.

F. Automatic Temperature Controls

1. Decentralized: including all thermostats, control dampers, control valves, programmable controllers, line and low-voltage wiring, smoke detectors, pressure sensors, control logic, etc.

G. Labor and Equipment: including project management, supervision, tradesmen, lifts, fork-trucks, cranes, scaffolding, saws, wrenches, etc.

H. Equipment Identification

- I. Start-up and Commissioning
- J. Demonstration and Owner Training
- K. Testing, Adjusting and Balancing

1.04 ENGINEER'S DRAWINGS

- A. The locations, arrangement and extent of equipment, devices, ductwork, piping, and other appurtenances related to the installation of the HVAC work shown on the Drawings are approximate and define the intent of the design. The Contractor shall not scale Engineer's Drawings, but shall refer to the architectural drawings for exact dimensions of building components. Should a conflict exist between the existing conditions and engineering drawings regarding dimensions and scale, the Contractor shall notify the Engineer of the discrepancy.
- B. Materials, equipment or labor not indicated but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.

1.05 EQUIPMENT, MATERIALS AND BID BASIS

- A. Manufacturers' names, model numbers, etc. cited on the Drawings and in the Specifications are for the purpose of describing type, capacity, function and quality of equipment and materials required. All project design and coordination between disciplines has been performed as if the named manufacturer and specific piece of equipment will be provided to the project by the Contractor.
- B. Alternate equipment and/or materials other than that named on the Drawings and in the Specifications may be proposed for use, but all equipment and materials shall conform entirely to the specified base items. Proposed alternate equipment shall be substantially equal in size, weight, construction and capacity. Alternate equipment and materials shall be submitted only as full equivalent to the equipment and materials specified, with sufficient supportive documentation and technical literature to demonstrate quality, performance, and workmanship without doubt or question. Requests for prior approval of alternate products shall be made at least ten (10) days prior to the bid. The Engineer shall consider the use of the alternate equipment based on the supportive documentation made available, and shall approve or disapprove any proposed alternates. The decision of the Engineer shall, in all cases, be final.
- C. The Contractor shall coordinate the installation of all HVAC equipment proposed for use in this project with all building trades (architectural, structural, electrical, etc.). Coordination shall be accomplished prior to, and shall be reflected in, the equipment submittals for approval. When the Contractor requests substitution of alternate equipment, it is with the knowledge that he shall be responsible for any and all costs

required by the substitution, including necessary engineering and construction revisions in his or any other contract or trade to satisfy the design intent shown on the Plans and described in the Specifications.

1.06 SUBMITTALS

A. The Contractor shall prepare, submit and obtain Engineer's review of all manufacturers' data on the HVAC equipment and systems prior to ordering, purchasing or installing any equipment or materials. Electronic submittals are acceptable. All submittals shall be transmitted simultaneously in a single .zip file, with the associated specification sections cited and the items submitted clearly identified. Partial submittals will be returned without review. Submittals, as a minimum, shall include:

1. All HVAC items scheduled on the Drawings
2. Equipment arrangement, ductwork and piping drawings. Contractor drawings shall be prepared at a minimum scale of 1/8" = 1'-0". A scale of 1/4" = 1'-0" scale is preferred. Drawings shall be indicative of actual equipment purchased and shall show all offsets, transitions, fittings, dampers, valves, hanger locations, etc. Sections are required in spatially tight areas (e.g. kitchens, laundries, central plants, mechanical rooms, etc.) The following will guide the Contractor as to minimum drawing detail required:
 - a. Clearly indicate top and bottom of duct and pipe elevations. All elevations shall be coordinated as to not conflict with structural, plumbing, electrical and architectural trades.
 - b. Indicate all offsets (both vertical and horizontal).
 - c. Indicate graphically all duct and pipe joints and their lengths.
 - d. Submit duct and pipe-work fabrication schedule indicating duct size range with minimum duct material gauges, pipe schedule being used, duct and pipe connection joint types, section lengths, duct reinforcement type and spacing, etc.
 - e. Indicate graphically all ductwork to be fabricated with internal duct liner.
 - f. Indicate all insulation for ductwork and piping.
 - g. Indicate all dampers and valves as shown on design documents and called for in the specifications.
 - h. Indicate all flexible connectors where required by specifications and notes.
3. Flexible ductwork, duct-board, insulation and linings
4. Dampers, louvers, air distribution devices
5. Manufacturer's cut sheets of all piping and tubing materials
6. Where split systems are used in a "long line application," submit manufacturer's refrigerant line set routing drawings and engineered calculations supporting the recommended suction and liquid line sizes. Identify and provide cut sheets of any and all accessories required to make the system complete, functional and reliable.
7. Valves, thermometers, pressure gauges

- 8. Roof curbs, equipment supports, hanger systems, vibration isolators, seismic restraints
 - 9. Control equipment, systems and diagrams
 - 10. Test and balance reports
- B. All submittal approvals required by any code or enforcement authority, insurance underwriter, etc. shall be obtained prior to being submitted to the Engineer.
 - C. Review of submittals by the Engineer does not relieve the Contractor from responsibility for complying with all requirements of the Contract Documents. Furthermore, it shall be the responsibility of the Contractor to coordinate the requirements (roof penetrations, wall penetrations, floor penetrations, curbs, electrical, etc.) of all approved equipment with the other trades and disciplines.
 - D. All submittals shall be identified by the equipment mark or tag identification numbers shown on the Contract Drawings. Each individual submittal item shall be marked to show which specification section pertains to the item.
 - E. The Contractor shall provide a written statement confirming coordination of voltage requirements for all HVAC equipment requiring an electrical connection. Statement shall bear the names and signatures of the HVAC and electrical contractors. A photocopied reproduction of the below statement is acceptable.

VOLTAGE COORDINATION STATEMENT

This statement is to confirm that the voltages of the equipment provided under this specification have been coordinated with the Electrical Drawings, as well as with the Electrical Contractor.

HVAC Contractor: _____

Project Manager Name: _____

Project Manager Signature/Date: _____

Electrical Contractor: _____

Project Manager Name: _____

Project Manager Signature/Date: _____

1.07 PERMITS

- A. The Contractor shall obtain all permits and inspections required for the installation of the HVAC work and pay all charges incident thereto. He shall deliver copies of all certificates of permit and inspection to the Architect.

1.08 COORDINATION OF TRADES

- A. The Contractor shall give full cooperation to other trades, and shall furnish all information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.
- B. Piping and other HVAC equipment shall not be installed without first coordinating the installation of same with other trades. The Contractor, at his own expense, shall relocate all uncoordinated ductwork, piping and other HVAC equipment installed should they interfere with the proper installation and mounting of electrical, plumbing equipment, ceilings and other architectural or structural finishes.
- C. The Contractor shall coordinate the elevations of all piping and equipment above ceilings and in exposed areas with the work of all other disciplines prior to installation.
- D. The HVAC Contractor shall confirm that his work does not interfere with the clearances required for finished columns, pilasters, partitions, walls or other architectural or structural elements as shown on the Contract Documents.
- E. Work that is installed under this Contract which interferes with the architectural design or building structure shall be removed and relocated as required at no additional cost to the Contract.

1.09 OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall prepare a minimum of three (3) instruction manuals, one of which shall be submitted to the Engineer for review. Manuals shall describe installation, operation and maintenance of all HVAC equipment and shall include copies of control schematics, sequences of operation, function and operations of all components, as well as the Contractor's name, address, and telephone number. Manuals shall also contain one copy of all manufacturers' drawings, pamphlets, data, parts lists, and instruction manual for each piece of equipment. Upon approval, two copies shall be delivered to the Owner; one copy shall be kept by the Contractor. The pamphlets and drawings are to be neatly bound in (a) 3-ring binder(s).

1.10 AS-BUILT DRAWINGS

- A. The Contractor shall maintain a record of all changes in the work from that shown in the Contract Documents. The record shall be by red-line mark-up on the most current set of Engineer's Drawings kept in the field office. After all work is completed, the Contractor shall prepare a set of "as-built" reproducible drawings of similar type and quality as the Engineer's Drawings. As-built drawings shall

accurately depict actual final arrangement of all HVAC items. As-built drawings shall be delivered to the Architect.

1.11 WARRANTY

- A. All equipment furnished and installed under this Contract shall be provided with the manufacturer's standard warranty unless otherwise noted.
- B. All reciprocating and scroll air conditioning compressors shall be provided with an extended 5-year parts warranty.
- C. The Contractor shall make good all defects in material, equipment, or workmanship disclosed within a period of one (1) year from date of building acceptance by the Owner. The phrase "make good" shall mean to furnish promptly, without charge, all work necessary to remedy the defects to the satisfaction of the Engineer.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All equipment, materials, accessories, etc. used shall be new and of current production unless specified otherwise. Equipment not specified in the Engineer's Drawings shall be suitable for the intended use and shall be subject to approval by the Engineer.
- B. All equipment, products and materials shall be free of defects and shall be constructed to operate in a safe manner without excessive noise, vibration, leakage, or wear.
- C. All equipment shall bear the inspection Label of Underwriters Laboratories Inc.
- D. All equipment and material for similar applications or systems shall be provided from the same manufacturer unless noted otherwise.

2.02 ELECTRICAL WORK

- A. Except as otherwise specified or noted, electrical equipment used in HVAC systems shall be as specified herein.
- B. Motor controls, system controls, starters, pilot lights, push buttons, etc. shall be furnished by the HVAC Contractor complete as a part of the motor or apparatus that it operates. Electrical equipment shall be wired for the voltages of existing equipment.
- C. Electric motors shall be high efficiency, open drip-proof type unless otherwise specified. Motors shall be standard NEMA continuous duty type and shall bear the UL Label. Motors shall be selected with a minimum of 15% safety factory greater than the fan brake/horsepower (e.g. 4.75 BHP would require a nominal 7-1/2 HP

motor). The motor service factor shall not be used as part of the safety factor. All motors shall have thermal overload protection. Motors shall meet Table MG-1-12C of EPACT 1992.

- D. Motors controlled by a variable frequency drive (VFD) shall be inverter duty rated and fully compatible with the VFD provided.
- E. Starters for motors 1/3 HP and smaller shall be manual type, and for 1/2 HP and larger, shall be magnetic type. Starters shall be minimum size 0, combination type (with disconnect and lockable handle) with molded case circuit breaker. Starters for motors with remote or automatic control shall be magnetic. Relays, interlocks and auxiliary contacts shall be provided as specified and required.
- F. Magnetic motor starters shall be across-the-line, full voltage, non-reversing type unless otherwise indicated on the Drawings or specified herein. Starters for motors 75 HP and greater shall be solid state, reduced voltage type.
- G. Motor controls shall be either "Hand-Off-Auto" switches or "On-Off" push buttons with one indicating light. "Hand-Off-Auto" switches shall be provided for automatically controlled apparatus.
- H. Electrical power wiring to disconnects, starters, motors and similar devices shall be provided under the Electrical Section. All equipment requiring electrical power shall be installed with disconnect switches at each piece of equipment. Coordinate switch type (fused or non-fused) with equipment characteristics, manufacturer's recommendations and electrical drawings.
- I. The Contractor shall provide all system controls, control and interlock wiring 120 volts and less in conduits and in accordance with materials and installation requirements of drawings and specifications.
- J. All starters shall be labeled on the face of the starter with a semi-rigid plastic laminate nameplate with 1" high white letters on a black background securely affixed to the equipment. The label shall indicate equipment served by the starter (equipment tag used on the Drawings). Labels shall be furnished and installed by the Contractor.
- K. All starters for 3-phase equipment shall have overload devices in each phase.
- L. Wiring diagrams shall be furnished by the Contractor.
- M. Acceptable manufacturers shall be General Electric, Square D, Cutler-Hammer, Siemens and Allen Bradley.

PART 3 - EXECUTION

3.01 GENERAL

- A. All equipment and materials shall be completely installed, adjusted, and fully operational with all accessories and connections.
- B. Equipment, piping, ductwork, etc. shall fit into the spaces provided in the building and shall be installed at such time and in such a manner as to avoid damage and as required by the job progress. The Contractor shall coordinate work with other trades and locate work described herein to avoid interferences with structural, electrical and architectural work. Equipment, accessories and similar items requiring normal servicing or maintenance shall be accessible.
- C. The Engineer reserves the right to direct the removal of any item which, in his opinion, does not present an orderly and reasonably neat or workmanlike appearance. Such removal and replacement shall be done when directed by the Engineer and without additional cost to the Owner.
- D. Listed mounting heights are to the finished bottom of the device unless otherwise noted.
- E. All work shall be designed and installed to comply with the requirements for the seismic design category and use group for the area in which the building is constructed.

3.02 STORAGE AND PROTECTION OF MATERIALS

- A. During construction, all equipment shall be properly protected against damage, defacing and freezing with shipping cartons, plastic sheeting, shipping covers, etc.
- B. All open ends of piping and equipment shall be sealed with nipples and caps, plugs, and test plugs until final connection to system is made.
- C. All equipment, piping and ductwork shall be protected to prevent entrance of foreign matter and debris by covering exposed openings during construction.
- D. Handle and store materials in accordance with manufacturer's and supplier's recommendations and in a manner to prevent damage to materials during storage and handling. Replace damaged materials.
- E. Equipment and materials shall not be installed until such time as the environmental conditions of the job site are suitable to protect the equipment or materials. Equipment or materials damaged or which are subjected to these elements are unacceptable and shall be removed from the premises and replaced.

3.03 CUTTING AND PATCHING

- A. The work shall include all cutting and patching required as part of the HVAC installation. Refer to Division 1 – General Requirements.

3.04 CONCRETE WORK

- A. Construct curbs, pads and similar supports for equipment where required.
- B. Provide 4" thick housekeeping pads for all floor mounted equipment, extending 6" beyond the area occupied by the equipment. Dowel pads to structural slab.
- C. Perform concrete work in accordance with applicable portions of Division 3 - Concrete. Minimum compressive strength of concrete shall be same as specified for slabs on grade.
- D. Mix and install grout for HVAC equipment base bearing surfaces and anchors. Provide forms as necessary and place grout to completely fill equipment bases.

3.05 EQUIPMENT SUPPORTS

- A. Major equipment supports (structural steel frames, framed structural slab and wall openings, etc.) shall be furnished and installed by others; however, the HVAC work shall include furnishing and installation of all miscellaneous equipment supports, structural members, rods, clamps and hangers required to provide adequate support of all HVAC equipment.
- B. Unless otherwise shown on the Drawings, all HVAC equipment, piping, and accessories shall be installed level, square, and plumb.
- C. All equipment, piping, etc. supported by structural bar joists shall be supported only by the top chord of the joists. Hangers shall not be attached to the bottom chord of any joists.

3.06 PIPE AND DUCTWORK PENETRATIONS

- A. Sleeves shall be installed in all masonry or concrete walls, floors, roofs, etc. for pipe and ductwork penetrations. Sleeves for pipe shall be schedule 40 black steel. Sleeves for ductwork shall be 20-gauge galvanized steel. Sleeves shall be sized to provide a minimum of 1/4" clearance between the sleeve and pipe or duct. For insulated pipes or ducts, the clearance shall be between the sleeve and the insulation.
- B. As far as possible, all pipe and ductwork penetrations shall be provided for at the time of masonry or concrete construction. Where drilling is required, only core drills shall be used. Star drills shall not be used.
- C. All pipes penetrating walls or floors of any construction shall be installed with escutcheon plates on both sides of the penetration securely fastened to the wall or floor. In exposed areas, escutcheon plates shall be chrome plated. All escutcheon plates shall be sized to completely conceal the penetration.

- D. Ductwork penetrating walls or floors of any material shall be installed with closure plates on both sides of the penetration. Pipe penetrations through exterior walls shall be sealed weather-tight with expandable link type seals by Thunderline, Linkseal, or Engineer approved equal.
- E. All pipe and duct penetrations of fire, smoke, or fire and smoke-rated assemblies shall be fire-stopped as required to retain the integrity of the UL-rated assembly. Fire barrier products shall be as manufactured by Tremco, Hilti, 3M, Metacaulk, Nelson, or approved equal. Refer

3.07 FLASHING

- A. All piping and ductwork penetrating roofs shall be flashed in an approved manner, shall be watertight.

3.08 EQUIPMENT LABELING

- A. All HVAC equipment shall be labeled. This shall include all central plant, air handling or air conditioning equipment, air terminals, and other similar and miscellaneous equipment.
- B. Labels for air terminals or other devices shall be located for optimum visibility through access panel or removed ceiling tiles.
- C. Equipment labeling shall be one of the following, unless noted or specified otherwise:
 - 1. Permanently attached plastic laminated signs with 1" high lettering
 - 2. Stencil painted identification, 2" high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel

3.09 CLEANING

- A. At all times, the premises shall be kept reasonably clean and free of undue amounts of waste, trash and debris by periodic cleaning and removal. After completion, all foreign material, trash and other debris shall be removed from the job site.
- B. After all equipment has been installed, but prior to testing and balancing, all equipment, piping, ductwork, etc. shall be thoroughly cleaned both inside and out.
- C. All water piping shall be chemically flushed and cleaned prior to circulating water through equipment.
- D. After cleaning, filters shall be installed where required and all systems shall be tested and balanced.

- E. After testing and balancing and just prior to Owner review and acceptance, all systems shall be finally cleaned and left ready for use.

3.10 PAINTING

- A. Painting will be done under Division 9 – Painting except as otherwise noted, but the HVAC Contractor shall leave all surfaces of work free of rust, dirt and grease.
- B. The HVAC Contractor shall touch-up any equipment scratched in shipment or during installation to match original finish. Touch-up painting of HVAC equipment shall be part of the HVAC work.
- C. Any visible ductwork through grilles, registers and diffusers shall be painted flat black.
- D. Provide one coat of rust preventive primer on all new structural steel supports and new ferrous surfaces not galvanized, including HVAC piping. Rust preventive painting shall be part of the HVAC work. Rust preventive paint shall be “Rust Destroyer” by Advanced Protective Products, Inc., Fairlawn, NJ, (201) 794-2000. Product shall have a 5-year warranty when applied directly over rust. Clean and prepare surface per manufacturer’s recommendations.
- E. All painting and coating shall match the original finish and shall conform to the requirements of Cobb County.
- F. Do not paint over equipment nameplates, nonferrous hardware, accessories or trim.

