SMITH & COMPANY
ARCHITECTS

ADDENDUM NO. 1

DATE:	May 13th 2013
PROJECT:	Felix Fraga Academic Center Level 3 Renovation
LOCATION:	301 N. Drennan St. Houston, Texas 77003
PROJECT NO.	
DISTRIBUTION:	
DELIVERED VIA:	05/13/2013
NO. PAGES:	4
PREPARED BY:	Smith & Company Architects, Inc

This addendum forms a part of the Specifications for the Felix Fraga Academic Center Level 3 Renovation for Houston Community College, documents posted on April 22, 2013 for the subject project and modifies/add to them as noted below.

Please Note that a second Addendum; Addendum 2, will be issued on Thursday May 16, 2013.

CHANGES TO PROJECT MANUAL

SPECIFICATIONS

1. Section TABLE OF CONTENTS dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

2. Section 221116 DOMESTIC WATER PIPING, dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

3. Section 221316 SANITARY WASTE PIPING, dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

4. Section 226213 VACUUM PIPING FOR LABORATORY, dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

5. Section 230923 DDC CONTROLS, dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

6. Section 232113 HYDRONIC PIPING, dated April 22, 2013 replace the section with the attached section, dated May 13, 2013.

7. Section 101100 VISUAL DISPLAY UNITS, Paragraph 1.2-A-Delete # 3 “Tackboards”.

8. Section 101100 VISUAL DISPLAY UNITS, Paragraph 1.3-Delete A "Tackboard: Framed…"

9. Section 101100 VISUAL DISPLAY UNITS, Paragraph 1.3-B-line 2-Revise to read "…perimeter frame; includes chalkboards and markerboards".

10. Section 101100 VISUAL DISPLAY UNITS, Paragraph 1.3-C-line 2-Revise to read "…including surfaces of chalkboards, markerboards, and surfacing materials…"

11. Section 101100 VISUAL DISPLAY UNITS; delete Part 2.3 Titled "TACKBOARD ASSEMBLIES".

12. Section 101100 VISUAL DISPLAY UNITS, Part 2.4-Revise to read "MARKERBOARD ACCESSORIES".

13. Section 101100 VISUAL DISPLAY UNITS, Paragraph 2.5-C-3-line 1-Revise to read "…joints between markerboards of combination units".

14. Section 096519 RESILIENT TILE FLOORING, Paragraph 3.4-D-1-Revise to read "Apply Three coats."

15. Add attached City of Houston 2013, Prevailing Wage Rate.

16. Add attached Houston Community College, Request for Competitive Sealed Proposals.

17. Add attached Houston Community College, CSP Contract.

18. Add attached Houston Community College, Hot Work Permit.

19. Add attached Houston Community College, Uniform General and Supplementary General Conditions.

20. Cover Revise to read "Felix Fraga Academic Center, Houston Community College…"

21. All Section headers-line 1- Revise to read "Felix Fraga Academic Center Level 3 Renovation"

22. All Section headers-line 2-Revise to read "Houston Community College".

23. Disregard all references to LEED in all Specification Sections.

CHANGES TO DRAWINGS

1. Cover and Drawing Title Block Revise to read "Felix Fraga Academic Center, Houston Community College".

2. Replace Sheet A002-Code Compliance and General Notes, Dated April 22, 2013, Replace with attached Sheet A002-Code Compliance and General Notes, Dated May 13th, 2013.

3. Replace Sheet A005-Life Safety and Egress Plan, Dated April 22, 2013, Replace with attached Sheet A005-Life Safety and Egress Plan, Dated May 13th, 2013.

4. Add Attached Sheet A006-Construction Staging and Coordination Existing Site Survey, Dated May 13th, 2013.

5. Add Attached Sheet A100-Existing Site Plan and Parking Requirements, Dated May 13th, 2013.

6. Replace Sheet A200-Level 3 Floor Plan, Dated April 22, 2013, Replace with attached Sheet A200-Level 3 Floor Plan, Dated May 13th, 2013.

7. Replace Sheet A201-Level 3 Finish Floor Plan, Dated April 22, 2013, Replace with attached Sheet A201-Level 3 Finish Floor Plan, Dated May 13th, 2013.

8. Replace Sheet A220-Enlarged Plans and Lab Legend, Dated April 22, 2013, Replace with attached Sheet A220-Enlarged Plans and Lab Legend, Dated May 13th, 2013.

9. Replace Sheet A230-Level 3 Reflected Ceiling Plan, Dated April 22, 2013, Replace with attached Sheet A230-Level 3 Reflected Ceiling Plan, Dated May 13th, 2013.

10. Replace Sheet A231-Enlarged Reflected Ceiling Plan and Details, Dated April 22, 2013, Replace with attached Sheet A231-Enlarged Reflected Ceiling Plan and Details, Dated May 13th, 2013.

11. Replace Sheet A300-Door and Frame Types; Door and Frame Schedule; Window Types, Dated April 22, 2013, Replace with attached Sheet A300-Door and Frame Types; Door and Frame Schedule; Window Types, Dated May 13th, 2013.

12. Replace Sheet A302-Partition Types, Dated April 22, 2013, Replace with attached Sheet A302-Partition Types, Dated May 13th, 2013.

13. Replace Sheet A303-Finish and Material Schedule, Dated April 22, 2013, Replace with attached Sheet A303-Finish and Material Schedule, Dated May 13th, 2013.

14. Replace Sheet A400-Interior Elevations, Dated April 22, 2013, Replace with attached Sheet, A400-Interior Elevations, Dated May 13th, 2013.

15. Add Attached Sheet A401-Lab Casework Schedules, Legends & Notes, Dated May 13th, 2013.

16. Delete Sheet A401-Interior Lab Casework Elevations, Dated April 22, 2013, Replace with Attached Sheet A402- Interior Lab Casework Elevations, Dated May 13th, 2013.

17. Delete Sheet M0.02–Schedules, Dated April 22, 2013, Replace with Attached Sheet M0.02–Schedules, Dated May 13th, 2013.

18. Delete Sheet M2.01 - Third Floor Plan - New - Mechanical, Dated April 22, 2013, Replace with Attached Sheet M2.01 - Third Floor Plan - New - Mechanical, Dated May 13th, 2013.

19. Delete Sheet M3.01-Details, Dated April 22, 2013, Replace with Attached Sheet M3.01-Details, Dated May 13th, 2013.

20. Delete Sheet E1.02 -Specifications and Notes, Dated April 22, 2013, Replace with Attached Sheet E1.02 -Specifications and Notes, Dated May 13th, 2013.