3.11 PRESSURE TESTING

- A. Unless otherwise specified herein, all HVAC piping shall be tested as required by Code to 1-1/2 times the rated system pressure or 100 psig, whichever is greater. Care shall be taken to isolate all equipment not suitable for this test pressure by installing pipe caps or blank flanges at the equipment connections. All valves and fittings shall be tested under pressure.

3.12 PERFORMANCE AND DEMONSTRATION TESTS

- A. All testing and demonstration of any and all HVAC systems required for acceptance by any authorities having jurisdiction shall be included as part of the HVAC work. This shall include the furnishing of any and all testing equipment, smoke generation devices, and any other required equipment or accessories, and all necessary labor required to perform any required tests or demonstrations. The Contractor shall coordinate and verify all devices, equipment and sequence of testing and/or events with such authorities having jurisdiction. The Contractor shall perform a minimum of two (2) satisfactory preliminary tests or demonstrations prior to any formal tests and/or demonstrations for any code authorities, and shall give a minimum of five (5) days advance notice to the Engineer of any and all preliminary tests and/or demonstrations, indicating the date and time of such tests.

3.13 TRAINING

- A. Upon completion of the work, the Contractor shall conduct operation and training session(s) for the Owner's key operating personnel. These sessions shall be of sufficient length and duration to adequately explain the design intent and proper operating and maintenance techniques for all HVAC equipment and systems. After these sessions are completed, the Contractor shall provide a copy of a signed statement by the Owner that his personnel are thoroughly familiar with and capable of operating all HVAC equipment and systems.

END OF SECTION

SECTION 15010
HVAC DEMOLITION, ADDITIONS & RENOVATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Refer to specification section 15000 - HVAC General, all of which applies to work described in this section as if written in full herein.
- B. Furnish all labor, equipment, materials and incidentals required to remove and/or make-safe the existing equipment, pipe, fittings, valves and appurtenances indicated on the Drawings, and not required for the proper operation of the new HVAC system. Removal will be consistent with the final configuration of the new systems as indicated and as required by the Architect. The equipment and piping identified shall be removed from their present locations and shall be removed from the site or stored as specified hereinafter.
- C. Contractor shall visit site, become familiar with existing equipment and include and perform all work required to tie-in the new work to the existing systems and to adapt the existing systems to the new work. Refer to the Engineer's Drawings for the intended final HVAC system configuration.
- D. Before removal of any electrically operated equipment, coordinate carefully to assure that power and control wiring has been disconnected and/or locked out, tagged out and made-safe.
- E. It should be noted that most HVAC components are to remain. If any of these systems are damaged during the progress of construction or demolition, they shall be repaired or replaced to the satisfaction of the Architect without incurring additions to the Contract.

PART 2 - PRODUCTS - Not Applicable

PART 3 - EXECUTION

3.01 GENERAL

- A. Prior to the ordering or purchasing of any equipment or materials or the layout or installation of any new work, the Contractor shall examine the premises and verify any and all of the existing conditions under which he will be obliged to operate, or that will in any manner affect the work under this Contract.
- B. Unless specifically noted to be removed, existing equipment, piping, ductwork, etc. is to remain. Any equipment, piping or appurtenances removed which are necessary for the operation of the existing system shall be replaced to the satisfaction of the Architect without incurring additions to the Contract.

- C. When encountered in work, protect, brace, and support existing, active services as necessary for proper execution of the work. Relocate existing, active services encountered as necessary or as shown on the Contract Documents. Do not prevent or disturb operation of active services that are to remain. Notify all utility companies or municipal agencies having jurisdiction prior to modifying services.
- D. Where work makes temporary shut down of services unavoidable, shut down at night or at such times as approved by the Owner, which will cause the least interference with scheduled operations. Arrange work to assure that services will be shut down only during time actually required to make the connection to the existing work.
- E. All ductwork, pipe, fittings, tubing, insulation, hangers and supports, etc. that are demolished or damaged shall become the property of the Contractor upon removal. The materials shall be removed immediately from the site and shall not be reused.
- F. Any existing property damaged by the Contractor while performing any work shall be replaced with new materials to match existing conditions; however, any existing insulation that is damaged shall be replaced as specified for new insulation.
- G. Wherever piping is removed for disposition, adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner. Piping passing through floors that is to be removed shall be cut or ground flush with the floor and filled with grout flush with adjacent floor.
- H. Equipment to be retained by the Owner shall be carefully removed from the present location, cleaned, packaged and immediately stored at a place on-site as designated by the Owner.
- I. The Contractor shall take all necessary precautions against damaging the material and equipment to be stored. The Contractor shall repair all damage resulting from his operations, as directed by and to the satisfaction of the Architect. Itemized lists of materials removed and stored shall be recorded and submitted to the Owner at the completion of construction. The list shall include a physical description of all items, how they are packaged and where they are stored.
- J. Where work under this project requires extension, relocation, reconnection or modifications to existing equipment or systems, the existing equipment or systems shall be restored to their original and operating condition.
- K. Where pipes, control devices and wiring which are to remain in service, but are disconnected for the removal or relocation of equipment or because of building alterations, they shall be reconnected.
- L. All thermostats and temperature sensors that are to remain in service shall be removed and stored in a safe place or covered in plastic and protected from construction/demolition. Prior to construction, catalog all existing thermostats to be reused and verify proper operation. Notify the Architect at this time of any

inoperable thermostats. Any thermostats damaged or found to be inoperable at turnover shall be replaced by the Contractor at no additional cost.

END OF SECTION

SECTION 15020
DUCTWORK AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work in this section shall be subject to the provisions of Section 15000 - HVAC General.
- B. Furnish and install all material, labor, accessories, etc. shown on the Drawings and as specified herein to completely install all ductwork systems.
- C. Ductwork systems shall be classified as follows:
 - 1. Static pressure class +2" W.G. - from rooftop unit or air handling unit to supply diffusers, and all return and exhaust ductwork
- D. Ductwork shall be constructed according to the latest edition of SMACNA ductwork construction standards applicable to the system pressures described above, and the system material construction.
- E. Duct sizes shown on the Drawings are nominal inside clear.

PART 2 - PRODUCTS

2.01 DUCTWORK

- A. ILS Electrical Building & Headworks: All ductwork shall be constructed of galvanized steel sheets of the thickness listed in the SMACNA manuals for the pressures referenced above.
- B. Influent Lift Station: All ductwork shall be 16-gauge aluminum and shall be installed per SMACNA guidelines.

2.02 FLEX DUCT CONNECTORS

- A. Install flex duct connectors at connections of sheet metal duct to motor driven equipment, or otherwise noted. Flex duct connectors shall be glass fabric coated with neoprene, suitable for service. Install per manufacturer's instructions, and support sheet metal ductwork so that no weight is supported by flex duct connector.
- B. Flex duct connectors shall also be provided at building expansion joints.

2.03 ACCESS DOORS

- A. Hinged, gasketed and latched access doors and/or panels shall be installed at each fire and smoke damper, each duct mounted smoke detector, each valve, at each duct mounted balancing damper or any other HVAC equipment or device that requires accessibility. Doors and panels shall be sized and located to optimize access to dampers, detectors, and other equipment for service and replacement. Access doors in ductwork shall be per SMACNA Standards. Access doors and panels in walls, ceilings or other surfaces shall be coordinated with architectural finishes, and shall be as manufactured by Cesco Products.

2.04 DUCT INSULATION

- A. Refer to Section 15170 - HVAC Insulation.

PART 3 - EXECUTION

3.01 DUCTWORK

- A. All ductwork shall be installed in accordance with applicable SMACNA Standards according to the pressure class described in PART 1 - GENERAL.
- B. Ductwork shall be supported as recommended by SMACNA Standards from structural members. Ductwork shall not be allowed to rest on ceilings, light fixtures or structural members. Ductwork supported from joists shall be supported from the top chord of all joists.
- C. All ductwork accessories shall be installed in strict accordance with manufacturer's recommendations.
- D. All ductwork shall be leak tested in accordance with SMACNA Standards. All ductwork seams shall be sealed with mastic to provide a system that is within the allowable SMACNA leakage limits. Six (6) copies of the ductwork test report shall be submitted to the Engineer prior to the Contractor's request for final payment.
- E. All ductwork shall be cleaned inside and out prior to system start up, and shall be left in a neat and orderly manner.
- F. Ducts, unless otherwise approved, shall be true to dimensions indicated, straight and smooth on inside with neatly finished joints; securely anchor to building in an approved manner, and install to be completely free from vibration under all conditions of operation. Exact routing of ductwork will be dependent on location of framing members. Route duct to avoid cutting framing members. Duct sizes shown on the Drawings are inside clear dimensions.
- G. Brace ducts not more than 60 inches on center. Make slip joints in direction of flow. Unless otherwise indicated, elbows shall have a centerline radius of not less than 1 ½ times the width of the duct. Where space limitations necessitate use of short radius or square elbows, install turning vanes. Offset ducts around obstructions where

possible. Where duct must encompass obstruction, area of duct shall remain constant. Duct tapers shall not exceed 1:4 ratio and transformations 30 degrees between air flow and diverging or converging air flow. Provide access doors for access to all equipment, dampers and motors concealed by sheet metal.

- H. Influent Lift Station: Contractor shall inspect the integrity of the existing aluminum ductwork and diffusers associated with DMAU-1 and DMAU-2 serving the Influent Lift Station. Contractor shall perform a leak test on each existing duct riser to confirm ductwork has been properly sealed. Contractor shall seal and properly support any ductwork found to be leaking or unsecured. Contractor shall confirm that the duct sizes actually installed are as shown on as-built drawings provided by Cobb County and report any variances to Engineer.
- I. Headworks: Contractor shall replace any damaged, corroded or rusted existing ductwork associated with the GMAU-1, GMAU-2, GMAU-3 and GMAU-4.
- J. All exterior ductwork serving the GMAU's shall be insulated per section 15170 – HVAC Insulation.

3.02 AUTOMATIC CONTROL DAMPERS

- A. Dampers shall be of the opposed blade, airfoil, low leakage type with polyurethane blade seals and stainless steel jamb seals.
- B. Leakage shall not exceed 1% of full air flow at 4" WG and below (based on 1,500 FPM approach velocity).
- C. Units shall be full size of ductwork with duct mounting flanges as shown on the Drawings.
- D. Units shall be Robertshaw D211 or equal with required operators.
- E. Install new dampers in systems as indicated below.
 - i. Provide powered open motor operated damper in the ductwork at the supply outlet of both DMAU-1 and DMAU-2. Interlock damper with fan so that end switch contacts are closed prior to fan being energized.
 - ii. Confirm all motor-operated dampers that are located in supply ductwork of MAU-1, MAU-2, MAU-3 and MAU-4 are operational. Repair and/or replace as necessary.

END OF SECTION

**SECTION 15051
NOISE AND VIBRATION CONTROL**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install vibration control devices, materials, and related items. Perform all work as shown on the Drawings and as specified herein to provide complete vibration isolation systems in proper working order.

1.02 MATERIAL AND EQUIPMENT

- A. Vibration isolation mounts shall be supplied by one of the following approved manufacturers:

1. Amber/Booth Co. (Houston, TX)	A.B.
2. Mason Industries, Inc. (Hauppauge, NY)	M.I.
3. Kinetics Noise Control, Inc. (Dublin, OH)	K.N.C.
4. Vibration Eliminator Co., Inc. (Copiague, NY)	V.E.
5. Vibration Mountings & Controls, Inc. (Butler, NJ)	V.M.&C

- B. Unless otherwise specified, supply only new equipment, parts and materials.
- C. Substitutions of equal equipment beyond the alternatives listed will be permitted only with the written permission of the Architect. Accompany each request for acceptance of substitute equipment with manufacturer's certified data proving the equivalence of the proposed substitute in quality and performance. The Architect shall be the final judge of the validity of the data submitted.
- D. Unless otherwise approved by the Architect, field-installed vibration isolation equipment shall be furnished by a single manufacturer or his authorized representative, who shall also be responsible for all work specified in this section to be performed by the manufacturer.

1.03 REQUESTS FOR CHANGE

- A. Any requests for changes to the specifications must be submitted in writing at least ten (10) days prior to bid closing. Approval will be given through a written addendum.

1.04 QUALITY ASSURANCE

- A. Coordinate the size, location, and special requirements of vibration isolation equipment and systems with other trades. Coordinate plan dimensions with size of housekeeping pads.
- B. Provide vibration isolators of the appropriate sizes, with the proper loading to meet the specified deflection requirements.
- C. Supply and install any incidental materials such as mounting brackets, attachments and other accessories as may be needed to meet the requirements stated herein, even if not expressly specified or shown on the Drawings, without claim for additional payment.
- D. Verify correctness of equipment model numbers and conformance of each component with manufacturer's specifications.
- E. Should any rotating equipment cause excessive noise or vibration when properly installed on the specified isolators, the Contractor shall be responsible for rebalancing, realignment, or other remedial work required reducing noise and vibration levels. Excessive is defined as exceeding the manufacturer's specifications for the unit in question.
- F. Upon completion of the work, the Architect or Architect's representative shall inspect the installation and shall inform the installing contractor of any further work that must be completed. Make all adjustments as directed by the Architect that result from the final inspection. This work shall be done before vibration isolation systems are accepted.

1.05 SUBMITTALS

- A. Refer to related sections elsewhere for procedural instructions for submittals.
- B. Before ordering any products, submit shop drawings of the items listed below. The shop drawings must be complete when submitted and must be presented in a clear, easily understood form. Incomplete or unclear presentation of shop drawings may be reason for rejection.
 - 1. A complete description of products to be supplied, including product data, dimensions, specifications, and installation instructions.
 - 2. Detailed selection data for each vibration isolator supporting equipment, including:
 - a. The equipment identification mark;
 - b. The isolator type;
 - c. The actual load;
 - d. The static deflection expected under the actual load;
 - e. The specified minimum static deflection.
 - 3. Steel rails, steel base frames, and concrete inertia bases showing all steel

work, reinforcing, vibration isolator mounting attachment method, and location of equipment attachment bolts.

4. Special details necessary to convey complete understanding of the work to be performed.

- C. Submission of samples may be requested for each type of vibration isolation device. After approval, samples will be returned for installation at the job if requested. All costs associated with submission of samples shall be borne by the Contractor.

1.06 DESIGN REQUIREMENTS

- A. Design isolators for equipment installed outdoors to provide adequate restraint to withstand the force as required by code to any exposed surface of the isolated equipment. Isolators for outdoor equipment shall have bolt holes for attachment to equipment and to supports. The vibration isolation Vendor shall submit verifying shear and over turning calculations, for their product and equipment installation arrangement, stamped by a licensed Professional Engineer. The design and supply of miscellaneous support steel above and below isolators will not be the responsibility of the vibration isolation manufacturer.

PART 2- PRODUCTS

2.01 VIBRATION ISOLATOR TYPES

A. General

1. All metal parts installed out-of-doors shall be corrosion resistant after fabrication. Galvanizing shall meet ASTM Salt Spray Test Standards and Federal Test Standard No. 14.
2. Isolators installed out-of-doors shall have base plates with bolt holes for fastening the isolators to the support members.
3. Isolator types are scheduled to establish minimum standards. At the Contractor's option, labor-saving accessories can be an integral part of isolators supplied to provide initial lift of equipment to operating height, hold piping at fixed elevations during installation and initial system filling operations, and similar installation advantages. Accessories and seismic restraint features must not degrade the isolation performance of the isolators.
4. Static deflection of isolators shall be as provided in the EXECUTION section and as shown on the Drawings. All static deflections stated are the minimum acceptable deflection for the mounts under actual load. Isolators selected solely on the basis of rated deflections are not acceptable and will be disapproved.

B. Type FSN (Floor Spring and Neoprene)

1. FSN isolators shall be freestanding and laterally stable without any housing. Spring diameter shall be not less than 0.8 of the compressed height of the spring at the rated load. Springs shall have a minimum additional travel-to-

solid equal to 50% of the rated deflection. Springs shall be so designed that the ratio of horizontal stiffness to vertical stiffness is approximately 1. Mounts shall have leveling bolts.

2. The spring element in the isolator shall be set in a neoprene cup and have a steel washer or a flat surface in contact with the neoprene to distribute the load evenly over the bearing surface of the neoprene. Alternatively, each isolator shall be mounted on a Type NP isolator. If the NP isolator is used, a rectangular bearing plate of appropriate size shall be provided to load the pad uniformly within the manufacturer's recommended range. If the isolator is to be fastened to the building and the NP isolator is used, the holes in the isolator base plate shall be oversized and GROMMETS shall be provided for each base plate bolt hole.
3. If the basic spring isolator has a neoprene friction pad on its base and an NP isolator is to be added to the base, a galvanized steel, stainless steel or aluminum bearing plate shall be used between the friction pad and the NP isolator. If the isolator is outdoors, bearing plates shall not be made of galvanized steel. The NP isolator, bearing plate and friction pad shall be permanently adhered to one another and to the bottom of the isolator base plate.
4. Type FSN isolators shall be one of the following products with the appropriate neoprene pad (if used) selected from Type NP or approved equal:
 - a. Type SW A.B.
 - b. Type SLF M.I.
 - c. Type FDS K.N.C.
 - d. Type OST V.E.
 - e. Series AC V.M.&C.

C. Type FSNTL (Floor Spring and Neoprene Travel Limited)

1. FSNTL isolators shall be freestanding and laterally stable without any housing. Spring diameter shall be not less than 0.8 of the compressed height of the spring at the rated load. Spring shall have a minimum additional travel-to-solid equal to 50% of the rated deflection. Springs shall be so designed that the ratio of horizontal stiffness to vertical stiffness is approximately 1. Mounts shall have leveling bolts. Mounts shall have vertical travel limit stops to control extension when weight is removed. The travel limit stops shall be capable of serving as blocking during erection of the equipment. A minimum clearance of 1/4" shall be maintained around restraining bolts and between the limit stops and the spring to avoid interference with the spring action.
2. The spring element in the isolator shall be set in a neoprene cup and have a steel washer or a flat surface in contact with the neoprene to distribute the load evenly over the bearing surface of the neoprene. Alternatively, each isolator shall be mounted on a Type NP isolator. If the NP isolator is used, a rectangular bearing plate of appropriate size shall be provided to load the pad uniformly within the manufacturer's recommended range. If the isolator is to be fastened to the building and the NP isolator is used, the holes in the isolator base plate shall be oversized and GROMMETS shall be provided for

each base plate bolt hole.