21. Delete Sheet E1.10 – One-Line, Dated April 22, 2013, Replace with Attached Sheet E1.10 – One-Line, Dated May 13th, 2013.

22. Delete Sheet E1.11 -Panel Schedules, Dated April 22, 2013, Replace with Attached Sheet E1.11 -Panel Schedules, Dated May 13th, 2013.

23. Delete Sheet E2.01 – Floor Plan - Power, Dated April 22, 2013, Replace with Attached E2.01 – Floor Plan - Power, Dated May 13th, 2013.

24. Delete Sheet E3.01 – Floor Plan - Lighting, Dated April 22, 2013, Replace with Attached E3.01 – Floor Plan - Lighting, Dated May 13th, 2013.

25. Delete Sheet E4.01 – Floor Plan – Special Systems, Dated April 22, 2013, Replace with Attached E4.01 – Floor Plan – Special Systems, Dated May 13th, 2013.

26. Delete Sheet E5.01 -Details, Dated April 22, 2013, Replace with E5.01 -Details, Dated May 13th, 2013.

27. Add Sheet E5.02 –Details, Dated May 13th, 2013.

END OF ADDENDUM NO. 1

DIVISION 7- THERMAL AND MOISTURE PROTECTION

DIVISION 8- OPENINGS

DIVISION 9- FINISHES

DIVISION 10 –SPECIALTIES

Uniform General and Supplementary General Conditions for Houston Community College

Building Construction Contracts

Table of Contents

Uniform General and Supplementary General Conditions for Houston Community College Building Construction Contracts

Article 1. Definitions

Unless the context clearly requires another meaning, the following terms have the meaning assigned herein.

1.1 Architect/Engineer (A/E) means a person registered as an architect pursuant to Tex. Occ. Code Ann., Chapter 1051, as a landscape architect pursuant to Tex. Occ. Code Ann., Chapter 1052, a person licensed as a professional engineer pursuant Tex. Occ. Code Ann., Chapter 1001 and/or a firm employed by Owner or Design-Build Contractor to provide professional architectural or engineering services and to exercise overall responsibility for the design of a Project or a significant portion thereof, and to perform the contract administration responsibilities set forth in the Contract.

1.2 *Change Order* means a written modification of the Contract between the Owner and Contractor, signed by the Owner, the Contractor and the Architect/Engineer.

1.3 *Change Order Proposal* means a Contractor -generated document in response to a Change Order Request (COR).

1.4 *Change Order Request (COR)* means a document which informs the Contractor of a proposed change in the Work, and appropriately describes or otherwise documents such change.

1.5 *Close-out documents* means the product brochures, product/equipment maintenance and operations instructions, manuals, and other documents/warranties, as-built record documents, affidavit of payment, release of lien and claim, and as may be further defined, identified, and required by the Contract Documents.

1.6 *Contract* means the entire agreement between the Owner and the Contractor, including all of the Contract Documents.

1.7 *Contract Date* is the date when the agreement between the owner and the Contractor becomes effective.

1.8 *Contract Documents* means those documents identified as a component of the agreement (contract) between the owner and the Contractor. These may include, but are not limited to, Drawings, Specifications, General, Supplementary and Special Conditions, and all pre-bid and/or pre-proposal addenda.

1.9 Contractor means the individual, corporation, company, partnership, firm or other entity contracted to perform the Work, regardless of the type of construction contract used, so that the term as used herein includes a Contractor or a Design-Build firm as well as a General or Prime Contractor. The contract documents refer to Contractor as if singular in number.

1.10 *Contract Sum* means the total compensation payable to the Contractor for completion of the Work in accordance with the terms of the contract.

1.11 *Contract Time* means the period between the Start Date identified in the Notice to Proceed with Construction and the Substantial Completion date identified in the Notice to Proceed or as subsequently amended by Change Order.

1.12 *Date of Commencement* means the date designated in the Notice to Proceed for the Contractor to commence the Work.

1.13 *Day* means a calendar day, unless otherwise specifically stipulated.

1.14 *Drawings* mean that product of the Architect/Engineer which graphically depicts the Work.

1.15 *Final Completion* means the date determined and certified by the Architect/Engineer and Owner on which the Work is fully and satisfactorily complete in accordance with the Contract.

1.16 *Owner* means Houston Community College, the State of Texas and any Agency of the State of Texas, acting through the responsible entity of Houston Community College identified in the Contract as the Owner.

1.17 *Owner's Designated Representative (ODR)* means the individual assigned by the Owner to act on its behalf, and to undertake certain activities as specifically outlined in the Contract. The ODR is the only party authorized to direct changes to the scope, cost, or time of the contract.

1.18 *Project* means all activities necessary for realization of the Work. This includes design, contract award(s), execution of the Work itself, and fulfillment of all contract and warranty obligations.

1.19 *Samples* means representative physical examples of materials, equipment or workmanship, used to confirm compliance with requirements and/or to establish standards for use in execution of the Work.

1.20 *Schedule of Values* means the detailed breakdown of the cost of the materials, labor and equipment necessary to accomplish the Work as described in the Contract Documents, submitted by Contractor for approval by Owner and Architect/Engineer.

1.21 *Shop Drawings* means the drawings, diagrams, illustrations, schedules, performance charts, brochures and other data prepared by the Contractor or its agents, which detail a portion of the Work.

1.22 *Site* means the geographical area of the location of the Work.

1.23 *Special Conditions* means the documents containing terms and conditions, which may be unique to the project. Special Conditions are a part of the Contract Documents and have precedence over the Uniform General Conditions.

1.24 *Specifications* means the written product of the Architect/Engineer that establishes the quality and/or performance of products utilized in the Work and processes to be used, including testing and verification for producing the Work.

1.25 *Subcontractor means* a business entity that enters into an agreement with the Contractor to perform part of the Work or to provide services, materials or equipment for use in the Work.

1.26 *Substantial Completion* means the date determined and certified by the Contractor, Architect/Engineer and Owner when the Work or a designated portion thereof is sufficiently complete, in accordance with the Contract, so as to be operational and fit for the use intended.

1.27 *Supplementary General Conditions* means procedures and requirements that modify the Uniform General Conditions. Supplementary General Conditions, when used, have precedence over the Uniform General Conditions.

1.28 *Unit Price Work* means Work or a portion of the Work paid for based on incremental units of measurement.

1.29 *Unilateral Change Order (ULCO)* means a Change Order issued by the Owner without the agreement of the Contractor.

1.30 *Work* means the administration, procurement, materials, equipment, construction and all services necessary for the Contractor, and/or its agents, to fulfill the Contractors obligations under the Contract.

Article 2. Laws Governing Construction

2.1. Environmental Regulations. The Contractor conducts activities in compliance with applicable laws and regulations and other requirements of the Contract relating to the environment, and its protection at all times. Unless otherwise specifically determined, the Owner is responsible for obtaining and maintaining permits related to stormwater run-off. The Contractor shall conduct operations consistent with stormwater run-off permit conditions. Contractor is responsible for all items it brings to site, including hazardous materials, and all such items brought to the site by its subcontractor and suppliers, or by other entities subject to direction of the Contractor. The Contractor shall not incorporate hazardous materials into the Work without prior approval of Owner, and shall provide an affidavit attesting to such in association with request for Substantial Completion inspection.

2.2. Wage Rates. The Contractor shall not pay less than the wage scale of the various classes of labor as shown on the "Prevailing Wage Schedule" provided by the Owner. The specified wage rates are minimum rates only. The Owner is not bound to pay any claims for additional compensation made by any Contractor because the Contractor pays wages in excess of the applicable minimum rate contained in the Contract. The "Prevailing Wage Schedule" is not a representation that qualified labor adequate to perform the Work is available locally at the prevailing wage rates.

2.2.1 Notification to Workers. The Contractor shall notify each worker, in writing, of the following as they commence work on the contract: the worker's job classification, the established minimum wage rate requirement for that classification, as well as the worker's actual wage. The notice must be delivered to and signed in acknowledgement of receipt by the employee and must list both the wages and fringe benefits to be paid or furnished for each classification in which the worker is assigned duties. When requested by the Owner, the Contractor shall furnish evidence of compliance with the Texas Prevailing Wage Law.

2.2.1.1 Submit a copy of each worker wage-rate notification to the ODR with the application for progress payment for the period during which the worker was engaged in activities on behalf of the project.

2.2.1.2 The "Prevailing Wage Schedule" is determined by the Owner in compliance with Tex. Gov't Code, Chapter 2258. Should the Contractor at any time become aware that a particular skill or trade not reflected on the Owner's Prevailing Wage Schedule will be or is being employed in the Work, whether by the Contractor or by a Subcontractor, the Contractor shall promptly inform the ODR of the proposed wage to be paid for the skill along with a justification for same. The Contractor is responsible for determining the most appropriate wage for a particular skill in relation to similar skills or trades identified on the Prevailing Wage

Schedule. In no case shall any worker be paid less than the wage indicated for Laborers.

2.2.1.3 Penalty for Violation. The Contractor and any Subcontractor will pay to the Owner a penalty of sixty dollars ($60) for each worker employed for each calendar day, or portion thereof, that the worker is paid less than the wage rates stipulated in the Prevailing Wage Schedule.

2.2.1.4 Complaints of Violations

2.2.1.4.1 Owner's Determination of Good Cause. Upon receipt of information concerning a violation of Tex. Gov't Code, Chapter 2258, the Owner will, within 31 days, make an initial determination as to whether good cause exists that a violation occurred. The Owner will send documentation of the initial determination to the Contractor against whom the violation was alleged, and to the worker involved. Upon making a good-cause finding, the Owner will retain the full amounts claimed by the claimant or claimants as the difference between wages paid and wages due under the Prevailing Wage Schedule and any supplements thereto, together with the applicable penalties, such amounts being subtracted from successive progress payments pending a final decision on the violation.

2.2.1.4.2 If the Contractor and claimant worker reach an agreement concerning the claim, the Contractor shall promptly notify the Owner in a written document countersigned by the worker.

2.2.1.4.3 Arbitration Required. If the violation is not resolved within 14 days following initial determination by the Owner, the Contractor and the claimant worker must participate in binding arbitration in accordance with the Texas General Arbitration Act, Tex. Civ. Prac. & Rev. Code, Chapter 171. For a period not to exceed 10 days, after which, if no agreement reached, a district court may be petitioned by any of the parties to the arbitration to appoint an arbitrator whose decision will be binding on all parties.

2.2.1.4.4 Arbitration Award. If an arbitrator assesses an award against the Contractor, the Contractor shall promptly furnish a copy of said award to the Owner. The Owner may use any amounts retained under Article 2.2.1.4.1 to pay the worker the amount as designated in the arbitration award. If the retained funds are insufficient to pay the worker in accordance with the arbitration award, the worker has a right of action against the Contractor, and/or the surety to receive the amount owed, plus attorneys' fees and court costs. The Owner has no duty to release any funds to either the claimant or the Contractor until it has received the notices of agreement or the arbitration award.

2.2.1.4.5 No Extension of Time. If the Owner's determination proves valid that good cause existed to believe a violation had occurred, the Contractor is not entitled to an extension of time for any delay arising directly or indirectly from of the arbitration procedures set forth herein.

2.3. Venue for Suits. The venue for any suit arising from this contract will be in a court of competent jurisdiction in Houston, Harris County, Texas, or as may otherwise designated in the Supplementary General Conditions.

2.4. Licensing of Trades. The Contractor shall comply with all applicable provisions of state law related to license requirements for skilled tradesmen, Contractors, suppliers

and or laborers, as necessary to accomplish the Work. In the event the Contractor, or one of its Subcontractors, loses its license during the term of performance of the Contract, the Contractor shall promptly hire or contract with a licensed provider of the service at no additional cost to the Owner.

2.5. Royalties, Patents & Copyrights. The Contractor shall pay all royalties and license fees, defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

2.6. State Sales and Use Taxes. The Owner qualifies for exemption from certain State and Local Sales and Use Taxes pursuant to the provisions of Tex. Tax Code, Chapter 151. The Contractor may claim exemption from payment of applicable State taxes by complying with such procedures as prescribed by the State Comptroller of Public Accounts. Owner is not required to reimburse Contractor for taxes paid on items that qualify for tax exemption.

Article 3. General Responsibilities of Owner & Contractor

3.1. Owner's General Responsibilities. The Owner is the entity identified as such in the Contract and referred to throughout the Contract Documents as if singular in number.

3.1.1 Preconstruction Conference. Prior to, or concurrent with, the issuance of Notice to Proceed with Construction, a conference will be convened for attendance by the Owner, Contractor, Architect/Engineer (AE) and appropriate Subcontractors. The purpose of the conference is to establish a working understanding among the parties as to the Work, the operational conditions at the project site, and general administration of the Project. Topics include communications, schedules, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, maintaining required records and all other matters of importance to the administration of the Project and effective communications between the project team members.