3. If the basic spring isolator has a neoprene friction pad on its base and an NP isolator is to be added to the base, a galvanized steel, stainless steel or aluminum bearing plate shall be used between the friction pad and the NP isolator. If the isolator is outdoors, bearing plates shall not be made of galvanized steel. The NP isolator, bearing plate and friction pad shall be permanently adhered to one another and to the bottom of the isolator base plate.
4. Type FSNTL isolators shall be one of the following products, with the appropriate neoprene pad (if used) selected from Type NP or approved equal:
 - a. Type CT A.B.
 - b. Type SLR M.I.
 - c. Type FLS K.N.C.
 - d. Type KW V.E.
 - e. Series AWR V.M.&C.

D. Type FN (Floor Neoprene)

1. NP isolators shall be neoprene-in-shear type with steel reinforced top and base. All metal surfaces shall be covered with neoprene. The top and bottom surfaces shall be ribbed. Bolt holes shall be provided in the base and the top shall have a threaded fastener. The mounts shall include leveling bolts that may be rigidly connected to the equipment.
2. Type FN isolators shall be one of the following products or approved equal:
 - a. Type RVD A.B.
 - b. Type ND M.I.
 - c. Type RD K.N.C.
 - d. Type D44 V.E.
 - e. Series RD V.M.&C.

E. Type FNC (Floor Neoprene Constrained)

1. FNC isolators shall incorporate bridge-bearing neoprene elements with all-directional restraint. The mount shall consist of a ductile iron casting containing two (2) separated and opposing molded neoprene elements. The elements shall prevent the central threaded sleeve and attachment bolt from contacting the casting during normal operation. Bolt holes shall be provided in the base and the top shall have a threaded fastener.
2. Type FNC isolators shall be one of the following products or approved equal:
 - a. Type BR M.I.
 - b. Series RSM V.M.&C.

F. Type PCF (Pre-compressed Fiberglass)

1. PCF isolator blocks shall be made of molded inorganic glass fiber that is individually coated and sealed with an impervious elastomeric membrane. Fiberglass shall be severely overloaded during the manufacturing process to stabilize the material into a product that is permanent and has consistent,

- predictable dynamic properties.
- 2. Type PCF isolators shall be one of the following products or approved equal:
 - a. Type KIP K.N.C.

G. Type NP (Neoprene Pad)

- 1. NP isolators shall be one layer of 5/16" to 3/8" thick ribbed or waffled neoprene. The pads shall be sized so that they will be loaded within the manufacturer's recommended range.
- 2. Type NP isolators shall be one of the following products or approved equal:
 - a. Type NR A.B.
 - b. Type W M.I.
 - c. Type NPS K.N.C.
 - d. Type 200N V.E.
 - e. Series Maxi-Flex V.M.&C.

H. Type DNP (Double Neoprene Pad)

- 1. DNP isolators shall be formed by two layers of 1/4" to 3/8" thick ribbed or waffled neoprene, separated by a galvanized steel, stainless steel or aluminum plate. If the isolator is outdoors, the plate shall not be made of galvanized steel. These layers shall be permanently adhered together. The pads shall be sized so that they will be loaded within the manufacturer's recommended range.
- 2. Type DNP isolators shall be formed from one of the following products or approved equal:
 - a. Type NR A.B.
 - b. Type WSW M.I.
 - c. Type NPS K.N.C.
 - d. Type 200N (Multilayers) V.E.
 - e. Series Maxi-Flex V.M.&C.

I. Type HSN (Hanger Spring and Neoprene)

- 1. HSN isolators shall consist of a freestanding and laterally stable steel spring and a neoprene element in series, contained within a steel housing. Spring diameters and hanger housing lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 degrees arc before contacting the housing. Alternatively, other provisions shall be made to allow for a 30 degrees arc of movement of the bottom hanger rod without contacting the isolator housing. Spring diameter shall be not less than 0.8 of the compressed height of the spring at the rated load. Spring elements shall have a minimum additional travel-to-solid equal to 50% of the rated deflection. The neoprene element shall be designed to have a 0.3" minimum static deflection. The deflection of both the spring element and the neoprene element shall be included in determining the overall deflection of Type HSN isolators.
- 2. A pre-compressed glass fiber element may be substituted for the neoprene element.

3. Type HSN isolators shall be one of the following products or approved equal:
 - a. Type BSR-A A.B.
 - b. Type 30N M.I.
 - c. Type SRH or SFH K.N.C.
 - d. Type SNRC V.E.
 - e. Type RSH 30A or RSHSC V.M.&C.

J. Type HN (Hanger Neoprene)

1. HN isolators shall consist of a neoprene-in-shear element contained within a steel housing. A neoprene neck bushing shall be provided where the hanger rod passes through the hanger housing to prevent the rod from contacting the hanger housing.
2. A pre-compressed glass fiber element may be substituted for the neoprene element.
3. Type HN isolators shall be one of the following products or approved equal:
 - a. Type BRD-A A.B.
 - b. Type HD M.I.
 - c. Type RH or FH K.N.C.
 - d. Type 3C V.E.
 - e. Type RHD V.M.&C.

2.02 EQUIPMENT BASES

A. Type BSR (Base - Steel Rail)

1. Steel rail bases shall consist of structural steel sections sized to provide a rigid beam that will not twist, deform, or deflect in any manner that will negatively affect the supported equipment or the vibration isolation mounts. Rail bases shall include mounting brackets for attachment of vibration isolators.
2. Type BSR bases shall be one of the following products or approved equal:
 - a. Type C or CIS A.B.
 - b. Type R or ICS M.I.
 - c. Type KRB or KFB K.N.C.
 - d. Type CS V.E.
 - e. Type WFR V.M.&C.

B. Type BSF (Base - Steel Frame)

1. Steel frame bases shall consist of structural steel sections sized, spaced, and connected to form a rigid base which will not twist, rack, deform, or deflect in any manner which will negatively affect the supported equipment or the vibration isolation mounts. Frames shall be adequately sized to support basic equipment units and motors plus any associated pipe elbow supports, duct elbow supports, electrical control elements, or other components closely related and requiring resilient support in order to prevent vibration transfer to the building structure. The depth of steel frame bases shall be at least 1/10

the longest dimension of the base supported between isolators and not less than 6". The base footprint shall be large enough to provide stability for supported equipment.

2. Frame bases shall include side mounting brackets for attachment to vibration isolators. Mounting brackets shall be located on the sides of the base that are parallel to the axis of rotation of the supported equipment.
3. Type BSF bases shall be one of the following products or approved equal:
 - a. Type WX A.B.
 - b. Type WFSL M.I.
 - c. Type SFB K.N.C.
 - d. Type HB V.E.
 - e. Series WFB V.M.&C.

C. Type BIB (Base - Inertia Base)

1. Inertia bases shall be formed of stone-aggregate concrete (150 lb/cu. ft.) and appropriate steel reinforcing cast between welded or bolted perimeter structural steel channels. Inertia bases shall be built to form a rigid base that will not twist, rack, deform, deflect, or crack in any manner that would negatively affect the supported equipment or the vibration isolation mounts. Inertia bases shall be adequately sized to support basic equipment units and motors plus any associated pipe elbow supports, duct elbow supports, electrical control elements, or other components closely related and requiring resilient support in order to prevent vibration transfer to the building structure. Inertia base depth shall be at least 1/12 the longest dimension of the base supported between isolators and not less than 6". The base footprint shall be large enough to provide stability for supported equipment. Inertia bases shall include side mounting brackets for attachment to vibration isolators. Mounting brackets shall be located on the sides of the base that are parallel to the axis of rotation of the supported equipment. Concrete may be provided by the General Contractor.
2. Frame and reinforcement for Type BIB bases shall be one of the following products or approved equal:
 - a. Type CPF A.B.
 - b. Type KSL or BMK M.I.
 - c. Type CIB-L or CIB-H K.N.C.
 - d. Type SN V.E.
 - e. Series MPF or WPF V.M.&C.

D. Type RC-1 (Roof Curb, Type 1)

1. Type RC-1 isolation bases shall be a prefabricated assembly consisting of an extruded aluminum frame and steel spring isolation system that fits over the roof curb and under the isolated equipment. The aluminum frame shall be sufficiently rigid to support the equipment load without detrimental twist or deflection. Spring isolators shall be selected and positioned along the curb to achieve the minimum static deflection called for in the schedule. The static deflection shall be constant around the entire periphery of the base. Springs

shall be free standing, laterally stable with a diameter of not less than 0.8 times the compressed height, and have additional travel-to-solid that is at least 50% of the rated deflection. Resilient neoprene snubbers shall be provided at the corners of the base to limit equipment movement to 1/4" under wind load.

2. The isolation curb base shall be made weather tight by sealing all around the periphery with closed cell neoprene or flexible membrane that shall in no way inhibit the vibration isolation of the spring elements. Closed cell sponge gasketing or field caulking shall be used between the equipment unit and the isolation curb base and between the isolation curb and roof curb to form a weather-tight seal. Each spring isolator used in the curbs shall be weather-protected as described in the PRODUCTS section under General.
3. Type RC-1 vibration isolation curb bases shall be supplied by the isolator manufacturer and shall be one of the following products or approved equal:
 - a. Type RTIR A.B.
 - b. Type CMAB M.I.
 - c. Type ASR K.N.C.
 - d. Type AR V.E.
 - e. Series AXR V.M.&C.

E. Type RC-2 (Roof Curb, Type 2)

1. Type RC-2 isolation bases shall be a prefabricated assembly consisting of a structural steel frame and steel spring isolation system that also forms the roof curb under the isolated equipment. The steel frame shall be sufficiently rigid to support the equipment load without detrimental twist or deflection. Spring isolators shall be selected and positioned along the curb to achieve the minimum static deflection called for in the schedule. The static deflection shall be constant around the entire periphery of the base. Springs shall be free standing, laterally stable with a diameter of not less than 0.8 times the compressed height, and have additional travel-to-solid that is at least 50% of the rated deflection. Spring isolators shall include travel limit stops that are capable of serving as blocking during erection of the equipment. A minimum clearance of 1/4" shall be maintained around restraining bolts as they pass through the limit stop brackets. Springs and limits stops shall be provided at the corners of the base to limit equipment movement to 1/4" under wind load.
2. The isolation curb base shall be made weather tight by sealing all around the periphery with closed cell neoprene, flexible membrane or light gauge spring metal loop, which shall in no way inhibit the vibration isolation of the spring elements. A closed cell sponge gasket or field caulking shall be used between the equipment unit and the isolation curb base and between the isolation curb and roof curb to form a weather-tight seal. Each spring isolator used in the curbs shall be weather-protected as described in the PRODUCTS section under General.
3. Type RC-2 vibration isolation curb bases shall be supplied by the isolator manufacturer and shall be one of the following products or approved equal:
 - a. Type RSC M.I.
 - b. Type SSR K.N.C.

- c. Vibrocurb ThyCurb

2.03 RESILIENT PENETRATION SLEEVE/SEAL

- A. Resilient penetration sleeve/seals shall be field-fabricated from a pipe or sheet metal section that is 1/2" to 3/4" larger than the penetrating element in all directions around the element, and shall be used to provide a sleeve through the construction penetrated. The sleeve shall extend 1" beyond the penetrated construction on each side. The space between the sleeve and the penetrating element shall be packed with glass fiber or mineral wool to within 1/4" of the ends of the sleeve. The remaining 1/4" space on each end shall be filled with acoustical sealant to form an airtight seal. The penetrating element shall be able to pass through the sleeve without contacting the sleeve. Alternatively, prefabricated sleeves accomplishing the same result are acceptable.

2.04 RESILIENT LATERAL SUPPORTS

- A. These units shall either be a standard product of the vibration isolator manufacturer, or be custom fabricated from standard components. These units shall incorporate neoprene isolation elements similar to Type FN that are specifically designed to provide resilient lateral bracing of ducts or pipes.
- B. Resilient lateral supports shall be one of the following products or approved equal:
 - 1. Type Custom A.B.
 - 2. Type ADA M.I.
 - 3. Type RGN K.N.C.
 - 4. Type VERG or VPL V.E.
 - 5. Type MDPA V.M.&C.

2.05 FLEXIBLE DUCT CONNECTIONS

- A. Flexible duct connections shall be made from coated fabric. The clear space between connected parts shall be a minimum of 3", and the connection shall have a minimum of 1.5" of slack material.

2.06 FLEXIBLE PIPE CONNECTIONS

- A. Flexible pipe connections shall be fabricated of multiple plies of nylon cord, fabric, and neoprene; and shall be vulcanized so as to become inseparable and homogeneous. Flexible connections shall be formed in a double sphere shape, and shall be able to accept compressive, elongating, transverse, and angular movements.
- B. The flexible connections shall be selected and specially fitted, if necessary, to suit the system temperature, pressure, and fluid type. In addition, suitable flexible connections should be selected, if possible, which do not require rods or cables to

control extension of the connector.

- C. Connectors for pipe sizes 2" or smaller shall have threaded female union couplings on each end. Larger sizes shall be fitted with metallic flange couplings.
- D. Flexible pipe connections shall be one of the following or an approved equal:
 - 1. Type 2600 or 2655 A.B.
 - 2. Type Twin Sphere Metraflex
 - 3. Type MFTNC or MFTFU M.I.
 - 4. Double Sphere Flexible Connectors V.E.
 - 5. Series VMT or VMU V.M.&C.

2.07 THRUST RESTRAINTS

- A. Thrust restraints shall consist of a spring element in series with a neoprene pad. The unit shall be designed to have the same deflection due to thrust-generated loads as specified for the isolators supporting the equipment. The spring element shall be contained within a steel frame and be designed so it can be pre-compressed at the factory to allow for a maximum of 1/4" movement during starting or stopping of the equipment. Allowable movement shall be field-adjustable. The assembly shall be furnished complete with rods and angle brackets for attachment to both the equipment and the adjacent fixed structural anchor. The thrust restraints shall be installed on the discharge of the fan so that the restraint rods are in tension. Assemblies that place the rods in compression are not acceptable. The holes in the spring restraint brackets through which the restraint rods pass must be oversized to prevent contact between the brackets and rods.
- B. Thrust restraints shall be one of the following products or an approved equal:
 - 1. Type TRK A.B.
 - 2. Type HSR K.N.C.
 - 3. Type WB M.I.
 - 4. Thrust Restraint V.E.

2.08 GROMMETS

- A. Grommets shall be made of neoprene or neoprene impregnated duct that is specially formed to prevent bolts from directly contacting the isolator base plate, and shall be sized so that they will be loaded within the manufacturer's recommended load range.
- B. Grommets shall either be custom made by combining a neoprene washer and sleeve, or be one of the following products or an approved equal:
 - 1. Type Isogrommets MBIS, Inc. (Bedford Heights, OH)
 - 2. Type WB Barry Controls (Brighton, MA)

3. Type HG

Mason Industries Inc. (Hauppauge, NY)

2.09 ACOUSTICAL SEALANT

A. Sealants for acoustical purposes as described in this specification shall be silicone or one of the resilient, non-hardening sealants indicated below:

- | | | |
|----|---|---------|
| 1. | Acoustical sealant | D.A.P. |
| 2. | BR-96 or AC-20 (AC-20 FTR - Fire Rated) | Pecora |
| 3. | Sonoloc | Sanborn |
| 4. | Acoustical Sealant #834 (Acrylic Latex) | Tremco |
| 5. | Acoustical sealant | U.S.G. |

PART 3 - EXECUTION

3.01 APPLICATION

A. General

1. Refer to the PRODUCTS section of this specification for vibration isolation devices identified on the Drawings or specified herein.
2. The static deflection of all isolators specified herein is the minimum acceptable deflections for the mounts under actual load. Isolators selected solely on the basis of rated deflection are not acceptable and will be disapproved.

B. Major Equipment Isolation

1. Unless otherwise shown or specified, all floor-mounted major equipment shall be set on housekeeping pads. See architectural or structural drawings for details.
2. Types and minimum static deflections of vibration isolation devices for major equipment items shall be as scheduled on the Drawings or specified hereunder.
3. Flexible duct connections shall be installed at all fan unit intakes, fan unit discharges, and wherever else shown on the Drawings.
4. Flexible pipe connections shall be installed at all pipe connections to vibration-isolated equipment in the positions shown on the Drawings.
5. Electrical connections to vibration-isolated equipment shall be flexible, as called for in the electrical portion of the specification.
6. Thrust restraints shall be installed on all suspended fans and on all floor-mounted fans developing 4" or more of static pressure, unless the horizontal component of the thrust force can be demonstrated to be less than 10% of the equipment weight.

C. Miscellaneous HVAC Equipment Isolation

1. Miscellaneous pieces of HVAC equipment, such as converters, pressure reducing stations, dryers, strainers, storage tanks, condensate receiver tanks, and expansion tanks, which are connected to isolated piping systems, shall be vibration-isolated from the building structure by Type NP or Type HN isolators (selected for 0.1" static deflection), unless their position in the piping system requires a higher degree of isolation as called for under Pipe Isolation.

D. Pipe Isolation

1. All chilled water, condenser water, hot water, steam, refrigerant, drain and engine exhaust piping that is connected to vibration-isolated equipment shall be isolated from the building structure within the following limits:
 - a. Within mechanical rooms;
 - b. Within 50' total pipe length of connected vibration-isolated equipment (chillers, pumps, air handling units, pressure reducing stations, etc.);
 - c. At every support point for piping that is greater than 4" in diameter.
2. Piping shall be isolated from the building structure by means of vibration isolators, resilient lateral supports, and resilient penetration sleeve/seals.
3. Isolators for the first three support points adjacent to connected equipment shall achieve one half the specified static deflection of the isolators supporting the connected equipment. When the required static deflection of these isolators is greater than 1/2", Type FSN or HSN isolators shall be used. When the required static deflection is less than or equal to 1/2", Type FN or HN isolators shall be used. All other pipe support isolators within the specified limits shall be either Type FN or HN achieving at least 1/4" static deflection.
4. Where lateral support of pipes is required within the specified limits, this shall be accomplished by use of resilient lateral supports.
5. Pipes within the specified limits that penetrate the building construction shall be isolated from the building structure by use of resilient penetration sleeve/seals.
6. Provide flexible pipe connections as called for under Major Equipment above and wherever shown on the Drawings.