3.1.2 Owner's Designated Representative. Prior to the start of construction, Owner will identify the Owner's Designated Representative (ODR), who has the express authority to act and bind the Owner to the extent and for the purposes described in the various Articles of the Contract, including responsibilities for general administration of the Contract.

3.1.2.1 Unless otherwise specifically defined elsewhere in the contract documents, the ODR is the single point of contact between the Owner and Contractor. Notice to the ODR, unless otherwise noted, constitutes notice to the Owner under the Contract.

3.1.2.2 All directives on behalf of the Owner will be conveyed to the Contractor by the ODR in writing.

3.1.3 Owner Supplied Materials and Information.

3.1.3.1 The Owner will furnish to the Contractor those surveys describing the physical characteristics, legal description, limitations of the site, site utility locations, and other information used in the preparation of the Contract Documents.

3.1.3.2 The Owner will provide information, equipment, or services under the Owner's control to the Contractor with reasonable promptness.

3.1.4 Availability of Lands. The Owner will furnish, as indicated in the Contract, all required rights to use the lands upon which the Work occurs. This includes rights-of-way and easements for access and such other lands that are designated for use by the Contractor. The Contractor shall comply with all Owner identified encumbrances or restrictions specifically related to use of lands so furnished. The Owner will obtain and pay for easements for permanent structures or permanent changes in existing facilities, unless otherwise required in the Contract Documents.

3.1.5 Limitation on Owner's Duties

3.1.5.1 The Owner will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, technologies, sequences or procedures of construction or the safety precautions and programs incident thereto. The Owner is not responsible for any failure of Contractor to comply with laws and regulations applicable to the Work. The Owner is not responsible for the failure of Contractor to perform or furnish the Work in accordance with the Contract Documents. Owner is not responsible for the acts or omissions of Contractor, or any of its Subcontractor, suppliers or of any other person or organization performing or furnishing any of the Work on behalf of the Contractor.

3.1.5.2 The Owner will not take any action in contravention of a design decision made by the AE in preparation of the Contract Documents, when such actions are in conflict with statutes under which the AE is licensed for the protection of the public health and safety.

3.2 Role of Architect/Engineer. Unless specified otherwise in the Contract between the Owner and the Contractor, the AE shall provide general administration services for the Owner during the construction phase of the project. Written correspondence, requests for information, and shop drawings/submittals shall be directed to the AE for action. The AE has the authority to act on behalf of the Owner to the extent provided in the Contract Documents, unless otherwise modified by
written instrument, which will be furnished to the Contractor by the ODR, upon request.

3.2.1 Site Visits

3.2.1.1 The AE will make visits to the site at intervals as provided in the AE's contract agreement with the Owner, to observe the progress and the quality of the various aspects of Contractor's executed Work and report findings to the Owner.

3.2.1.2 The AE has the authority to interpret Contract Documents and inspect the Work for compliance and conformance with the Contract. Except as referenced in Article 3.1.5.2, the Owner retains the sole authority to accept or reject Work and issue direction for correction, removal, or replacement of Work.

3.2.2 Clarifications and Interpretations. It may be determined that clarifications or interpretations of the Contract Documents are necessary. Upon direction by the ODR such clarifications or interpretations will be provided by the AE consistent with the intent of the Contract Documents. The AE will issue these clarifications with reasonable promptness to the Contractor as Architect's Supplemental Instruction (ASI) or similar instrument. If the Contractor believes that such clarification or interpretation justifies an adjustment in the Contract Sum or the Contract Time, the Contractor shall so notify the Owner in accordance with the provisions of Article 11.

3.2.3 Limitations on Architect/Engineer Authority. The AE is not responsible for:

3.2.3.1 The Contractor's means, methods, techniques, sequences, procedures, safety, or programs incident to the Project nor will the AE supervise, direct, control or have authority over the same.

3.2.3.2 The Failure of Contractor to comply with laws and regulations applicable to the furnishing or performing the Work.

3.2.3.3 The Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

3.2.3.4 Acts or omissions of the Contractor, or of any other person or organization performing or furnishing any of the Work.

3.3 Contractor's General Responsibilities. The Contractor is solely responsible for implementing the Work in full compliance with all applicable laws and the contract documents and shall supervise and direct the Work using the best skill and attention to assure that each element of the Work conforms to the Contract requirements. The Contractor is solely responsible for all construction means, methods, techniques, safety, sequences, coordination and procedures. ***The Contractor is responsible for visiting the site and being familiar with local conditions such as the location, accessibility, and general character of the site and/or building*.**

3.3.1 Project Administration. The Contractor shall provide project administration for all Subcontractors, vendors, suppliers, and others involved in implementing the Work and shall coordinate administration efforts with those of the AE and ODR in accordance with these General Conditions and provisions of Division 1 Specifications, and as outlined in the Pre-construction Conference.

3.3.1.1 ***The Contractor shall furnish to the ODR one copy of the current edition of Means Facility Cost Data at no additional cost. This document shall be in either hard copy format or electronic CD, at option of the ODR.***

3.3.1.2 ***The Contractor shall furnish to the ODR one copy of the current edition of the "Rental Rate Blue Book for Construction Mobilization Costs" at no additional cost. This document shall be in either hard copy format or electronic CD, at option of the ODR.***

3.3.2 Contractor's Superintendent. Employ a competent resident superintendent who will be present at the Project Site during the progress of the Work. The superintendent is subject to the approval of the ODR. Do not change approved superintendents during the course of the project without the written approval of the ODR unless the superintendent leaves the employ of the Contractor.

3.3.3 Labor. Provide competent, suitably qualified personnel to survey, lay-out, and construct the Work as required by the Contract Documents. Maintain good discipline and order at the Site at all times.

3.3.4 Services, Materials, and Equipment. Unless otherwise specified, provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities, incidentals, and services necessary for the construction, performance, testing, start-up, inspection and completion of the Work.

3.3.5 Non-Compliant Work. Should the AE and/or the ODR identify Work as non-compliant with the Contract Documents, the ODR will communicate the finding to the Contractor and the Contractor will correct such Work at its expense. The approval of Work by either the AE or ODR does not relieve the Contractor from the obligation to comply with all requirements of the Contract Documents.

3.3.6 Subcontractors. Do not employ any Subcontractor, supplier or other person or organization, whether initially or as a substitute, against whom the Owner may have reasonable objection. The Owner will communicate such objections in writing. The Contractor is not required to employ any Subcontractor, supplier or other person or organization to furnish any of the work to whom the Contractor has reasonable objection. The Contractor will not substitute Subcontractors without the acceptance of the Owner.

3.3.6.1 All Subcontracts and supply contracts shall be consistent with and bound to the terms and conditions of the Contract Documents including provisions of the Agreement between the Contractor and the Owner.

3.3.6.2 The Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with the Contractor. Require all Subcontractors, suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with Owner only through the Contractor. Furnish to the Owner a copy of each first-tier subcontract promptly after its execution. The Contractor agrees that the Owner has no obligation to review or approve the content of such contracts and that providing the Owner such copies in no way relieves the Contractor of any of the terms and conditions of the Contract, including, without limitation, any provisions of the Contract which require the Subcontractor to be bound to the Contractor in the same manner in which the Contractor is bound to the Owner.

3.3.7 Continuing the Work. Carry on the Work and adhere to the progress schedule during all disputes, disagreements or alternative resolution processes with the Owner. Do not delay or postpone any Work because of the pending resolution of any disputes, disagreements or processes, except as the Owner and the Contractor may agree in writing.

3.3.8 Cleaning. At all times, keep the Site and the Work clean and free from accumulation of waste materials or rubbish caused by the construction activities under the Contract. The Contractor shall ensure that the entire Project is thoroughly cleaned prior to requesting Substantial Completion Inspection and, again, upon completion of the Project prior to the final inspection.

3.3.9 Acts and Omissions of Contractor, its Subcontractors and Employees. The Contractor is responsible for acts and omissions of his employees and all its Subcontractors, their agents and employees. The Owner may, in writing, require the Contractor to remove from the Project any of Contractor's or its Subcontractors employees that the ODR finds to be careless, incompetent, or otherwise objectionable.

3.3.10 Indemnification of Owner. The Contractor covenants and agrees to FULLY INDEMNIFY and HOLD HARMLESS, the Owner and the elected officials, employees, officers, directors, volunteers, and representatives of the Owner,

individually or collectively, from and against any and all costs, claims, liens, damages, losses, expenses, fees, fines, penalties, proceedings, actions, demands, causes of action, liability and suits of any kind and nature, including but not limited to, personal or bodily injury, death and property damage, made upon the Owner directly or indirectly arising out of, resulting from or related to Contractor's activities under this Contract, including any acts or omissions of Contractor, any agent, officer, director, representative, employee, consultant or the Subcontractor of Contractor , and their respective officers, agents, employees, directors and representatives while in the exercise of performance of the rights or duties under this Contract. The indemnity provided for in this paragraph does not apply to any liability resulting from the negligence of the Owner, officers or employees, separate Contractor s or assigned Contractors, in instances where such negligence causes personal injury, death or property damage. IN THE EVENT CONTRACTOR AND OWNER ARE FOUND JOINTLY LIABLE BY A COURT OF COMPETENT JURISDICTION, LIABILITY WILL BE APPORTIONED COMPARATIVELY IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS, WITHOUT WAIVING ANY GOVERNMENTAL IMMUNITY AVAILABLE TO THE STATE UNDER TEXAS LAW AND WITHOUT WAIVING ANY DEFENSES OF THE PARTIES UNDER TEXAS LAW.

3.3.10.1 The provisions of this Indemnification are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

3.3.10.2 Promptly advise the Owner in writing of any claim or demand against the Owner or the Contractor known to the Contractor related to or arising out of the Contractor's activities under this Contract.

3.3.11 Ancillary Areas. Operate and maintain operations and associated storage areas at the site of the Work in accordance with the following:

3.3.11.1 Confine all Contractor operations, including storage of materials and employee parking upon the Site of Work, to areas designated by the Owner.

3.3.11.2 The Contractor may erect, at its own expense, temporary buildings that will remain its property. Remove such buildings and associated utility service lines upon completion of the Work, unless the Contractor requests and the Owner provides written consent that it may abandon such buildings and utilities in place.

3.3.11.3 Use only established roadways or construct and use such temporary roadways as may be authorized by the Owner. Do not allow load limits of vehicles to exceed the limits prescribed by appropriate regulations or law. Provide protection to road surfaces, curbs, sidewalks, trees, shrubbery, sprinkler s, drainage structures and other like existing improvements to prevent damage and repair any damage thereto at the expense of the Contractor.

3.3.11.4 The Owner may restrict the Contractor's entry to the site to specifically assigned entrances and routes.

3.3.12 Separate Contracts. Additional Contractor responsibilities when the Owner awards separate Contracts

3.3.12.1 The Owner reserves the right to award other contracts in connection with other portions of the Project under these or similar contract conditions.

3.3.12.2 The Owner reserves the right to perform operations related to the Project with the Owner's own forces.

3.3.12.3 Under a separate contract, the conditions described herein continue to apply except as may be amended by change order.

3.3.12.4 ***The Contractor shall cooperate with other Contractors employed on the project by the Owner, including providing access to site and project information as requested.***

Article 4. Small Business (SB) Subcontracting Plan

4.1. General Description. The purpose of the Small Business (SB) Program is to promote equal business opportunities for economically disadvantaged businesses to contract with the HCC in accordance with the goals specified in HCC Small Business Requirements.

4.1.1 State agencies are required by statute to make a good faith effort to assist SBs in participating in contract awards issued by the State. 1 TAC §111.11-111.28, outline the state's policy to encourage outreach to and potential utilization of SBs in state contracting opportunities through race, ethnic and gender neutral means.

4.1.2 A Contractor who contracts with the HCC in an amount of $100,000 is required to make a good faith effort to award subcontracts to SBs in accordance with HCC Board policy by submitting a SB Subcontracting Plan at the time of bidding and complying with the SB Subcontracting Plan after it is accepted by the Owner and during the term of the contract.

4.2. Compliance with Approved SB Subcontracting Plan. Contractor, having been awarded this Contract in part by complying with the SB Program policies, hereby covenants to continue to comply with the SB Program as follows:

4.2.1 Prior to substituting a SB Subcontracting Plan the Contractor will promptly notify the Owner in the event a change is required for any reason; the Owner must approve and accept the substituted SB Subcontracting Plan.

4.2.2 Conduct the good faith effort activities required and provide the Owner with necessary documentation to justify approval of a change to the approved SB Subcontracting Plan.

4.2.3 Cooperate in the execution of a Change Order or such other approval of the change in the SB Subcontracting Plans as the Contractor and Owner may agree to.

4.2.4 Maintain and make available to Owner upon request business records documenting compliance with the accepted SB Subcontracting Plan.

4.2.5 Upon receipt of payment for performance of Work, submit to Owner a compliance report, in the format required by the Owner that demonstrates Contractor's performance of the SB Subcontracting Plan.