E. Duct Isolation

1. All sheet metal ducts and air plenums that are within mechanical rooms or within a distance of 50' total duct length of connected vibration-isolated equipment (whichever is longer) shall be isolated from the building structure by Type FN, PCF or HN isolators. All isolators shall achieve 0.1" minimum static deflection.
2. Ducts within the specified limits that penetrate the building construction shall be isolated from the building structure by use of resilient penetration sleeve/seals.
3. Flexible duct connections shall be provided as called for above under Major

Equipment and wherever shown on the Drawings.

3.02 INSTALLATION OF VIBRATION ISOLATION EQUIPMENT

A. General

1. Locations of all vibration isolation devices shall be selected for ease of inspection and adjustment as well as for proper operation.
2. Installation of vibration isolation equipment shall be in accordance with the manufacturer's instructions.

B. Isolators

1. All vibration isolators shall be aligned squarely above or below mounting points of the supported equipment.
2. Isolators for equipment with bases shall be located on the sides of the bases which are parallel to the equipment shaft unless this is not possible because of physical constraints.
3. Locate isolators to provide stable support for equipment, without excess rocking. Consideration shall be given to the location of the center of gravity of the system and the location and spacing of the isolators. If necessary, a base with suitable footprint shall be provided to maintain stability of supported equipment, whether or not such a base is specifically called for herein.
4. If a housekeeping pad is provided, the isolators shall bear on the housekeeping pad and the isolator base plates shall rest entirely on the pad.
5. Hanger rods for vibration-isolated support shall be connected to major structural members, not the floor slab between major structural members. Provide suitable intermediate support members as necessary.
6. Vibration isolation hanger elements shall be positioned as high as possible in the hanger rod assembly, but not in contact with the building structure, and so that the hanger housing may rotate a full 360 degrees about the rod axis without contacting any object.
7. Parallel running pipes may be hung together on a trapeze that is isolated from the building. Isolator deflections must be the greatest required by the provisions for pipe isolation for any single pipe on the trapeze. Do not mix isolated and un-isolated pipes on the same trapeze.
8. Pipes, ducts and equipment shall not be supported from other pipes, ducts and equipment.
9. Resiliently isolated pipes, ducts and equipment shall not come in rigid contact with the building construction or rigidly supported equipment.
10. The installed and operating heights of equipment supported by Type FSNTL isolators or with Type RC-2 isolation bases shall be identical. Limit stops shall be out of contact during normal operation. Adjust isolators to provide 1/4" clearance between the limit stop brackets and the isolator top plate, and between the travel limit nuts and travel limit brackets.
11. Adjust all leveling bolts and hanger rod bolts so that the isolated equipment is

level and in proper alignment with connecting ducts or pipes.

C. Bases

1. No equipment unit shall bear directly on vibration isolators unless its own frame is suitably rigid to span between isolators and such direct support is approved by the equipment manufacturer. This provision shall apply whether or not a base frame is called for on the schedule. In the case that a base frame is required for the unit because of the equipment manufacturer's requirements and is not specifically called for on the equipment schedule, a base frame recommended by the equipment manufacturer shall be provided at no additional expense.
2. Unless otherwise indicated, there is to be a minimum operating clearance of 1" between steel rails, steel frame bases or inertia bases and the floor beneath the equipment. The isolator mounting brackets shall be positioned and the isolators adjusted so that the required clearance is maintained. The clearance space shall be checked by the Contractor to ensure that no construction debris has been left to short circuit or restrict the proper operation of the vibration isolation system.
3. Isolation bases shall be installed in strict accordance with the manufacturer's instructions.

D. Flexible Duct Connections

1. Prior to installation of the flexible connection, sheet metal ducts and plenum openings shall be squarely aligned with the fan discharge, fan intake, or adjacent duct section, and the gap between connected parts shall be uniform. Flexible duct connections shall not be installed until this provision is met. There shall be no metal-to-metal contact between connected sections, and the fabric shall not be stretched taut.

E. Flexible Pipe Connections

1. Install flexible pipe connections in strict accordance with the manufacturer's instructions.

F. Thrust Restraints

1. Thrust restraints shall be attached on each side of the fan parallel to the thrust force. This may require custom brackets or standoffs. The body of the thrust restraint shall not come in contact with the connected elements. Thrust restraints shall be adjusted to constrain equipment movement to the specified limit.

G. Grommets

1. Where grommets are required at hold down bolts of isolators, bolt holes shall be properly sized to allow for grommets. The hold down bolt assembly shall include washers to distribute load evenly over the grommets. Bolts and washers shall be galvanized.

H. Resilient Penetration Sleeve/Seals

1. Maintain an airtight seal around the penetrating element and prevent rigid contact between the penetrating element and the building structure. Fit the sleeve tightly to the building construction and seal airtight on both sides of the construction penetrated with acoustical sealant.

END OF SECTION

SECTION 15055
SPLIT SYSTEM AIR CONDITIONING (COOLING ONLY)

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install direct expansion air cooled split system units of the size and capacity shown on the equipment schedules.
- B. Units shall be factory matched with air handling units for compatibility and shall be rated in accordance with ARI standards.
- C. Equipment schedules and specifications are based on units provided by Seasons 4
- D. Equal products: Addison

PART 2 - PRODUCTS

2.01 OUTDOOR UNIT

- A. The air-cooled condensing section must be designed and manufactured by the unit manufacturer. The floor of the air-cooled condenser section shall be crowned for water drainage and constructed of aluminum to resist the corrosive effects of the weather. All refrigerant piping shall be tested for leakage in the factory prior to shipment of the complete unit.
- B. Unit shall have a minimum of two compressors. Compressors must be heavy duty suction cooled, hermetic scroll type complete with forced feed lubrication, suction and discharge service valves, suction strainer, crankcase heater, and 3 phase solid state thermal motor protection. The compressors must be mounted on rubber in shear isolators to prevent transmission of any noise and vibration to the space below. The lead compressor shall have hot gas bypass.
- C. The independent refrigerant circuits shall be piped, tested, dehydrated and fully charged with oil and refrigerant R-410a. The refrigerant circuit components shall include compressor, condenser with integral liquid sub-cooling, liquid line service and charging valve, filter drier in the liquid line, filter in the suction line, liquid line sight glass, and relief valve.
- D. The air-cooled condenser coils must be a minimum of four rows deep, and have copper tubes expanded into a maximum of ten aluminum fins per inch. Coils shall be tested at 425 PSIG (500 PSIG for R-410a only), and mounted vertically for complete surface utilization. Coils shall be counter flow with a minimum of 10 degrees of liquid sub-cooling and have adequate capacity to dissipate the total heat rejection of the compressors at design conditions. Condensers shall have 11 gauge guards to protect the coils from vandalism and weather related damage.

- E. Condenser fans shall be steel coated with epoxy enamel and have a steel hub locked on a stainless steel motor shaft with a keyway and square head set screws. Provide radius-spun venturi for efficient performance. Fans shall have vinyl coated external guards capable of being removed for service without removing the fan motor. Condenser fans shall have OSHA type bottom guards. Fans shall be direct driven by NEMA constructed, three phase motors operating at 1140 RPM. Motors must have stainless steel shafts to prevent "rust welding" of the fan hubs to the shaft. Each motor shall have a shaft slinger to prevent water seepage into the motor. Condenser head pressure shall be controlled and maintained down to an ambient of 50 deg F. Condenser head pressure will be maintained down to an ambient of 0 deg F. Included with this feature is a VFD with mild weather cycling switches installed as backup in case off VFD failure.

2.02 INDOOR UNIT:

- A. The unit frame shall be constructed of heavy gauge galvanized steel with a formed galvanized structural steel base. Lifting lugs shall be welded on the base frame for rigging the unit. All exterior panels must be fabricated from embossed mill finish aluminum alloy. All exterior panels must be fabricated from pre-painted embossed aluminum alloy. Aluminum panels shall be fastened to the frame with stainless steel screws. Panels must be isolated from the steel frame with dielectric gaskets to prevent galvanic corrosion. All seams must be caulked with silicone inside and out to prevent air and water leakage.
- B. Access doors shall have extruded aluminum frame and must be provided for all sections housing components requiring routine maintenance. Doors shall be supported on full-length continuous aluminum/stainless steel hinges and have and have single handle, multiple latch closures. Access doors shall have stainless steel "hold back" latches to prevent door closure during the performance of service procedures. When obstructions on the roof will interfere with access doors, provide lift off panels held in place by a minimum of four Allegis nylon cam action handles.
- C. All walls, roof, floor and doors in the air-handling compartment shall be double wall construction enclosing 2" thick foam insulation with minimum R value of 13. Galvanized liners shall be provided to protect the insulation during routine service and maintenance operations.
- D. All doors in the air handling section shall open against the pressure or shall include an additional number of latches equal to 50% of the number of latches used on the same size doors that open with the pressure.
- E. Cooling coils must be installed downstream of the supply air blower and in series with the heating section. Coils shall be direct expansion type and constructed of seamless copper tubes expanded into aluminum fins and encased in a galvanized steel coil casing. Provide with thermostatic expansion valves, adjustable super heat controls, and external equalizers. Each evaporator coil shall be provided with a

positive draining IAQ type double pitched, stainless steel drain pan. The drain for the main drain pan must be metal and extend through the side of the unit.

- F. The supply air blower wheel shall be a dual double width double inlet forward curved centrifugal blower, secured to a machined, ground and polished solid steel shaft. The shaft shall be coated with a rust inhibitor and supported by two outboard bearings. The complete blower assembly must be dynamically balanced. Bearings shall be self-aligning ball bearing pillow block type and be designed for an L-50 life of 200,000 hours.
- G. Blower drive shall include an adjustable pitch motor sheave with multiple V-belts having a minimum service factor of 150%. Motors shall be premium efficiency heavy-duty open drip proof 3 phase, 1800 rpm, mounted on a heavy-duty sliding base. Motor and blower assembly shall be mounted on a heavy duty steel frame rigidly secured to the unit casing. Installing contractor shall provide rubber isolators for the complete unit.
- H. The blower shall be trimmed balanced before shipping.

2.03 MAIN CONTROL PANEL:

- A. The Condensing unit shall have a single point electrical power connection in the same location as the unit being replaced. The new unit must be able to utilize the same power wiring as the unit being replaced. The main control panel must include a disconnect switch mounted in a weatherproof enclosure on the side or the end of the unit.
- B. All components shall be identified with nametags and wired in accordance with the National Electric Code. The main control panel must include the following:
 - i. A terminal block for single point power supply with fuses for all branch circuits.
 - ii. A 24-volt control transformer and 24-volt field wiring control terminal strip. Terminals shall be numbered for field connection of all controls in accordance with the wiring diagram.
 - iii. All wiring must be numbered and color-coded.
 - iv. A phase failure and low voltage protection relay.
 - v. All refrigeration safety and operating controls.
 - vi. Temperature control components as required for the system described below in the "Temperature Control Sequence".
 - vii. Wiring diagrams must be laminated to the control panel door.
 - viii. Fan motor starters with three-phase overloads factory mounted and wired.
 - ix. Compressor and condenser fan motor starters.
 - x. Condensing unit low ambient lockout set at 0 degrees F.
- C. The above components are in addition to electrical components associated with other sections required to accomplish the sequence of control specified below.

2.04 TEMPERATURE CONTROLS:

- A. Unit to be provided with a 2 stage cooling thermostat.

PART 3 - EXECUTION

3.01 GENERAL

- A. Units shall be installed as shown on the Drawings and in strict accordance with manufacturer's recommendations.
- B. CONTRACTOR SHALL SUBMIT REFRIGERANT ROUTING TO ENGINEER FOR APPROVAL. REFRIGERANT PIPING SHALL BE CERTIFIED BY THE AIR CONDITIONING EQUIPMENT MANUFACTURER. FAILURE TO SUBMIT REFRIGERANT PIPING DRAWINGS SHALL BE CAUSE FOR REJECTION OF THE ENTIRE SUBMITTAL. LONG LINE REFRIGERANT PIPING APPLICATIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT SPLIT SYSTEM LONG-LINE APPLICATION GUIDELINE.
- C. Split system installation shall be staged so that cooling is provided continuously with out interruption OR contractor shall provide temporary cooling equal in capacity to the total of the two (2) primary units during the installation. The contractor shall submit staging plan for approval by the engineer and owner prior to beginning work.
- D. For grade mounting, provide 6" thick reinforced concrete pad with 6" larger all around than the condensing unit.
- E. Condensing units shall be installed level.
- F. Units shall be installed to allow adequate service to all components.
- G. The manufacturer must send an installation expert to the jobsite to advise on proper rigging and alignment of the equipment. The installing contractor should become familiar with the manufacturer's rigging and installation instructions.
- H. Check, Test, Startup: Unit must be checked out, tested, and placed into operation by the installing contractor under the supervision of an authorized representative of the factory.

END OF SECTION

SECTION 15060
REFRIGERANT PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install all materials, labor, accessories, etc. shown on the Drawings and specified herein to completely install all piping systems.
- B. Refrigerant piping shall meet the requirements of the American National Standard Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15-78, B9.1), and the Code for Pressure Piping (ANSI B31.5).

PART 2 - PRODUCTS

2.01 REFRIGERANT PIPING

- A. Piping shall be minimum type "L" or refrigeration service copper tubing and shall conform to ANSI H23.5 standard for seamless copper tubes for refrigeration field service.
- B. Fittings shall be wrought copper.
- C. Joints shall be brazed.
- D. Valves, filter-driers and other accessories shall be suitable for refrigerant service.

2.02 INSULATION

- A. Refrigerant suction piping shall be insulated with 3/4" thick flexible elastomeric tubing insulation, AP Armaflex Pipe Insulation manufactured by Armacel or equal. Where possible, insulation shall be slid over piping from one end before pipe ends are joined and shall not be slit or cut. All joints and seams shall be sealed weather-tight.
- B. Finish coat for flexible elastomeric insulation installed outdoors shall be water-based latex enamel designed for use over all forms of flexible elastomeric insulation. Finish coat shall provide a protective finish suitable to both indoor and outdoor applications, formulated for cold weather flexibility to resist cracking and weather-resistant to ultraviolet (UV) and ozone. Coating shall be Armaflex WB Finish or equivalent.

PART 3 - EXECUTION

3.01 GENERAL

- A. Refrigerant piping shall be supported as shown on the Drawings and as required at intervals not over 8'-0" O.C. and at all turns and offsets. Hangers shall be copper plated tubing hangers of adequate size to fit around tubing and insulation as required. Saddles shall be used under insulated tubing to protect insulation.
- B. Refrigerant piping shall be clean and free of outside contaminants at all times. Prior to start-up of any equipment or insulation installation, all piping shall be cleaned, tested, dehydrated and charged as recommended by the refrigerant compressor manufacturer.
 - 1. Procedure: Joints and connections in refrigerant piping shall not be installed in partitions or walls or where inaccessible for testing, inspection and rework. Make provisions to prevent contact of dissimilar metals. During construction, cap all tubing to prevent moisture from entering. Keep in dry location.
 - 2. Leak testing and recharging: Upon completion of installation of air conditioning equipment, test all refrigerant piping, components and accessories, including quick-connect refrigerant connectors for evaporator and condensing unit; test with a halide torch; prove tight by Contractor to assure a leak-tight refrigerant system. If leaks are detected at the time of installation or during warranty period, remove entire refrigerant charge from system, correct leaks, and retest system. After system is found to be leak free, evacuation shall be accomplished by use of a reliable gauge and a vacuum pump capable of pulling vacuum of at least one mm Hg absolute. Accomplish system evacuation in strict accordance with equipment manufacturer's printed instruction. System leak testing, evacuation, dehydration and charging with refrigerant shall comply with requirements contained in ARI Standard 260.
- C. All joints in refrigerant piping shall be made accessible. Joints shall not be permitted below concrete.
- D. All piping shall be run true to grade and shall be arranged to make the best possible appearance. Except where otherwise required by conditions of installation, all piping shall be symmetrical and parallel with lines of buildings or structure in which it is installed. All piping shall be run concealed except in mechanical room and where indicated otherwise.
- E. All piping and equipment shall be supported and guided. Anchors shall be provided to absorb or transmit thrust and eliminate vibration or pulsation. Hangers or supports shall be provided near each change of direction. Supports shall be so located or shall be of such type as not to unduly restrict the movement of the pipe due to lateral or longitudinal expansion.

END OF SECTION

SECTION 15125
PACKAGED ROOFTOP HEATING & VENTILATING UNITS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install all packaged rooftop heating & ventilating units of the size, type, capacity and characteristics as existing units to be replaced, as indicated below and as shown on attached schedule.
- B. Equipment schedules and specifications are based on the one manufacturer listed on the schedule. Other manufacturers of equal quality and performance may be submitted to the Engineer for review prior to bid as required by Section 15000 HVAC General. When substitution of equipment is made, the Contractor shall be responsible for the costs of any item and engineering and construction revisions necessary in his or any other contract or trade that may be required to satisfy plans and specifications.

PART 2 - PRODUCTS

2.01 FANS

- A. Fans and Motors: Blowers shall be forward-curved, centrifugal, belt-driven type capable of delivering the air quantities scheduled on the. Motor pulley shall be adjustable pitch. Indoor blower motor shall have permanently lubricated bearings. Include all required controls, dampers, and inlets to provide an air control cycle of 100% OA continuously.

2.02 CABINET

- A. Unit cabinet shall be constructed of double wall galvanized steel, bonderized and coated with a baked enamel finish. Cabinet interior shall be insulated with 1" thick insulation. Cabinet panels shall be easily removable for service to all operating components. Cabinet shall have filter rack for 2" thick throw-away filters and 100% outdoor air intake hood.

2.03 CONTROLS

- A. Heating controls shall consist of an electronic modulating gas valve with remote select (discharge air sensor with room override stat), intermittent pilot ignition, remote pilot flame sensor, limit switches and centrifugal switch.
- B. Contractor shall abandon existing ATC panel for the units and install new stand-alone thermostats with remote sensors for each unit. Remote sensors shall be mounted on wall in control room of the Ordor Control Chemical Storage building.

2.04 HEAT EXCHANGER

- A. Heat exchanger shall be tubular in design and constructed of 409 stainless steel. Heat exchanger shall carry a 5-year warranty and an extended 10-year warranty at additional cost. Burners shall be constructed of stainless steel and be of the slotted-port type.

2.05 ELECTRICAL

- A. Unit Electrical Connections: New units shall be capable of connecting to existing electrical.

PART 3 - EXECUTION

3.01 GENERAL

- A. Unit shall be installed in strict accordance with manufacturer's recommendations with clean filters prior to test and balance.
- B. Contractor shall replace any damaged, corroded or rusted existing ductwork associated with the units.
- C. All exterior ductwork shall be insulated per section 15170 – HVAC Insulation.