4.2.6 Promptly and accurately explain and provide supplemental information to Owner to assist in the Owner's investigation of the Contractor's good faith effort to fulfill the SB Subcontracting Plan and the requirements under 1 TAC §111.14.

4.3. Failure to Demonstrate Good Faith Effort. Upon a determination by Owner that Contractor has failed to demonstrate a good faith effort to fulfill the SB Subcontracting Plan or any contract covenant detailed above, the Owner may, in addition to all other remedies available to it, may bar the Contractor from future contracting opportunities with the Owner.

Article 5. Bonds & Insurance

5.1. Construction Bonds. The Contractor is required to tender to Owner, prior to commencing the Work, performance and payment bonds, as required by Tex. Gov't Code, Chapter 2253.

5.1.1. A Performance Bond is required if the Contract Price is in excess of $100,000. The Performance Bond is solely for the protection of the Owner. The Performance Bond is to be for the Contract Sum to guarantee the faithful performance of the Work in accordance with the Contract Documents. The form of the bond shall be approved by the bond approved by Attorney General of Texas. The Performance Bond shall be effective through the Contractor's warranty period.

5.1.2. A Payment Bond is required if the Contract Price is in excess of $25,000. The payment bond is to be for the Contract Sum and is payable to the Owner solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the Contractor or a Subcontractor. The form of the bond shall be the bond approved by the Attorney General of Texas.

5.1.3. Bond Requirements. Each bond shall be executed by a corporate surety or sureties authorized to do business in the State of Texas and acceptable to the Owner, on the Owner's form, and in compliance with the relevant provisions of the Texas Insurance Code. If any bond is for more than 10 percent of the surety's capital and surplus, the Owner may require certification that the company has reinsured the excess portion with one or more reinsurers authorized to do business in the State. A reinsurer may not reinsure for more than 10 percent of its capital and surplus. If a surety upon a bond loses its authority to do business in the State, the Contractor shall, within thirty (30) days after such loss, furnish a replacement bond at no added cost to the Owner.

5.1.4. Power of Attorney. Each bond shall be accompanied by a valid Power-of-Attorney (issued by the surety company and attached, signed and sealed with the corporate embosses seal, to the bond) authorizing the attorney in fact who signs the bond to commit the company to the terms of the bond, and stating any limit in the amount for which the attorney can issue a single bond.

5.1.5. Bond Indemnification. The process of requiring and accepting bonds and making claims thereunder shall be conducted in compliance with Tex. Gov't Code, Chapter 2253. IF FOR ANY REASON A STATUTORY PAYMENT OR PERFORMANCE BOND IS NOT HONORED BY THE SURETY, THE CONTRACTOR SHALL FULLY INDEMNIFY AND HOLD THE OWNER HARMLESS OF AND FROM ANY COSTS, LOSSES, OBLIGATIONS OR LIABILITIES IT INCURS AS A RESULT.

5.1.6. Furnishing Bond Information. Owner shall furnish certified copies of the payment bond and the related Contract to any qualified person seeking copies who complies with Tex. Gov't Code, §2253.026.

5.1.7. Claims on Payment Bonds. Claims on payment bonds must be sent directly to the Contractor and his surety in accordance with Tex. Gov't Code § 2253.041. All Payment Bond claimants are cautioned that no lien exists on the funds unpaid to the Contractor on such Contract, and that reliance on notices sent to the Owner may result in loss of their rights against the Contractor and/or his surety. The Owner is not responsible in any manner to a claimant for collection of unpaid bills, and accepts no such responsibility because of any representation by any agent or employee.

5.1.8. Payment Claims when Payment Bond not Required. The rights of Subcontractors regarding payment are governed by Tex. Prop. Code, §§ 53.231 – 53.239 when the value of the Contract between the Owner and the Contractor is less than $25,000.00. These provisions set out the requirements for filing a valid lien on funds unpaid to the Contractor as of the time of filing the claim, actions necessary to release the lien and satisfaction of such claim.

5.1.9 Sureties shall be listed on the US Department of the Treasury's Listing Approved Sureties stating companies holding Certificates of Authority as A-acceptable sureties on Federal Bonds and acceptable reinsuring companies (Department Circular 570).

5.2. Insurance Requirements.

The Contractor shall carry insurance in the types and amounts indicated in this Article for the duration of the Contract. The required insurance shall include coverage for Owner's property in the care, custody and control of Contractor prior to construction, during construction and during the warranty period. The insurance shall be evidenced by delivery to the Owner of certificates of insurance executed by the insurer or its authorized agent stating coverages, limits, expiration dates and compliance with all applicable required provisions. Upon request, the Owner, and/or its agents, shall be entitled to receive without expense, copies of the policies and all endorsements. The Contractor shall update all expired policies prior to submission for monthly payment. Failure to update policies shall be reason for withholding of payment until renewal is provided to the Owner.

5.2.1. The Contractor shall provide and maintain the insurance coverage with the minimum amounts described below until the end of the warranty period unless otherwise stated in Supplementary General Conditions. Failure to maintain insurance coverage, as required, is grounds for Suspension of Work for Cause pursuant to Article 14. The Contractor will be notified of the date on which the Builder's Risk insurance policy may be terminated through Substantial Completion Notices, Acceptance Notices and/or other means as deemed appropriate by the Owner.

5.2.2. Coverage shall be written on an occurrence basis by companies authorized and admitted to do business in the State of Texas and rated A- or better by A.M. Best Company or otherwise acceptable to Owner.

5.2.2.1. Insurance coverage required includes:

5.2.2.1.1. Workers' Compensation. Insurance with limits as required by the Texas Workers' Compensation Act, with the policy endorsed to provide a waiver of subrogation as to the Owner, Employer's Liability insurance of not less then:

$1,000,000 each accident

$1,000,000 disease each employee

$1,000,000 disease policy limit

5.2.2.1.2. Commercial General Liability Insurance. Including Independent Contractor's liability, Products and Completed Operations and Contractual Liability, covering, but not limited to, the liability assumed under the indemnification provisions of this contract, fully insuring Contractor's (or Subcontractors) liability for bodily injury and property damage with a combined bodily injury (including death) and property damage minimum limit of :

$1,000,000 per occurrence

$1,000,000 general aggregate

$1,000,000 products and completed operations aggregate

Coverage shall be on an "occurrence" basis.

The policy shall include coverage extended to apply to completed operations and explosion, collapse, underground hazards. The policy shall include endorsement CG2503 Amendment-Aggregate Limits of Insurance (Per Project) or its equivalent.