3.02 SEQUENCE OF OPERATION

- A. GMAU-1 – The unit shall be provided with a stand alone thermostat with remote sensor. The unit shall operate continuously and is interlocked with exhaust fan EF-3. The unit shall be provided with gas fired heating section, which maintains a space temperature of no less than 40 degrees F. The heating section is energized when the space temperature falls below 50 degrees F. The unit is equipped with a smoke detector for automatic fan shutdown. The motor operated damper located in the supply duct shall close any time fan is shut down.
- B. GMAU-2 and GMAU-3 – The units shall be provided with a stand alone thermostat with remote sensors. The units operate continuously and shall be interlocked with the Odor Control System. The unit shall be provided with gas-fired heating section, which maintains a space temperature of no less than 40 degrees F. The heating section is energized when the space temperature falls below 50 degrees F. The unit is equipped with a smoke detector for automatic fan shutdown. The motor operated damper located in the supply duct shall close any time fan is shut down.
- C. GMAU-4 – The unit shall be provided with a stand alone thermostat with remote sensor. The unit shall operate continuously. The unit shall be provided with gas fired heating section, which maintains a space temperature of no less than 40 degrees F. The heating section is energized when the space temperature falls below 50 degrees F. The motor operated damper located in the supply duct shall close any time fan is shut down.

GAS FIRED MAKE- UP AIR UNIT

TAG	AREA SERVED (HEADWORKS)	MODEL No.	CFM	CSA CFM	ESP	BLOWER FAN HP	PPM	DRIVE	MBH INPUT	MBH OUTPUT	FUEL TYPE	NOTES	ACCESSORIES
GMAU-1	ODOR CONTROL CHEMICAL STORAGE	FPBL-500	6460	6460	1.25	7.5	1200	BELT	500	400	NAT GAS	A	1-14
GMAU-2	MECHANICAL SCREENS	FPBL-500	7765	7765	1.25	10	1350	BELT	500	400	NAT GAS	A	1-13,15
GMAU-3	MECHANICAL SCREENS/ SCREENINGS REMOVAL	FPBL-500	7765	7765	1.25	10	1350	BELT	500	400	NAT GAS	A	1-13,15
GMAU-4	GRT REMOVAL	HFPB-125	1580	1580	0.75	3/4	1050	BELT	125	100	NAT GAS	A	1-7,9-12

NOTES:

- A. MOUNT UNITS ON EXISTING ROOF CURBS.
 B. THERMOSTATS SHALL BE LOCATED IN CONTROL ROOM OF ODOR CONTROL CHEMICAL STORAGE ROOM

ACCESSORIES:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. 409 STAINLESS STEEL HEAT EXCHANGER BURNERS AND DRIP PAN 2. TWO POSITION OUTSIDE AIR DAMPER AND OUTSIDE AIR INTAKE HOOD 3. ELECTRONIC SPARK IGNITION 4. POWER VENTED 5. UNIT RUNS CONTINUOUSLY 6. FILTER PACK WITH 2" PLEATED FILTERS 7. SPACE THERMOSTAT WITH REMOTE SENSOR FOR HEATING. PROVIDE GUARD OVER SENSOR | <ol style="list-style-type: none"> 8. DUCT MOUNTED SMOKE DETECTOR 9. HIGH AND LOW PRESSURE SWITCHES 10. AIR FLOW PROMING SWITCH 11. DISCHARGE AIR SENSOR TO MODULATE GAS CONTROL. PROVIDED BY UNIT MANUFACTURER 12. UNIT MOUNTED DISCONNECT 13. FM CONTROLS 14. RELAY CONTACTS TO INTERLOCK AND ENERGIZE EF-3 15. RELAY TO INTERLOCK WITH ODOR CONTROL SYSTEM |
|---|---|

SELECTIONS BASED ON PRODUCTS BY PEZCOR
 EQUAL PRODUCTS SHALL BE SUBMITTED FOR APPROVAL BY ENGINEER

END OF SECTION

**SECTION 15170
HVAC INSULATION**

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

- A. Materials shall be the standard products of manufacturers regularly engaged in the production of insulation products. Insulation materials shall be products that have been in use in commercial buildings for at least 2 years prior to bid opening.

- B. Surface Burning Characteristics:
 - i. Insulation installed indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - ii. Insulation installed outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
 - iii. Insulation and related materials shall have surface burning characteristics determined by test performed on identical products per ASTM E 84, mounted and installed as per ASTM E 2231.
 - iv. All testing shall be performed by a testing and inspecting agency acceptable to authorities having jurisdiction. Insulation, jacket materials, adhesives, mastics, tapes and cement material containers shall be labeled with appropriate markings of applicable testing and inspecting agency.

- C. Storage and Protection From Moisture:
 - i. Store tapes, adhesives, mastics, cements, and insulation materials in ambient conditions in accordance with the recommendations of the manufacturer.
 - ii. Do not store insulation materials on grade or where they are at risk of becoming wet.
 - iii. Do not install insulation products that have been exposed to water.
 - iv. Protect installed insulation work with plastic sheeting to prevent water damage.

- D. Materials containing asbestos shall not be used.

1.02 RELATED WORK

- A. Where pipes and ducts pass through fire walls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with firestopping materials as specified in Section 23 00 00 HVAC GENERAL.
- B. Painting of insulation jackets, where specified shall be as specified in Section 09900 PAINTING, GENERAL

1.03 DESCRIPTION

- A. Furnish and install all insulation materials and accessories as specified or as required for a complete installation.

1.04 SUBMITALS

- A. Submit product information for insulation materials to the Architect in accordance with Division 1 and Section 15000 HVAC GENERAL.
- B. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

PART 2 - PRODUCTS

2.01 RIGID FIBERGLASS BOARD INSULATION

- A. Description:
 - 1. Rigid fiberglass insulation meeting ASTM C 612 Type IA and IB
 - 2. Minimum Density: 6 PCF (96 kg/m³).
 - 3. Maximum K value: ASTM C 177, 0.22 BTU·in/hr·ft²·°F at 75° F (0.032 at 24° C) mean temperature.
 - 4. Vapor Retarder Jacket: ASJ conforming to ASTM C 1136 Type I, or FSK or PSK conforming to ASTM C 1136 Type II in combination with protective jacket where necessary.
 - 5. Maximum Service Temperature Rating: 450° F (232° C).
- B. Thickness shall be 2"[, except exterior ductwork shall be 3" constructed with two 1-1/2" thick layers. For exterior ductwork with flanged construction, the inside layer shall be located between flanges and the outside layer shall be continuous.]
- C. Insulate the following with rigid fiberglass duct insulation:
 - 1. Mechanical room supply [and return air] ductwork [not indicated to be internally lined].
 - 2. Mechanical room outside air ductwork and plenums.
 - 3. Ductwork located exterior to the building and/or exposed to the weather.
 - 4. Mechanical room plenums.
 - 5. Mechanical room relief ductwork and plenums between the exterior and 18" past relief damper assemblies.
 - 6. [Chilled water air separators.]
 - 7. [Chilled water expansion tanks.]
- D. Subject to compliance with requirements, insulation shall be manufactured by: CertainTeed, Johns Manville, Knauf, or Owens-Corning.

2.02 PIPE INSULATION FOR WATER AND REFRIGERANT PIPING

- A. Self-Wicking Fiberglass Pipe Insulation for Cold Pipes:
 - 1. Molded, rigid, fiber glass with moisture wicking liner, meeting ASTM C 547, ASTM C 585, and ASTM C 795.

2. Moisture wicking system shall be designed specifically for below ambient temperature applications in interior environments. The system shall consist of a wicking material that transports condensed water to the outside of the system for evaporation to the atmosphere. The system shall be designed and constructed to keep the fiber glass insulation dry, preventing dripping and degradation of the insulation.
3. Maximum Thermal Conductivity (K-Value): 0.23 BTU·in/hr·ft²·°F (0.033 W/m K), when tested in accordance with ASTM C 335 at 75 °F (24 °C).
4. Maximum Service Temperature rating: 350 °F (177 °C).
5. Vapor Retarder Jacket for cold pipes: All service jacket with vapor transmission rating of 0.04 perms (0.23 ng/(Pa s sq m)) and evaporation holes, secured with self-sealing longitudinal laps (SSL) and butt strips.
6. Fitting Cover Material: Wicking cloth, rigid insulation of same thickness, and PVC fitting covers.
7. Subject to compliance with requirements, insulation shall be manufactured by:
 - a. Knauf PermaWick,
 - b. Owens Corning VaporWick
8. Provide fiberglass pipe insulation for the following cold pipes installed in the building interior:
 - a. Refrigerant suction piping.
 - b. Chilled water supply and return.
 - c. Condenser water supply, located within building.

B. Flexible Elastomeric Insulation

1. Flexible, closed-cell, elastomeric thermal pipe insulation.
2. Minimum Density: 6 PCF meeting ASTM C 534.
3. Maximum K-value: 0.25 BTU·in/hr·ft²·°F at 75°F (24°C) mean temperature.
4. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to and including 1-1/2 inch as tested by ASTM E 84.
5. Insulation and tape shall be in accordance with ASTM C 534-1988, Type I
6. Insulate the following pipe with ½" thick flexible elastomeric insulation:
 - a. Refrigerant suction.
 - b. Refrigerant liquid, where exterior exposed to sunlight.
 - c. Refrigerant hot gas bypass.
 - d. Chilled water pumps.
7. Subject to compliance with requirements, insulation shall be manufactured by: AP Armaflex by Armacell or K-Flex.

Pipe Insulation Material and Minimum Thickness (inches)
--

Temp Range °F (°C)	Insulation Material	Pipe Size					
		Run outs < 2" *	≤1"	1¼" –2"	2½" – 4"	6"	≥8"
Interior Chilled Water Piping (except piping located within attic spaces), Interior Condenser Water Piping for systems with waterside economizer							
40-60 (4-16)	Self Wicking Fiberglass	1	1	1.5	1.5	1.5	2
	Flexible Elastomeric	1	1	1.5	1.5	1.5	N/A
Condensate Piping: Self Wicking Fiberglass: ¾" thick for all pipe sizes Polyisocyanurate: ¾" thick for all pipe sizes Flexible Elastomeric: ¾" thick for all pipe sizes							

2.03 FACTORY APPLIED JACKETS

- A. ASJ/SSL: All service jacket with self-sealing lap. White-kraft paper bonded to aluminum foil and reinforced with glass fibers; conforming to ASTM C 1136 Type 1; vapor retarder; with a self-sealing adhesive.
- B. ASJ: All service jacket. White-kraft paper bonded to aluminum foil and reinforced with glass fibers; conforming to ASTM C 1136; vapor retarder.
- C. FSK: Foil scrim kraft. Aluminum foil, fiberglass reinforced scrim with kraft backing; conforming to ASTM C 1136 Type 1; vapor retarder.
- D. PSK: Poly scrim kraft. Metalized polypropylene, fiberglass reinforced scrim with kraft backing; conforming to ASTM C 1136 Type 1; vapor retarder.
- E. Redi-Klad Jacket: Venture Clad 5-ply weather and abuse resistant with self-seal lap. Zero permeability per ASTM E 96-05; puncture resistance 35.4 kg (189.3 N) per ASTM D 1000; tear strength 4.3 lb. (19.4 N) per ASTM D 624; thickness 14.5 mils (0.0145"); tensile strength 68.0 lb./inch width [306 N (31 kg)/25 mm].

2.04 FIELD APPLIED JACKETS

- A. PVC: Proto Corporation 25/50 or Indoor/Outdoor, UV-resistant fittings, jacketing and accessories, white or colored. Fitting cover system consists of pre-molded, high-impact PVC materials with fiber glass inserts. Fiber glass insert has a thermal conductivity (k value) of 0.26 at 75° F (0.037 at 24°C) mean temperature. Closures: stainless steel tacks, matching PVC tape, or PVC adhesive per manufacturer's recommendations.
- B. Metal: Aluminum, 0.016-inch (0.406 mm) thick or Stainless Steel, 0.010-inch (0.254 mm) thick in smooth, corrugated, or embossed finish with factory-applied moisture

barrier. Overlap shall be 2-inch (50 mm) minimum. Fittings shall be die-shaped with factory-applied moisture barrier.

- C. Laminated Self-Adhesive Water and Weather Seals: permanent acrylic self-adhesive system; weather resistant, high puncture and tear resistance; meeting or exceeding requirements of UL 723; applied in strict accordance with manufacturers' recommendations.

2.05 OUTDOOR DUCTWORK

- A. Aluminum Jacket: 0.016-inch (0.406 mm) thick in smooth, corrugated, or embossed finish with factory applied moisture barrier. Overlap shall be 2-inch (50 mm) minimum. PVC Jacket: Proto Corporation Indoor/Outdoor, UV resistant, white. Closure shall be solvent weld adhesive or per manufacturers' recommendations.
- B. Laminated Self-Adhesive Water and Weather Seals: applied per manufacturers' recommendations.
- C. Either ductwork or insulation shall be installed so as to shed water and not allow standing water.

PART 3 - EXECUTION

3.01 GENERAL

- A. Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions.
- B. Insulation materials shall not be applied until the following have been completed:
 - 1. Rust, scale, dirt and moisture removed from surfaces to be insulated.
 - 2. Required tests
- C. Insulation shall be kept clean and dry. If insulation becomes wet, the insulation shall be removed from the jobsite and replaced with new.
- D. Repair existing insulation to the extent damaged by new work.
- E. Seal all vapor barrier joints, breaks, and punctures with tape.

3.02 RIGID FIBERGLASS BOARD INSULATION

- A. Secure insulation with weld pins set in adhesive 18" (460 mm) on center horizontally and vertically with 2 rows per panel minimum. Cover joints and clips with tape.

3.03 SELF-WICKING FIBERGLASS PIPE INSULATION FOR COLD PIPES

- A. Install continuously on surfaces to be insulated, without gaps; butt sections firmly unless overlapping is specified or recommended by manufacturer.
- B. Locate seams in least visible location. Extend surface finishes to protect raw edges, ends and surfaces of insulation.
- C. Maintain continuous, unbroken moisture and vapor seal. Insulate and vapor seal all hangers, supports, anchors, and other projections secured to cold surfaces to prevent condensation. Repair penetrations and damage to vapor retarder using joint tape prior to system startup.
- D. Install pipe insulation continuously through walls, ceiling and floor openings, and sleeves except where firestopping materials are required.
- E. Insulation installed on piping operating below ambient temperature must have a continuous vapor retarder. Seal all joints, seams and fittings.
- F. Insulate fittings and valves with insulation equivalent to that required for adjacent piping. Finish with same materials unless otherwise specified.

3.04 POLYISOCYANURATE PIPE INSULATION

- A. Except as otherwise specified, material shall be installed in accordance with manufacturer's installation guidelines.
- B. In below ambient systems, staples, rivets, screws and other fasteners capable of penetrating the vapor retarder shall not be used.
- C. Install pre-fabricated insulation fittings on elbows, tees, and valves. Insulation at fittings shall be the same type and thickness as on straight pipe sections.
- D. Insulation sections in hanger saddles shall be 2lb/ cu ft polyisocyanurate for pipes less than 16 NPS. At 10 feet hanger spacing and on pipes 16 NPS and larger, the bottom insulation sections in hanger saddles shall be 3lb/cu ft rigid polyisocyanurate foam insulation for resistance to compression . Saddles shall wrap the insulation in an arc between 120° and 180° depending upon the load.
- E. When vapor retarder film and tape are used, and when the pipe size is 4" in diameter or greater, a 1"-wide or greater filament tape with a 25% (1-1/4 wraps) circumferential overlap is recommended to be wrapped around the outside of the vapor retarder on 18" centers.

3.05 FLEXIBLE ELASTOMERIC INSULATION

- A. Insulation shall be cemented with contact adhesive.

- B. Insulate pipe fittings, unions, and valves with miter cut pieces of insulation.
- C. Outdoors Exposed Piping:
 - 1. All outdoor exposed piping shall be painted with two coats of ultraviolet resistant coating.
 - 2. Prior to applying the finish, the insulation shall be wiped clean with denatured alcohol. The finish shall not be tinted. To insure good adhesion, the temperature should be above 50 °F during application and drying.
 - 3. All outdoor exposed piping shall have the seams located on the lower half of the pipe.

3.1 WEATHERPROOFING

- A. Insulated piping, ductwork, and equipment exposed to weather outside the building shall be protected with corrugated aluminum covers.. Locate longitudinal seams on bottom surfaces and seal. Secure covers with 3 aluminum bands per section.

3.2 PIPES PASSING THROUGH SLEEVES AND PREPARED OPENINGS

- A. Pipe insulation shall be continuous through pipe sleeves.
- B. Where walls are indicated to be sealed, pipe penetrations shall be sealed. Provide aluminum jacket with factory applied moisture barrier shall be provided over the insulation. The aluminum jacket shall extend 2 inches (50 mm) beyond both sides of the wall and shall be secured on each end with a band.

3.3 PIPES PASSING THROUGH HANGERS

- A. Insulation shall be continuous through hangers, except for domestic hot water and heating hot water piping 2-1/2" and smaller.
- B. Insulated pipes shall be supported on hangers with the addition of a protection shield to protect insulation. The shield length shall be 6 inches.
- C. A cellular glass or calcium silicate insulation insert shall be installed under each shield at pipes 2 inches (50 mm) and larger. The insert shall cover not less than the bottom 180 degree arc of the pipe. Inserts shall be the same thickness as the insulation, and shall extend 2 inches (50 mm) on each end beyond the protection shield.
- D. Vertical pipes shall be supported with riser clamps with the addition of two protection shields covering the 360 degree arc of the insulation. An insulation insert of cellular glass or calcium silicate shall be installed between each shield and the pipe. The insert shall cover the 360 degree arc of the pipe. Inserts shall be the same thickness as the insulation, and shall extend 2 inches (50 mm) on each end beyond the protection shield. If the insulation thickness is less than 1 inch (50 mm) wooden or cork dowels or blocks may be installed between the pipe and the shield to prevent the hanger from crushing the insulation as an option instead of installing insulation

inserts.

- E. The vertical weight of pipe risers shall be supported with hangers located in a horizontal section of the pipe.
- F. Vertical pipe risers longer than 30 feet (9 m), shall be additionally supported with hangers in the vertical run of the pipe which are directly clamped to the pipe, penetrating the pipe insulation. Hangers shall be insulated and the insulation jacket sealed as indicated herein for anchors in a similar service.
- G. Inserts shall be covered with a jacket material of the same appearance and quality as the adjoining pipe insulation jacket, shall overlap the adjoining pipe jacket and shall be sealed as required for the pipe jacket. The jacket material used to cover inserts in flexible elastomeric insulation shall conform to ASTM C 921, Type 1, and is allowed to be of a different material than the adjoining insulation material.

END OF SECTION

SECTION 15800
CHILLED WATER COILS
(Serving DMAU-2)

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Installation of chilled water coils to serve DMAU-2.

1.02 RELATED WORK

- A. Section 1500 – HVAC General
- B. Section 15010 - Demolition

1.03 REFERENCES

- A. ARI 410 - Standard for Forced Circulation Air-Cooling and Air-Heating Coils

1.04 QUALITY ASSURANCE

- A. Air Coils: Certify capacities, pressure drops and selection procedures in accordance with ARI 410-87.

1.05 SUBMITTALS

- A. Submit as-built drawings and product data under provisions of Section 15000 - HVAC General.
- B. Product data shall indicate dimensions, weights, coil performance, finishes of materials.
- C. Submit the manufacturer's installation instructions under provisions of Section 15000 - HVAC General.

1.06 OPERATION AND MAINTENANCE DATA:

- A. Submit operation and maintenance data under provisions of Section 15000 - HVAC General.

1.07 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver products to site under provisions of Section 15000 - HVAC General.

- B. Store and protect products under provisions of Section 15000 - HVAC General.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

PART 2 - PRODUCTS

2.01 GENERAL

- A. The manufacturer must clearly define any exceptions made to plans and specifications. The HVAC Contractor is responsible for expenses that occur due to exceptions made.
- B. The contractor shall be prepared to remove three-way control valve if necessary to properly install new coils. Proper care and re-installation is the responsibility of the contractor.

2.02 COILS

- A. Provide three (3) chilled water coils to match existing coil size and capacity located in the MAU-2 dehumidification unit.
- B. Provide three (3) chilled water coils each capable to cool 15,000 CFM from 95.0db/77.0wb degrees F to 48.4db/48.3wb degrees F. using 338.3 GPM with 25% Glycol. Max APD = 0.67" and FPD = 20.8'. Coils shall be 10 rows with 9 fins per inch each.
- C. Provide Baked Phenolic Coating on coil.
- D. Coils shall be manufactured by Aerofin. Install coils such that headers and return bends are enclosed by unit casings.
- E. Construct coils of configuration plate fins and seamless tubes. Fins shall have collars drawn, belled and firmly bonded to tubes by means of mechanical expansion of tubes. Do not use soldering or tinning in bonding process.
- F. Construct coil casings of minimum stainless steel with formed end supports and top and bottom channels. Contractor shall ensure the cooling coil drain pans and restored to proper working condition after installation of the coil.
- G. Water Cooling Coils
 - 1. Clearly label supply and return headers on outside of units such that direction of coil water-flow is counter to direction of unit air-flow.
 - 2. Coils shall be proof tested to 300 psig and leak tested to 200 psig air pressure under water.
 - 3. Construct headers of carbon steel

4. Construct tubes of 5/8" O.D. copper and construct fins of aluminum.

PART 3 - EXECUTION

3.01 EQUIPMENT

- A. Coils shall be factory tested before shipping.

3.02 INSTALLATION

- A. Coils shall be installed per coil manufacturer's installation instructions.
- B. Coils shall be charged with 25% Propylene Glycol solution for freeze protection after coils are installed. Contractor shall provide engineer with solution testing results confirming required water/glycol solution has been provided.
- C. Preliminary assessment of the existing chiller has been performed and it has been reported that it appears to be in proper operating condition. Contractor is responsible for reporting to the owner any issues with existing chiller as soon as discovered.
- D. System shall be tested and balanced once installation is complete.
- E. The contractor shall be prepared to remove the existing three-way control valve if necessary to properly install new coils with out causing damage to any existing unit components. Proper care and re-installation of three-way valve is the responsibility of the contractor.

3.03 SEQUENCE OF OPERATIONS (DMAU'S):

- A. The controls for both DMAU-1 AND DMAU-2 shall be re-commissioned back to original design intent AFTER the ductwork has been tested per section 15020. The sequence of operations shall be as follows:
 - i. Unoccupied mode (normal operation): 60,000 CFM of supply air is provided to the Influent Pump Station spaces. The supply air consists of 25% outdoor air, 75% return air and the unit exhausts 25% of the return air. The normally open damper located in vertical 60x60 duct is open. The normally closed damper in the horizontal 60x60 bypass duct is closed. The normally open damper in the supply air duct at the outlet of the DMAU is open.
 - ii. Occupied mode (switched manually at ATC panel): 60,000 CFM of outside air (100%) is provided to the Influent Pump Station spaces and exhausts 60,000 CFM RA air. The normally open damper located in vertical 60x60 duct is open. The normally closed damper in the horizontal 60x60 bypass duct is closed. The normally open damper in the supply air duct at the outlet of the DMAU is open.

- iii. Bypass mode (switched manually at ATC panel): This occurs when one of the two units is down for maintenance or repair. 60,000 CFM of outside air (100%) is provided to the Influent Pump Station spaces and exhausts 60,000 CFM RA air by the operational unit.
 - 1. Manual dampers serving the operational unit: The normally open damper located in vertical 60x60 duct is open. The normally closed damper in the horizontal 60x60 bypass duct is closed. The normally open damper in the supply air duct at the outlet of the DMAU is open.
 - 2. Manual dampers serving the non-operational unit: The normally open damper located in vertical 60x60 duct is CLOSED. The normally closed damper in the horizontal 60x60 bypass duct is OPEN. The normally open damper in the supply air duct at the outlet of the DMAU is CLOSED.

- iv. Summer operations: The unit shall provide coil leaving air temperature of 48 degrees F (dew point) to control humidity.

- v. Winter operations: The unit shall provide 50 degree F supply air temperature for freeze protection.

- vi. Fire protection: The units are interlocked with smoke detectors and the fire alarm system for shutdown upon detection of smoke.

- vii. Freeze protection: In addition to the 25% glycol chilled water solution, add the following to the unit controls:
 - 1. Upon a drop in outdoor air temperature below set point (25 degrees F adjustable) the chilled water three-way control valve shall open and the chilled water pump shall energize, circulating water until outdoor air temp reaches above 25 degrees F.

END OF SECTION

SECTION 15950
TESTING, ADJUSTING AND BALANCING (TAB)

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Refer to specification section 15000 - HVAC General, all of which applies to work described in this section as if written in full herein.
- B. The work described by this section of the specifications consists of furnishing all materials, instruments, labor, and appurtenances to test, adjust and balance all of the HVAC systems furnished and installed under Division 15 of the specifications.
- C. The TAB agency shall be a subcontractor of the General Contractor and shall not report to or be paid by the HVAC Contractor. The HVAC subcontractor shall be responsible to cooperate with and provide for the balancing subcontractor any and all materials, services, labor, etc. to facilitate completion of the balancing work.

1.02 QUALITY ASSURANCE

- A. The TAB agency and its specialist shall be certified members of Associated Air Balance Council (AABC) or certified by the National Environmental Balance Bureau (NEBB) to perform TAB service for HVAC, and vibration and sound testing of equipment. The certification shall be maintained for the entire duration of duties specified herein. The TAB agency shall have been in business for at least the past five years and must be free of disciplinary action by either the AABC or the NEBB during that time.
- B. All TAB technicians performing actual TAB work shall be experienced and must have done satisfactory work on a minimum of 3 projects comparable in size and complexity of this project and must be certified so by the TAB agency in writing.
- C. The basic instrumentation shall be calibrated to accuracy requirements by its manufacturer, AABC or NEBB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems. Provide calibration history of the instruments to be used for test and balance purpose.
- D. One or more of the applicable AABC, NEBB or SMACNA publications, supplemented by the ASHRAE Handbooks and requirements stated herein shall be the basis for planning, procedures, tolerances and reports. Final report shall cite the exact names of publications used as a basis or reference for the TAB work or reports.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide plastic plugs to seal holes drilled in ductwork for test purposes.
- B. Provide for repair of insulation removed or damaged for TAB work to match installation.

PART 3 - EXECUTION

3.01 TAB PROCEDURES

- A. TAB shall be performed in accordance with the requirements of the Standard under which the TAB agency is certified, either AABC or NEBB.
- B. During TAB all related system components shall be in full operation. Fan and pump rotation, motor loads and equipment vibration shall be checked and corrected as necessary before proceeding with TAB. Set controls and/or block off parts of distribution systems to simulate design operation of variable volume air or water systems for test and balance work.
- C. Adjustment of the temperature controls shall be coordinated by the TAB work specialist in conjunction with the Automatic Temperature Control Company's Engineer. Both shall cooperate to simulate a complete cycle for every system in every mode of operation (automatic, economizer, fire emergency, etc.).
- D. Coordinate TAB procedures with any phased construction completion requirements for the project. Provide TAB reports for each phase of the project prior to partial final inspections of each phase of the project.

3.02 AIR SYSTEMS TAB (Split Systems Serving ILS Electrical)

- A. Systems shall be tested, adjusted and balanced so that air quantities and temperatures at outlets are as shown on the Contract Drawings and so that the distribution from supply outlets is uniform over the face of each outlet.
- B. Direct reading velocity meters may be used for comparative adjustment of individual outlets, but air quantities in ducts having velocities of 1,000 feet per minute or greater shall be measured by means of pitot tubes and inclined gauge manometers. Instrument test opening enclosures shall be provided as required at the direction of the TAB agency.
- C. Adjustments shall be made in such a manner that splitter and volume adjusters close to air outlets will have the least pressure drop consistent with volume requirements. Primary balancing shall be obtained by adjustment of the dampers at branch duct take-offs. Adjustable fan drives shall be used for making final adjustments of total air quantities. Additional dampers or other air volume adjusters required to

accomplish the balancing and adjusting shall be furnished and installed as part of the HVAC work.

- D. Artificially load air filters by partial blanking to produce air pressure drop of at least 90 percent of the design final pressure drop.
- E. Check and readjust factory set minimum and maximum air terminal unit flow rates if necessary. Balance air distribution on full cooling maximum. Reset room thermostats and check operation from maximum to minimum cooling, to the heating mode, and back to cooling. Record and report the heating coil leaving air temperature when in the maximum heating mode.
- F. Adjust fan speeds to provide design air flow. Adjust V-belt drives, including fixed pitch pulley requirements.
- G. After completion of the testing, adjusting and balancing of the air systems, six (6) copies of a recognized complete set of reports showing the minimum following information shall be submitted to the Engineer for review:
 - 1. Systems inspection narrative on equipment and installation for conformance with design
 - 2. Duct Air Leakage Test Report
 - 3. Systems Readiness Report
 - 4. TAB report covering flow balance and adjustments, performance tests, vibration tests and sound tests. Required information:
 - a. Location of each air outlet or inlet. This shall be presented in the form of a reduced size floor plan showing outlet number keyed to the outlet number in the report.
 - b. Dimensions or size of each outlet or inlet
 - c. Type and manufacturer of diffusers, grilles, registers. Indicate duty as supply, return, exhaust, etc.
 - d. Cfm of air as indicated on the Drawings for each outlet or inlet with corresponding velocity
 - e. Velocity of air as measured and corresponding cfm at which system has been balanced and adjusted, for each outlet or inlet
 - f. Velocity of air measured and corresponding cfm, after each complete system has been balanced and adjusted, for each main branch or zone duct at the supply fan, the return fan and the exhaust fan, as the case may be
 - g. After each complete system has been balanced and adjusted, the total cfm at fan discharge, the total return air to the apparatus, the total outside air to the apparatus, static pressure at fan outlet, total static pressure for apparatus, fan speed, motor amperage for each phase and voltage
 - 5. Narrative of uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements

- H. The above testing, adjusting and balancing shall be performed for the first season of the year, cooling season or heating season, which occurs at the completion of the building. Additional balancing and adjusting which may be required for the season of the year next following shall be performed as part of the work under this specification.

3.03 WATER SYSTEMS TAB (New chilled water coils installed in DMAU-2)

- A. Water circulating systems shall be adjusted and balanced so that water quantities circulated through the apparatus will be as specified.
- B. Where no meters are provided, the adjustment of individual coil circuits shall be based on return water temperatures and pressure drops, provided air balancing and adjusting has been satisfactorily completed first. Temperature control valves shall be wide open during the balancing. Balancing cocks and valves shall be set. If this results in excessive total flow, this shall be corrected by partial closing of pump discharge valves during further adjusting and balancing. Settings of cocks, valves, etc. shall be permanently marked so that they can be restored if disturbed at any time.
- C. After completion of the testing, adjusting and balancing of the water systems, six (6) copies of a recognized complete set of reports showing the minimum following information shall be submitted to the Engineer for review:
 - 1. Systems inspection narrative on equipment and installation for conformance with design
 - 2. Systems Readiness Report
 - 3. TAB report covering flow balance and adjustments, performance tests, vibration tests and sound tests. Required information:
 - a. Identification of each piece of apparatus, manufacturer, size, model, rows, etc.
 - b. Flow as indicated on the Drawings for each piece of apparatus and corresponding pressure drop
 - c. Temperatures, pressures and corresponding water flow at each coil after each complete system has been balanced and adjusted
 - d. Head, gpm, bhp, volts, amps for each pump specified
 - e. Suction and discharge pressures at each pump and corresponding water flow after each complete system has been balanced and adjusted
 - 4. Narrative of uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements

3.04 VIBRATION TESTING

- A. Furnish instruments and perform vibration measurements for all rotating HVAC equipment of 1/2 horsepower and larger, including centrifugal/screw compressors, cooling towers, pumps, fans and motors.

- B. Record initial measurements for each unit of equipment on test forms and submit a report to General Contractor. Where vibration readings exceed the allowable tolerance, the HVAC Contractor shall correct the problem and the TAB agency shall verify the corrections are done for final reporting.

3.05 SOUND TESTING

- A. Perform and record required sound level measurements in approximately 15% of all rooms as designated by the General Contractor.
- B. Take measurements with a calibrated sound level meter and octave band analyzer of the accuracy required by AABC or NEBB.
- C. Where measure sound levels exceed specified levels, the installing contractor or equipment manufacturer shall take remedial action approved by the General Contractor and the necessary sound tests shall be repeated.

3.06 MARKING OF SETTINGS AND TEST PORTS

- A. Following the approval of the final TAB Report, the setting of all HVAC adjustment devices including valves, splitters and dampers shall be permanently marked by the TAB Specialist so that adjustment can be restored if disturbed at any time. Style and colors used for markings shall be coordinated with the General Contractor.
- B. The TAB Specialist shall permanently and legibly identify the location points of duct test ports. If the ductwork has exterior insulation, the identification shall be made on the exterior side of the insulation. All penetrations through ductwork and ductwork insulation shall be sealed to prevent air leaks and maintain integrity of vapor barrier.

END OF SECTION

Cobb County General Instructions For Bidders, Terms and Conditions

I. Preparation Of Bids

Each bidder shall examine the drawings, specifications, schedule and all instructions. Failure to do so will be at the bidder's risk, as the bidder will be held accountable for their bid response.

Unit price for each quotation shall be shown and such price shall include packing unless otherwise specified, along with a total and grand total where applicable. In case of discrepancy between a unit price and extended price, the unit price will be presumed correct.

Each bidder shall furnish all information required by the bid form or document. Each bidder shall sign the bid and print or type his or her name on the schedule. The person signing the bid must initial erasures or other changes. An authorized agent of the company must sign bids.

Invitations to Bid issued by Cobb County are advertised on the Cobb County Internet site (www.purchasing.cobbcounty.ga.gov) and every Friday in the Cobb County legal organ, the Marietta Daily Journal.

II. Delivery

Each bidder should state the time of proposed delivery of goods or services. Words such as "immediate", "as soon as possible", etc. shall not be used. The known earliest date or the minimum number of calendar days required after receipt of order (delivery A.R.O.) shall be stated (if calendar days are used, include Saturday, Sunday and holidays in the number).

III. Explanation to Bidders

Any explanation desired by a bidder regarding the meaning or interpretation of the invitation for bids, drawings, specifications, etc. must be received in writing **by 5:00 pm on the May 17, 2011** in order for a reply to reach all bidders before the close of the bid. Any information concerning an Invitation to Bid (ITB) will be furnished to all prospective bidders as an addendum if such information is necessary or if the lack of such information would be prejudicial to uninformed bidders.

The written bid documents supersede any verbal or written communication between parties. Addenda are posted on the Purchasing web site: www.purchasing.cobbcounty.ga.gov. Receipt of addenda should be acknowledged in the bid. It is the bidder's ultimate responsibility to ensure that they have all applicable addenda prior to bid submittal.

IV. Submission of Bids

Bids shall be enclosed in sealed envelopes, addressed to the Cobb County Purchasing Department with the name of the bidder, the date and hour of opening and the invitation to bid number on the face of the envelope. Bids must be received in the Purchasing

Department no later than the date and time (determined by the date/time stamp in the department) set forth in the Invitation to Bid. It is the sole responsibility of the bidder to ensure that his or her bid reaches the Purchasing Department. Telegraphic/faxed bids will not be considered. Any addenda should be enclosed in the sealed envelopes as well. **All bids shall be submitted on the Bid Proposal Form. Any revisions made on the outside of the envelope will not be accepted.** The bids will be publicly opened and read at the time and place set forth in the Invitation to Bid.

Samples of items, when required, must be submitted within the time specified and, unless otherwise specified by the County, at no expense to the County. Unless otherwise specified, samples will be returned at the bidder's request and expense if items are not destroyed by testing. Items offered must meet required specifications and must be of a quality, which will adequately serve the use and purpose for which intended.

Full identification of each item bid upon, including brand name, model, catalog number, etc. must be furnished to identify exactly what the bidder is offering. The bidder must certify that items to be furnished are new and that the quality has not deteriorated so as to impair its usefulness.

If no items are bid on, the "Statement of No Bid" must be returned, with the envelope plainly marked "No Bid" including the bid number. Where more than one item is listed, any items not bid upon must be indicated "No Bid".

Unsigned bids will not be considered except in cases where bid is enclosed with other documents, which have been signed. The County will determine this.