5.2.2.1.3. Asbestos Abatement Liability Insurance, including coverage for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos containing materials. *This requirement applies if the Work or the Project includes asbestos containing materials.

The Combined single limit for bodily injury and property damage will be a minimum of $1,000,000 per occurrence.

*Specific Requirement for Claims-Made Form: Required period of coverage will be determined by the following formula: Continuous coverage for life of the contract, plus one (1) year (to provide coverage for the warranty period), and an extended discovery period for a minimum of five (5) years which shall begin at the end of the warranty period.

If this contract is for asbestos abatement only, the All-Risk Builder's Risk or All-Risk Installation Floater (e) is not required.

5.2.2.1.4. Comprehensive Automobile Liability Insurance, covering owned, hired, and non-owned vehicles, with a combined bodily injury (including death) and property damage minimum limit of $1,000,000 per occurrence. No aggregate shall be permitted for this type of coverage.

Such insurance is to include coverage for loading and unloading hazards.

5.2.2.1.5. All Risk Builder’s Risk Insurance (or All Risk Installation Floater for instances in which the project involves solely the installation of equipment). Coverage shall be All-Risk, including, but not limited to, Fire, Extended Coverage, Vandalism and Malicious Mischief, Flood, Earthquake, Theft and damage resulting from faulty workmanship, design or materials. If Builder’s Risk, limit shall be equal to 100 percent of the contract. If Installation Floater, limit shall be equal to 100 percent of the contract cost. The policy shall be written jointly in the names of the Owner, the Contractor, Subcontractors and, Subsubcontractors shall be named as additional insured. The policy shall have endorsements as follows:

5.2.2.1.5.1. This insurance shall be specific as to coverage and not contributing insurance with any permanent insurance maintained on the property.

5.2.2.1.5.2. This insurance shall not contain an occupancy clause suspending or reducing coverage should the Owner occupy, or begin beneficial occupancy before the Owner has accepted final completion.

5.2.2.1.5.3. Loss, if any, shall be adjusted with and made payable to the Owner as Trustee for the insureds as their interests may appear; the right of subrogation under the Builder's Risk policy shall be waived as to the Owner. The Owner shall be named as Loss Payee. For renovation projects or projects that involve portions of work contained within an existing structure, refer to Special Conditions for possible additional Builder's Risk insurance requirements.

5.2.2.1.6. "Umbrella" Liability Insurance. The Contractor shall obtain, pay for and maintain umbrella liability insurance during the contract term, insuring the Contractor (or Subcontractor) for an amount of not less than amount specified in the Supplementary General Conditions or Special Conditions that provides coverage at least as broad as and applies in excess and follows form of the primary liability coverages required hereinabove. The policy shall provide "drop down" coverage where underlying primary insurance coverage limits are insufficient or exhausted.

If this contract is for asbestos abatement only, the "Umbrella" Excess Liability is not required

5.2.3. Policies must include the following clauses, as applicable:

5.2.3.1. This insurance shall not be canceled, materially changed, or non-renewed until after thirty (30) days prior written notice has been given to the Owner.

5.2.3.2. It is agreed that the Contractor's insurance shall be deemed primary with respect to any insurance or self insurance carried by the Owner for liability arising out of operations under the Contract with the Owner.

5.2.3.3. The Owner, its officials, directors, employees, representatives, and volunteers are added as additional insureds as respects operations and activities of, or on behalf of the named insured performed under contract with the Owner. The additional insured status must cover completed operations as well. This is not applicable to the workers' compensation policy.

5.2.3.4. The workers' compensation and employers' liability policy will provide a waiver of subrogation in favor of the Owner.

5.2.4. Without limiting any of the other obligations or liabilities of the Contractor, the Contractor shall require each Subcontractor performing work under the Contract, at the Subcontractor's own expense, to maintain during the term of the Contract, the same stipulated minimum insurance including the required provisions and additional policy conditions as shown above. As an alternative, the Contractor may include its Subcontractors as additional insured on its own coverage as prescribed under these requirements. The Contractor's certificate of insurance shall note in such event that the Subcontractors are included as additional insured's and that Contractor agrees to provide Workers' Compensation for the Subcontractors and their employees. The Contractor shall obtain and monitor

the certificates of insurance from each Subcontractor in order to assure compliance with the insurance requirements. The Contractor must retain the certificates of insurance for the duration of the Contract plus 5 years and shall have the responsibility of enforcing these insurance requirements among its Subcontractors. The Owner shall be entitled, upon request and without expense, to receive copies of these certificates.

5.2.5. Workers' Compensation Insurance Coverage must meet the statutory requirements of the Tex. Lab. Code, §401.011(44) and specific to construction projects for public entities as required by Tex. Lab. Code, §406.096.

A. Definitions:

Certificate of coverage ("certificate")- A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the project - includes the time from the beginning of the work on the project until the Contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons providing services on the project ("Subcontractor" in §406.096) - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent Contractors, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the Contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

E. The Contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) no later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The Contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The Contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The Contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the project, for the duration of the project;

(2) provide to the Contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) obtain from each other person with whom it contracts, and provide to the Contractor:

(a) a certificate of coverage, prior to the other person beginning work on the project; and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the governmental entity that all employees of the Contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the governmental entity to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

Article 6. Contract Documents

6.1. Drawings and Specifications

6.1.1 Copies Furnished. The Contractor will be furnished, free of charge, the number of complete sets of the Drawings and Specifications as provided in the Supplementary General Conditions or Special Conditions. Additional complete sets of Drawings and Specifications, if requested, will be furnished at reproduction cost to the one requesting such additional sets.

6.1.2 Ownership of Drawings and Specifications. All Drawings, Specifications and copies thereof furnished by the AE are to remain A/E's property. These documents are not to be used on any other project, and with the exception of one Contract set for each party to the Contract, are to be returned to the Architect/Engineer, upon request, following completion of the Work.

6.1.3 Interrelation of Documents. The Contract Documents as referenced in the Agreement between the Owner and the Contractor are complimentary, and what is required by one shall be as binding as if required by all.

6.1.4 Resolution of Conflicts in Documents. Where conflicts may exist between and/or within the Contract Documents, the higher quality, greater quantity, more restrictive, and/or more expensive requirement shall be ***required.*** The Contractor shall notify the AE and the ODR ***of any conflict before*** executing the work in question.