Cobb County is exempt from federal excise tax and Georgia sales tax with regards to goods and services purchased directly by Cobb County. Suppliers and contractors are responsible for federal excise tax and sales tax, including any taxes for materials incorporated in county construction projects. Suppliers and contractors should contact the State of Georgia Sales Tax Division for additional information. Tax Exemption Certificates will be furnished upon request.

Information submitted by a bidder in the bidding process shall be subject to disclosure after the public opening in accordance with the Georgia Open Records Act. Each page of proprietary information must be identified. Entire bid may not be deemed proprietary.

V. Withdraw Bid Due To Errors

The bidder shall give notice in writing of his claim of right to withdraw his bid without penalty due to an error within two (2) business days (48 hours) after the conclusion of the bid opening. Bids may be withdrawn from consideration if the price was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional arithmetic or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the

bid sought to be withdrawn. The bidder's original work papers shall be the sole acceptable evidence of error and mistake if he elects to withdraw his bid. If a bid is withdrawn under the authority of this provision, the lowest remaining responsive bid shall be deemed to be low bid. Bid withdrawal is not automatically granted and will be allowed solely at the discretion of Cobb County.

No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.

No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.

Supplier has up to forty-eight (48) hours to notify the Cobb County Purchasing Department of an obvious clerical error made in calculation of bid in order to withdraw a bid after bid opening. Withdrawal of bid for this reason must be done in writing within the forty-eight (48) hour period. Suppliers who fail to request the withdrawal of bid by the required forty-eight (48) hours shall automatically forfeit bid bond. Bid may not be withdrawn otherwise. Bid withdrawal is not automatically granted and will be allowed solely at the discretion of Cobb County.

VI. Testing and Inspection

Since tests may require several days for completion, the County reserves the right to use a portion of any supplies before the results of tests are determined. Cost of inspections and tests of any item, which fails to meet specifications, shall be borne by the bidder.

VII. F.O.B. Point

Unless otherwise stated in the Invitation to Bid and any resulting contract, or unless qualified by the bidder, items shall be shipped F.O.B. Destination. The seller shall retain title for the risk of transportation, including the filing for loss or damages. The invoice covering the items is not payable until items are delivered and the contract of carriage has been completed. Unless the F.O.B. clause states otherwise, the seller assumes transportation and related charges either by payment or allowance.

VIII. Patent Indemnity

The contractor guarantees to hold the County, its agents, officers, or employees harmless from liability of any nature or kind for use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, articles or appliances furnished or used in the performance of contract, for which the contractor is not the patentee, assignee or licensee.

IX. Bid, Pay, & Performance Bonds

A five percent (5%) bid bond, one hundred percent (100%) performance bond, and a one hundred percent (100%) payment bond shall be furnished to Cobb County for any bid as required in bid package or document. Failure to submit appropriate bonding will result in automatic rejection of bid. Bonding company must be authorized to do business in Georgia by the Georgia Insurance Commission, listed in the Department of the Treasury's publication of companies holding certificates of authority as acceptable surety on Federal bonds and as acceptable reinsuring companies, and have an A.M. Best rating as stated in the insurance requirements of the solicitation. The bonds shall be increased as the contract amount is increased.

XI. Insurance

Insurance requirements: Contractor shall procure and maintain for the duration of the contract, insurance against claims for injuries to persons or damages to property that may arise from or in connection with performance of the Work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

A. MINIMUM LIMITS OF INSURANCE

Contractor shall maintain limits no less than:

1. General Liability: \$1,000,000 combined single limit per occurrence for comprehensive coverage including bodily injury, personal injury and property damage for premises/operations, products/completed operations, contractual liability, independent contractors, broad-from property damage, and underground, explosion and collapse hazard.
2. Automobile Liability: \$1,000,000 combined single limit per accident for bodily injury and property damage including all owned, hired, and non-owned.
3. Workers' Compensation and Employers Liability: Workers' Compensation limits as required by the Labor code of the State of Georgia and Employers Liability of \$100,000 per accident.
4. Umbrella Liability: \$5,000,000 combined single limits per occurrence.
5. Builders Risk Insurance, if applicable: All Risk coverage on any buildings, structure of work and material in an amount equal to 100 per cent of the value of the contract. Coverage is to cover Cobb County interest and Cobb County shall be named as Loss Payee.

B. DEDUCTIBLES AND SELF-INSURED RETENTION

Any deductibles or self-insurance retentions must be declared to and approved by the Owner. At the option of the Owner, either: The insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers officials, and employees; or the Contractor shall procure a bond guaranteeing payment of losses related to investigations, claim administration and defense expenses.

C. OTHER INSURANCE PROVISIONS

1. General Liability, Automobile Liability, and Umbrella Liability Coverages.

The Owner and its officers, officials, employees and volunteers are to be covered as additional insureds as respects: liability arising out of activities performed by or on behalf of the Contractor.

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Owner and its officers, officials, employees and volunteers.

The Contractor is responsible for insuring its own property and equipment.

2. Workers' Compensation and Employers Liability Coverage. The insurer shall agree to waive all rights of subrogation against the Owner and its officers, officials, employees and volunteers for losses arising from the work performed by the Contractor for the Owner.

3. All Coverages: Each insurance policy required by this clause shall be endorsed to state that coverage shall not be changed, cancelled, suspended, terminated or non-renewed except after sixty (60) days prior written notice by certified mail, return receipt requested, has been given to Cobb County of said change of coverage, cancellation, suspension, termination / or non-renewal.

D. ACCEPTABILITY.

Insurance is to be placed with insurers with a Best's rating of no less than A: VII, or otherwise acceptable to the Owner.

E. VERIFICATION OF COVERAGE.

Contractor shall furnish the Owner with certificates of insurance and with original endorsements effecting coverage required by this clause. These certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements are to be received and approved by the Owner before any work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies at any time.

F. SUBCONTRACTORS

Subcontractor means one not in the employment of the Contractor who is performing all or part of the services under this Agreement under a separate contract with the Contractor.

Contractor shall include all subcontractors as an additional insured under its insurance or shall ensure that subcontractors have met the insurance requirements of this agreement. Owner may request evidence of subcontractor's insurance.

Contractor is responsible for having all subcontractors comply with all terms and conditions of the Invitation to Bid.

G. WAIVER OF SUBROGATION

Vendor shall require all insurance policies in any way related to the work and secured and maintained by Vendor to include clauses stating each underwriter shall waive all rights of recovery, under subrogation or otherwise, against Customer. Vendor shall require of subcontractors, by appropriate written agreements, similar waivers each in favor of all parties enumerated in this section.

XII. Award

Award will be made to the lowest responsive and responsible bidder. Conditional bids are not be acceptable. The quality of articles to be supplied, their conformity with the specifications, their suitability to the requirements of the County, and the delivery terms will be taken into consideration in making the award. The County may make such investigations as it deems necessary to determine the ability of the bidder to perform, and the bidder shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted by, or investigation of such bidder fails to satisfy the County that such bidder is properly qualified to carry out the obligations of the contract. The County reserves the right to reject or accept any or all bids and to waive technicalities, informalities, and minor irregularities in bids received.

The County reserves the right to purchase the goods or services described herein from other sources. The Bidder does not have the exclusive right to fill all of the County's requirements for the goods or services awarded nor will the County be obligated to purchase the estimated annual quantity or any quantity contained in the bid document.

The County reserves the right to make an award as deemed in its best interest, which may include awarding a bid to a single bidder or multiple bidders; or to award the whole bid, only part of the bid, or none of the bid to single or multiple bidders, based on its sole discretion of its best interest. In case of tie bid, the award will be made as follows:

1. The bid will be awarded to the in-county vendor.
2. The bid will be awarded to the in-state vendor.
3. The bid will be awarded to the vendor with the lesser total dollar volume.

The County reserves the right to award by line item to more than one vendor. The County reserves the right to negotiate a lower price than the bid award price on any line item with the successful vendor, should the quantity required significantly exceed those on the Invitation to Bid. If the County is unable to negotiate an acceptable price, it reserves the right to rebid the item(s) involved. If after the award of the bid there is a decrease in the price of a product from the manufacturer, or a rebate, the successful bidder will pass that price decrease and/or rebate onto the County.

Time payment discounts will be considered in arriving at net prices and in award of bids. Offers of discount for payment within ten (10) days following the end of the month are preferred.

XIII. Delivery Failures

Failure of a contractor to deliver within the time specified or within reasonable time as interpreted by the Purchasing Director, or failure to make replacement of rejected articles/services when so requested, immediately or as directed by the Purchasing Director, shall constitute authority for the Purchasing Director to purchase in the open market articles/services of comparable grade to replace the articles/services rejected or not delivered. On all such purchases, the contractor shall reimburse the County within a reasonable time specified by the Purchasing Director for any expense incurred in excess of contract prices, or the County shall have the right to deduct such amount from monies owed the defaulting contractor. Alternatively, the County may penalize the contractor one percent (1%) per day for a period of up to ten (10) days for each day that delivery or replacement is late. Should public necessity demand it, the County reserves the right to use or consume articles delivered which are substandard in quality, subject to an adjustment in price to be determined by the Purchasing Director.

XIV. County Furnished Property

No material, labor or facilities will be furnished by the County unless so provided in the invitation to bid.

XV. Reject And Withdraw Bids

Failure to observe any of the instructions or conditions in this invitation to bid may constitute grounds for rejection of bid.

XVI. Contract

Each bid is received with the understanding that the acceptance in writing by the County of the offer to furnish any or all commodities or services described therein shall constitute a contract between the bidder and the County which shall bind the bidder on his part to furnish and deliver the articles quoted at the prices stated in accordance with the conditions of said accepted bid. The County, on its part, may order from such contractor, except for cause beyond reasonable control, and to pay for, at the agreed prices, all articles specified and delivered. The County's normal payment terms are net thirty (30) days after receipt of invoice.

The Price and all unit prices shown shall be deemed to include all costs of Contractor's performance of the Work as set forth in the Bid Documents, including, but not limited to, the costs of labor, supervision, travel, services, materials, equipment, tools, scaffolds, hoisting, transportation, storage, insurance and taxes.

Upon receipt of a bid package, containing a Cobb County "Sample Contract" as part of the requirements, it is understood that the bidder has reviewed the documents with the understanding that Cobb County requires all agreements between the parties must be entered into via this document. If any exceptions are taken to any part, each must be stated in detail and submitted as part of the bid. If no exceptions are stated, it is assumed that the bidder

fully agrees to the provisions contained in the “Sample Contract” in its entirety.

When the contractor has performed in accordance with the provisions of this agreement, Cobb County shall pay the contractor, within thirty (30) days of receipt of any payment request based upon work completed or service provided pursuant to the contract, the sum so requested, less the retainage stated in this agreement, if any.

XVII. Non-Collusion

By submission of a bid, the vendor certifies, under penalty of perjury, that to the best of its knowledge and belief:

- (a) The prices in the proposal have been arrived at independently without collusion, consultation, communications, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other vendor or with any competitor.
- (b) Unless otherwise required by law, the prices which have been quoted in the proposal have not been knowingly disclosed by the vendor prior to opening, directly or indirectly, to any other vendor or to any competitor.
- (c) No attempt has been made, or will be made, by the vendor to induce any other person, partnership or corporation to submit or not to submit a proposal for the purpose of restricting competition.

Collusions and fraud in bid preparation shall be reported to the State of Georgia Attorney General and the United States Justice Department.

XVIII. Conflict of Interest, Etc.

By submission of a bid, the responding firm certifies, under penalty of perjury, that to the best of its knowledge and belief:

1. No circumstances exist which cause a Conflict of Interest in performing the services required by this ITB, and
2. That no employee of the County, nor any member thereof, nor any public agency or official affected by this ITB, has any pecuniary interest in the business of the responding firm or his sub-consultant(s) has any interest that would conflict in any manner or degree with the performance related to this ITB.

By submission of a bid, the vendor certifies under penalty of perjury, that to the best of its knowledge and belief:

- (a) The prices in the bid have been arrived at independently without collusion, consultation, communications, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other vendor or with any competitor.
- (b) Unless other wise required by law, the prices which have been quoted in the bid have not knowingly been disclosed by the vendor prior to opening, directly or indirectly, to any other vendor or competitor.
- (c) No attempt has been made, or will be made, by the vendor to induce any other person, partnership or cooperation to submit or not to submit a bid for the purpose of restricting competition.

For any breach or violation of this provision, the County shall have the right to terminate any related contract or agreement without liability and at its discretion to deduct from the price, or otherwise recover, the full amount of such fee, commission, percentage, gift, payment or consideration.

The successful responding firm shall require each of its sub-consultant(s) to sign a statement certifying to and agreeing to comply with the terms of the Sub-sections above.

XIX. Default

The contract may be cancelled or annulled by the Purchasing Director in whole or in part by written notice of default to the contractor upon non-performance or violation of contract terms. An award may be made to the next low responsive and responsible bidder, or articles specified may be purchased on the open market similar to those so terminated. In either event, the defaulting contractor (or his surety) shall be liable to the County for costs to the County in excess of the defaulted contract prices; provided, however, that the contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause. Failure of the contractor to deliver materials or services within the time stipulated on his bid, unless extending in writing by the Purchasing Director, shall constitute contract default.

XX. Disputes

Except as otherwise provided in the contract documents, any dispute concerning a question of fact arising under the contract which is not disposed of shall be decided after a hearing by the Purchasing Director, who shall reduce his/her decision to writing and mail or otherwise furnish a copy thereof to the contractor. The decision of the Purchasing Director shall be final and binding; however, the contractor shall have the right to appeal said decision to a court of competent jurisdiction.

XXI. Substitutions

Bidders offering and quoting on substitutions or who are deviating from the attached specifications shall list such deviations on a separate sheet to be submitted with their bid. The absence of such a substitution list shall indicate that the bidder has taken no exception to the specifications contained herein.

XXII. Ineligible Bidders

The County may choose not to accept the bid of a bidder who is in default on the payment of taxes, licenses, or other monies due to the County. Failure to respond three (3) consecutive times for any given commodity/service may result in removal from the supplier list under that commodity/service.

In compliance with the Americans With Disabilities Act (ADA), Cobb County provides reasonable accommodations to permit a qualified applicant with a disability to enjoy the privileges of employment equal to those employees without disabilities. Disabled

individuals must satisfy job requirements for education background, employment experience, and must be able to perform those tasks that are essential to the job with or without reasonable accommodations.

XXIII. Alterations Of Documents

Alterations of County documents are strictly prohibited and will result in automatic disqualification of the firm's solicitation response. If there are "exceptions" or comments to any of the solicitation requirements or other language, then the firm may make notes to those areas, but may not materially alter any document language.

XXIV. Termination For Convenience

The County, by written notice, may terminate this contract, in whole or in part, when it is in the County's interest. If this contract is terminated, the County shall be liable only for goods or services delivered or accepted. The County Notice of Termination may provide the contractor thirty (30) days prior notice before it becomes effective. However, at the County's sole option a termination of convenience may be effective immediately and may apply to delivery orders (if applicable) or to the contract in whole.

XXV. Inter-governmental Agreement

Other cities and Authorities located in Cobb County will be allowed to purchase identical items at the same price and upon the same terms and conditions, pursuant to the Intergovernmental Cooperative Purchasing Agreements entered into between the BOC and Cobb County Governmental entities listed under the Intergovernmental Cooperative Purchasing Program. These entities include the Cobb County Board of Education and Cities of Acworth, Austell, Kennesaw, Smyrna, Marietta, and Powder Springs and the Cobb County-Marietta Water Authority and the Cobb-Marietta Coliseum and Exhibit Hall Authority.

XXVI. Indemnification and Hold Harmless

By submission of a bid, the selected responding firm agrees to the fullest extent permitted by law to indemnify Cobb County and protect, defend, indemnify and hold harmless Cobb County, its officers, officials, employees and volunteers from and against all claims, actions, liabilities, losses (including economic losses), or costs arising out of any actual or alleged a) bodily injury, sickness, disease, or death; or injury to or destruction of tangible property including the loss of use resulting there from; or any other damage or loss arising out of or resulting claims resulting in whole or part from any actual or alleged act or omission of the responding firm, sub-consultant, anyone directly or indirectly employed by any firm or sub-consultant; or anyone for whose acts any of them may be liable in the performance of work; b) violation of any law, statute, ordinance, governmental administrative order, rule, regulation, or infringements of patent rights or other intellectual property rights by the responding firm in the performance of work; or c) liens, claims or actions made by the responding firm or other party performing the work, as approved by Cobb County. The indemnification obligations herein shall not be limited by any limitation on the amount, type of damages, compensation, or benefits payable by or for the responding firm or its sub-

consultant(s), as approved by the County, under workers' compensation acts, disability benefit acts, other employee benefit acts, or any statutory bar or insurance.

XXVII. Special Terms and Conditions

Should these General Terms and Conditions be in conflict with any attached Special Terms and Conditions, the Special Terms and Conditions will control.

XXV. Disadvantaged Business Enterprises (DBE): The following provisions should be carefully read to determine applicability to your business.

Cobb County Government encourages the participation of all businesses in offering their services and/or products. The Cobb County Government has the goal to fairly and competitively procure the best product at the most reasonable cost.

A Disadvantaged Business Enterprise (DBE) is generally defined as a Female, Black American, Hispanic American and any other minority owned business. The Federal Government has long had program in place to ensure participation of DBE vendors and suppliers. The State of Georgia has established a similar program whereby DBE firms are defined, certified and made known. This effort is managed by the Georgia Department of Transportation (GDOT). More information can be obtained from GDOT web site:

1. <http://www.dot.state.ga.us/eeo-div/index.shtml>

The Cobb County Government addresses DBE business participation (frequency and dollar value) in the following ways:

1. Cobb County wishes to identify all DBE participation; both at the contractor and sub-contractor levels in the following ways.
 - a. DBE businesses are requested to identify such status at the time they register as a vendor.
 - b. DBE businesses are requested to identify themselves at the time they propose to do business. Please complete **EXHIBIT B** if applicable and return with bid submittal.
 - c. All businesses will receive with each Purchase Order an instruction sheet for use of the furnished *Cobb County Government DBE Participation Report*, **EXHIBIT C**. Businesses are requested to complete this report and submit it with each invoice for the time period billed.
2. Cobb County has established a Disadvantaged Business Enterprise Plan in accordance with the regulations of the U.S. Department of Transportation (U. S. Department of Transportation (USDOT), 49 CFR Part 26.) The Cobb County Department of Transportation is the lead agency for implementing the USDOT DBE Program for the County.

The Plan applies only to projects which are clearly indicated by the County.

**XXVIII. Compliance with Georgia Security and Immigration Compliance Act
PROCEDURES & REQUIREMENTS**
(Effective 10-28-2010 - Supersedes All Previous Versions)

BACKGROUND

Pursuant to the “Georgia Security and Immigration Compliance Act,” Cobb County cannot enter into a contract for the physical performance of services unless the contractor registers and participates in the federal work authorization program to verify information of all newly hired employees or subcontractors. Neither may any contractor or subcontractor enter a contract with the county in connection with the physical performance of services unless the contractor and/or subcontractor registers and participates in the federal work authorization program to verify information of all new employees. O.C.G.A. § 13-10-91.

Before any bid for the physical performance of services is considered, the bid must include a signed, notarized affidavit from the contractor attesting to the following: (1) the affiant has registered with and is authorized to use the federal work authorization program; (2) the user ID number and date of authorization for the affiant; and (3) the affiant is using and will continue to use the federal work authorization program throughout the contract period. O.C.G.A. § 13-10-91 (b) (1). Affidavits shall be maintained for five years from the date of receipt. O.C.G.A. § 13-10-91 (b) (1).

Upon contracting with a new subcontractor, a contractor or subcontractor shall, as a condition of the contract or subcontract, provide Cobb County with notice of the identity of any and all subsequent subcontractors hired or contracted by that contractor or subcontractor within five (5) business days of entering into a contract or agreement for hire with any subcontractor. Such notice shall include an affidavit including the subcontractor’s name, address, user ID number, and date of authorization to use the federal work authorization program. O.C.G.A. § 13-10-91 (b) (3).

Based upon the County’s experience and desire for full compliance, no work may be commenced by any subsequent subcontractor prior to notice being received by the County that the subcontractor (regardless of tier) is in compliance with the law and the attached Procedures & Requirements, including the preparation and submission of the Contractor (or Subcontractor) Affidavit & Agreement AND the Immigration Compliance Certificate PRIOR to the commencement of any work.

DEFINITIONS

Affidavit – a written statement made or taken under oath before an officer of the court or a notary public or other person who duly has been authorized so to act.

Affiant – the person who makes and subscribes to a statement made under oath (affidavit).

Physical Performance of Services – the building, altering, repairing, improving, or demolishing of any public structure or building or other public improvements of any kind to public real property, including the construction, reconstruction, or maintenance of all or part of a public road; or any other performance of labor for a public employer under a contract or other bidding process.

PROCEDURES & REQUIREMENTS

1. Bid Documents: Bid documents should contain information regarding the contract language and contractual requirements described below.
2. Responsive Bid Documents: Responsive bid documents **MUST INCLUDE** a signed, notarized affidavit from the contractor in the form attached as EXHIBIT A (CONTRACTOR AFFIDAVIT & AGREEMENT). **If the affidavit is not submitted at the time of the bid, the applicant will be disqualified.**

THIS AFFIDAVIT MUST BE SIGNED, NOTARIZED AND SUBMITTED WITH ANY BID REQUIRING THE PERFORMANCE OF PHYSICAL SERVICES. IF THE AFFIDAVIT IS NOT SUBMITTED AT THE TIME OF THE BID, THE BID WILL BE DETERMINED TO BE NON-RESPONSIVE AND WILL BE DISQUALIFIED.

3. Contract Language & Contractual Requirements: Affirmative language shall be contained in agreements for the performance of services to cover all statutory and County requirements; such language shall require:
 - (a) That affidavits in the form attached to these “Procedures & Requirements” be executed from a contractor (and any subcontractors, regardless of tier) and notarized, showing compliance with the requirements of O.C.G.A. § 13-10-91 and that such be made part of the contract and/or subcontracts;
 - (b) That the contractor (and any subcontractors, regardless of tier) fully comply with the requirements for completing and submitting the “Immigration Compliance Certification” and that such certification be received by the County prior to the commencement of any work under the contract or subcontract;
 - (c) That the contractor (or any subcontractor, regardless of tier) notify the County within five (5) business days of entering into a contract or other agreement for hire with any subcontractor(s), regardless of tier;
 - (d) That the contractor be responsible for obtaining and providing to the County the “Subcontractor Affidavit & Agreement” and “Immigration Compliance Certification” attached to and required under these “Procedures & Requirements” from each subcontractor, regardless of tier, employed or retained for work under the contract prior to the commencement of any work under the contract or any subcontract;
 - (e) That Cobb County, Georgia, reserves the right to dismiss, or require the dismissal of, any contractor or subcontractor for failing to provide the required affidavit or certification and/or for failure to comply with the statutory requirements of O.C.G.A. § 13-10-91 and/or for providing false or misleading information upon the required affidavit(s) or certification(s);
 - (f) That any contractor and/or subcontractor retaining any other subcontractor to perform services under the contract provide legal notice to any subcontractor of the requirements of Cobb County for immigration compliance and further provide notice that Cobb County, Georgia, reserves the right to dismiss, or require the dismissal of, any contractor or subcontractor for failing to provide the required affidavit or certification and/or for failure to comply with the statutory requirements of O.C.G.A.

§ 13-10-91 and/or for providing false or misleading information upon the required affidavit(s) or certification(s);

(g) That failure to comply with any of the requirements and procedures of the County (i.e., failure to timely supply required affidavits or compliance certification documents; failure to utilize federal work authorization procedures; failure to permit or facilitate audits or reviews of records by County or State officials upon request; and/or failure to continue to meet any of the statutory or County obligations during the life of the contract) shall constitute a material breach of the agreement and shall entitle the County to dismiss any general contractor or to require the dismissal of any subcontractor or sub/subcontractor (irrespective of tier) for failing to fully comply with these requirements;

(h) That upon notice of a material breach of these provisions, the contractor (or subcontractor, regardless of tier) shall be entitled to cure the breach within ten (10) days and provide evidence of such cure. Should the breach not be cured, the County shall be entitled to all available remedies, including termination of the contract, the requirement that a subcontractor be dismissed from performing work under the contract, and any and all damages permissible by law.

4. Immigration Compliance Certification: Prior to commencing work under any contract for the physical performance of services, the contractor shall complete the “IMMIGRATION COMPLIANCE CERTIFICATION” form attached to these “Procedures & Requirements” and submit the same to the County.

Prior to allowing any other subcontractor to perform work under the contract, the contractor shall obtain a completed “IMMIGRATION COMPLIANCE CERTIFICATION” from each subcontractor (regardless of tier) and submit the same to the County.

FORM ATTACHMENTS:

1. CONTRACTOR AFFIDAVIT & AGREEMENT (EXHIBIT A);
2. SUBCONTRACTOR AFFIDAVIT & AGREEMENT (EXHIBIT A-1);
3. IMMIGRATION COMPLIANCE CERTIFICATION (EXHIBIT A-2).

**CONTRACTOR AFFIDAVIT & AGREEMENT
(EXHIBIT A)**

This affidavit must be signed, notarized and submitted with any bid requiring the performance of physical services. If the affidavit is not submitted at the time of the bid, the bid will be determined non-responsive and will be disqualified.

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is contracting with Cobb County, Georgia, has registered with, is authorized to use, and is participating in a federal work authorization program (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)). The undersigned contractor further attests that it will continue to use the federal Employment Eligibility Verification (EEV) work authorization program throughout the contract period.

The undersigned further agrees that should it employ or contract with any subcontractor(s) or should its subcontractor(s) employ other subcontractor(s) for the physical performance of services pursuant to the contract with Cobb County, Georgia, the contractor or subcontractor will:

- (1) Notify the County within five business days of entering into a contract or agreement for hire with any subcontractor(s);
- (2) Secure from any subcontractor(s) and/or their subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91 on the attached Subcontractor Affidavit (EXHIBIT A-1) prior to the commencement of any work under the contract/agreement;
- (3) Secure from any subcontractor(s) and/or their subcontractor(s) a completed Immigration Compliance Certification (EXHIBIT A-2) prior to the commencement of any work under the contract/agreement;
- (4) Provide the subcontractor(s) with legal notice that Cobb County, Georgia, reserves the right to dismiss, or require the dismissal of, any contractor or subcontractor for failing to provide the affidavit and/or for failure to comply with the requirements referenced in the affidavit;
- (5) Maintain records of such compliance and provide a copy of each such verification to Cobb County, Georgia, at the time the subcontractor(s) is retained to perform such services or upon any request from Cobb County, Georgia; and
- (6) Maintain such records for a period of five (5) years.

EEV (E-Verify) Program User ID Number

EEV Program Date of Authorization

BY: Authorized Officer or Agent
[Contractor Name]

Contractor Business Name

Printed Name

Date

SWORN AND SUBSCRIBED BEFORE ME
ON THIS THE ____ DAY OF _____, 201_

Notary Public Commission Expires: _____

Effective 10-28-2010

**SUBCONTRACTOR AFFIDAVIT & AGREEMENT
(EXHIBIT A-1)**

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Cobb County, Georgia, has registered with, is authorized to use, and is participating in a federal work authorization program (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)). The undersigned contractor further attests that it will continue to use the federal Employment Eligibility Verification (EEV) work authorization program throughout the contract period.

The undersigned further agrees that should it employ or contract with any subcontractor(s) or should its subcontractor(s) employ other subcontractor(s) for the physical performance of services pursuant to the contract with Cobb County, Georgia, the undersigned subcontractor will:

- (1) Notify the County within five business days of entering into a contract or agreement for hire with any subcontractor(s);
- (2) Secure from any subcontractor(s) and/or their subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91 on this Subcontractor Affidavit form (EXHIBIT A-1) prior to the commencement of any work under the contract/agreement;
- (3) Secure from any subcontractor(s) and/or their subcontractor(s) a completed Immigration Compliance Certification (EXHIBIT A-2) prior to the commencement of any work under the contract/agreement;
- (4) Provide the subcontractor(s) with legal notice that Cobb County, Georgia, reserves the right to dismiss, or require the dismissal of, any contractor or subcontractor for failing to provide the affidavit and/or for failure to comply with the requirements referenced in the affidavit;
- (5) Maintain records of such compliance and provide a copy of each such verification to Cobb County, Georgia, at the time the subcontractor(s) is retained to perform such services or upon any request from Cobb County, Georgia; and
- (6) Maintain such records for a period of five (5) years.

EEV (E-Verify) Program User ID Number

EEV Program Date of Authorization

BY: Authorized Officer or Agent
[Subcontractor Name]

Subcontractor Business Name

Printed Name

Date

SWORN AND SUBSCRIBED BEFORE ME
ON THIS THE ____ DAY OF _____, 201_

Notary Public Commission Expires: _____

Effective 10-28-2010

IMMIGRATION COMPLIANCE CERTIFICATION
(Required to be completed by Contractors and all Subcontractors)
(EXHIBIT A-2)

I certify to the Cobb County Board of Commissioners that the following employees will be assigned to:

(Project Name/Description)

_____	_____	_____
_____	_____	_____
_____	_____	_____

I further certify to Cobb County, Georgia the following:

- The E-Verify program was used to verify the employment eligibility of each of the above-listed employees hired after the effective date of our contract to use the program;
- We have not received a Final Nonconfirmation response from E-Verify for any of the employees listed.
- If we receive a Final Nonconfirmation response from E-Verify for any of the employees listed above, we will immediately terminate that employee's involvement with the project.
- I have confirmed that we have an I-9 on file for every employee listed above and that to the best of my knowledge all the I-9's are accurate.
- To the best of my knowledge and belief, all of the employees on the above list are legally authorized to work in the United States.
- If any other employee is assigned to this Cobb County project, a certification will be provided for said employee prior to the employee commencing work on the project.

To the best of my knowledge and belief, the above certification is true, accurate and complete.

Sworn to by:

Employer Name & Address:

Signature of Officer

Printed Name/Title

Date

SWORN AND SUBSCRIBED BEFORE ME
ON THIS THE ____ DAY OF _____, 201_

Notary Public
Commission Expires: _____

Effective 10-28-2010

EXHIBIT B

DISADVANTAGED BUSINESS ENTERPRISE (DBE) IDENTIFICATION FORM

A Disadvantaged Business Enterprise (DBE) is generally defined as a Female, Black American, Hispanic American and any other minority owned business. If your firm is classified as a Disadvantaged Business Enterprise (DBE), please complete this form and submit with bid response or send to:

Cobb County Purchasing Department
Attn: Purchasing Director
1772 County Services Parkway
Marietta, GA 30008
Fax: 770-528-1154
Email: purchasing@cobbcounty.org

Name of Business: _____

Address: _____

Telephone: _____

Fax: _____

Email: _____

Certification Number: _____

Name of Organization Certification _____

This information is acquired for informational purposes only and will have no bearing on the award unless otherwise stated

Instructions for Completing Exhibit C
Disadvantaged Business Enterprise (DBE)
Participation Report

All Cobb County Government contractors or vendors are requested to complete a report descriptive of any DBE subcontractor involvement in work for which the government is making payment. If otherwise specified in an RFP/ITB or contract, additional reporting forms may be required as well.

The objective of this request is to assist in the identification of Disadvantaged Business Enterprise (DBE) business participation with the Cobb County Government and to quantify that participation.

The Cobb County Government does not administer a DBE Certification Program. The principle certification agency for the State of Georgia is the Georgia Department of Transportation. As a Contractor/Vendor you are not responsible for verification of any DBE Certification information of your subcontractor.

*** **Instructions** ***

1. Contractor/Vendor is furnished the one-page *DBE Monthly Participation Report* with each Cobb County Government-issued Purchase Order.
2. Contractor/Vendor completes this report for each billing period and attaches it to the invoice to then be sent to the County department/agency receiving the service or product.
3. Upon receipt of a Contractor/Vendor invoice and DBE report, the County department/agency receiving the service or product should keep a copy of the completed DBE report for their reporting process. In order to add or verify the prime contractor is registered as a DBE vendor in AMS, the County department/agency should send a copy of the DBE report to:

Cobb County Purchasing Division
Attn.: DBE Report

A Disadvantaged Business Enterprise (DBE) is a firm that is under the control of someone in an ownership position (at least 51%) that:

1. Has membership in one or more of the following groups: Female, Black American, Hispanic American, Native American, Subcontinent Asian American and Asian-Pacific America. There may be other groups that may be eligible to be certified as DBE.
2. Is a U.S. citizen or lawfully admitted permanent resident of the U.S.
3. Has a personal net worth which does not exceed \$750,000.
4. The business meets the Small Business Administration's size standard for a small business. Its annual gross receipts for the three previous fiscal years cannot have exceeded \$22,410,000. Depending on the type of work the business performs, other size standards may apply.
5. The business is organized as a for-profit business.
6. The business may also be DBE eligible as a certified U.S. Small Business Administration 8 (a) program.

Exhibit C
Cobb County Government Disadvantaged Business Enterprise Participation
Monthly Report

Contractor/Vendor: Please keep this blank report to make copies as needed. Print or type in the report, then send the completed report to the County department/agency receiving the service or product.

County Departments: Keep a copy of this completed report and use the dollar figures to input into your quarterly DBE report to the DBE Liaison (Records Management Division). If you already have a similar reporting method of gathering the dollar figures continue to use it. Send a copy of this completed report to the Purchasing Division (Attn: DBE Report) to add or verify the prime contractor is registered as a DBE vendor in AMS.

Submitted by: _____ Month Invoiced: _____
Name of Prime Contractor/Vendor **From/To:**

Cobb County Project Name: _____ Bid or P.O. Number: _____

Cobb County Department or Agency receiving service or product: _____

Description of Purchased Service/Product: _____

Full Contracted Amount: \$ _____ Payment amount requested at this time: \$ _____

1. Are YOU, the Prime Contractor a DBE business? YES _____ NO _____
2. Are YOUR subcontractors DBE vendors? YES _____ NO _____

Please provide information below for each participating DBE subcontractor(s).

DBE Subcontractor Business Name	Type Service or Product Supplied	DBE Subcontractor Business/Contact Tel. Number	Actual Dollar Value of DBE Subcontractor Participation this Reporting Month
			\$
			\$
			\$
			\$
			\$
			\$

Submitted by: _____
Printed Name

Title or position: _____

Date Completed: _____

Signature of Authorized Representative

BID FORM
Page 1 of 3

TO: COBB COUNTY BOARD OF COMMISSIONERS

THE UNDERSIGNED, having examined the proposed contract documents titled:

HVAC IMPROVEMENTS FOR R. L. SUTTON WATER RECLAMATION FACILITY
COBB COUNTY WATER SYSTEM
SEALED BID #11-5577

AND having visited the work site(s) and examined the conditions affecting the Work, HEREBY proposes and agrees to furnish all labor and materials, equipment, and appliances and to perform all operations necessary TO COMPLETE ALL WORK FOR ALL SERVICES AS REQUIRED BY THE PROJECT MANUAL, INCLUDING ANY ADDENDA.

FOR ALL OF THE WORK IDENTIFIED FOR THE STIPULATED SUMS OF:

_____ DOLLARS (\$_____)

The undersigned understands and agrees also to comply with and be bound by the entire contents of the Sealed Bid No. #11-5577 (aka Project Manual) including all Addenda.

Acknowledged: _____

The undersigned acknowledges receipt of Addenda numbers:

ADDENDUM NO. _____ Acknowledged: _____

CONTRACTOR'S QUALIFICATION STATEMENT

I. CONTRACTOR

Name of Contractor: _____

Address of Contractor: _____

Primary Contact Person: _____

Telephone Number: _____

Type of Business Entity: _____
(corporation, sole proprietorship, partnership, p.c.)

Contractor does _____ or does not _____ anticipate using subcontractor(s) in the performance of this Work.

Contractor Business Entity Principals:

Primary Owners (if other than C-Corporation): _____

President: _____

Secretary: _____

Business is organized under the Laws of the State of _____

II. BANK REFERENCE

Primary Bank: _____

Relationship officer
responsible for account: _____

Telephone Number: _____

III. REFERENCES

Attach names, contact persons and current telephone numbers of a minimum of five (5) references of companies for which you are currently providing services substantially similar to those specified in this bid.

IV. BACKGROUND

Has Contractor ever done business under a different name? _____

If so, provide names: _____

Prior projects with Cobb County: _____

BIDDER SIGNATURES

Bid dated this _____ day of _____ 2011

Bidder: _____

Signed: _____

Title: _____

Address: _____