6.1.5 Contractor's Duty to Review Contract Documents. In order to facilitate its responsibilities for completion of the Work in accordance with and as reasonably inferable from the Contract Documents, prior to pricing or commencing the Work, the Contractor shall examine and compare the Contract Documents, information furnished by the Owner, relevant field measurements made by the Contractor and any visible or reasonably anticipated conditions at the site affecting the Work. This duty extends throughout the construction phase prior to commencing each particular work activity and/or installation.

6.1.6 Discrepancies and Omissions in Drawings and Specifications

6.1.6.1 ***The Owner does not warrant or make any representations as to the accuracy or completeness of the information furnished to the Contractor by the Owner.*** The Contractor shall promptly report to the ODR and to the AE the discovery of any apparent error, omission or inconsistency in the Contract Documents prior to execution of the Work.

6.1.6.2 It is recognized that the Contractor is not acting in the capacity of a licensed design professional, unless it is performing as a Design-Build firm.

6.1.6.3 It is further recognized that the Contractor's examination of contract documents is to facilitate construction and does not create an affirmative responsibility to detect errors, omissions or inconsistencies or to ascertain compliance with applicable laws, building codes or regulations, unless it is performing as a Design-Build firm or a Contractor.

6.1.6.4 When performing as a Design-Build firm, the Contractor has sole responsibility for discrepancies, errors, and omissions in the drawings and specifications.

6.1.6.5 When performing as a Contractor, the Contractor has a shared responsibility for discovery and resolution of discrepancies, errors, and omissions in the Contract Documents. In such case, the Contractor’s responsibility pertains to review, coordination, and recommendation of resolution strategies within budget constraints, but does not establish a liability for design.

6.1.6.6 The Contractor has no liability for errors, omissions, or inconsistencies unless the Contractor knowingly failed to report a recognized problem to the Owner or the Work is executed under a Design-Build or Contractor contract as outlined above. Should the Contractor fail to perform the examination and reporting obligations of these provisions, the Contractor is responsible for avoidable costs, direct, and/or consequential damages.

6.2 Requirements for Record Documents

Maintain at the Site one copy of all Drawings, Specifications, addenda, approved Submittals, Contract modifications, and all Project correspondence. Keep current and maintain Drawings and Specifications in good order with postings and markings to record actual conditions of Work and show and reference all changes made during construction. Provide Owner and AE access to these documents.

6.2.1 Maintain this record set of Drawings and Specifications which reflect the "As Constructed" conditions and representations of the Work performed, whether it be directed by addendum, Change Order or otherwise. Make available all records prescribed herein for reference and examination by the Owner and its representatives and agents.

6.2.2 Update the "As-Constructed" Drawings and Specifications monthly prior to submission of periodic partial pay estimates. Failure to maintain such records constitutes cause for denial of a progress payment otherwise due.

6.2.3 Prior to requesting Substantial Completion Inspection by the ODR and AE, furnish a complete set of the marked up “As-Constructed” set maintained at the site and one photocopy of same. Concurrently with furnishing these record drawings, furnish a preliminary copy of each operating and maintenance manual (O&M) required by the Contract Documents, for review by the AE and the ODR.

6.2.4 Once determined acceptable, provide one set of prints of professionally drafted “As-Constructed” drawings, along with electronic copy on CD, “As-Constructed” specifications in bound volume(s) along with electronic copy on CD, , four sets of operating and maintenance manuals and one electronic copy on CD, two sets of approved submittals, and other record documents as required elsewhere in the Contract Documents. ***All electronic copies shall be provided in a format acceptable to the ODR*.**

Article 7. Construction Safety

7.1. General. It is the duty and responsibility of the Contractor and all of its Subcontractors to be familiar with, enforce and comply with all requirements of Public Law 91-596, 29

U.S.C. §§651 et. seq., the Occupational Safety and Health Act of 1970, (OSHA) and all amendments thereto. The Contractor shall prepare a Safety Plan specific to the Project and submit it to the ODR and AE prior to commencing Work. In addition, the Contractor and all of its Subcontractors shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property to protect them from damage, injury or loss and erect and maintain all necessary

7.2. Notices. The Contractor shall provide notices as follows:

7.2.1 Notify owners of adjacent property including those that own or operate utility services and/or underground facilities, and utility owners, when prosecution of the Work may affect them or their facilities, and cooperate with them in the protection, removal, relocation and replacement, and access to their facilities and/or utilities.

7.2.2 Coordinate the exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in connection with laws and regulations. Maintain a complete file of MSDS for all materials in use on site throughout the construction phase and make such file available to the Owner and its agents as requested.

7.3. Emergencies. In any emergency affecting the safety of persons or property, the Contractor shall act to minimize, mitigate, and prevent threatened damage, injury or loss.

7.3.1 Have authorized agents of Contractor respond immediately upon call at any time of day or night when circumstances warrant the presence of Contractor to protect the Work or adjacent property from damage or to take such action pertaining to the Work as may be necessary to provide for the safety of the public.

7.3.2 Give the ODR and AE prompt notice of all such events.

7.3.3 If Contractor believes that any changes in the Work or variations from Contract Documents have been caused by its emergency response, promptly notify the Owner within 72 hours of the emergency response event.

7.3.4 Should Contractor fail to respond, Owner is authorized to direct other forces to take action as necessary and Owner may deduct any cost of remedial action from funds otherwise due the Contractor.

7.4. Injuries. In the event of an incident or accident involving outside medical care for an individual on or near the Work, Contractor shall notify the ODR and other parties as may be directed within twenty-four (24) hours of the event.

7.4.1 Record the location of the event and the circumstances surrounding it, by using photography or other means, and gather witness statements and other documentation which describes the event.

7.4.2 Supply the ODR and AE with an incident report no later than 36 hours after the occurrence of the event. In the event of a catastrophic incident (one fatality or three workers hospitalized), barricade and leave intact the scene of the incident until all investigations are complete. A full set of incident investigation

documents, including facts, finding of cause, and remedial plans shall be provided within one week after occurrence, unless otherwise directed by legal counsel. Contractor shall provide the ODR with written notification within one week of such catastrophic event if legal counsel delays submission of full report.

7.5. Environmental Safety. Upon encountering any previously unknown potentially hazardous material, or other materials potentially contaminated by hazardous material, Contractor shall immediately stop work activities impacted by the discovery, secure the affected area, and notify the ODR immediately.

7.5.1 Bind all Subcontractors to the same duty.

7.5.2 Upon receiving such notice, the ODR will promptly engage qualified experts to make such investigations and conduct such tests as may be reasonably necessary to determine the existence or extent of any environmental hazard. Upon completion of this investigation, the ODR will issue a written report to the Contractor identifying the material(s) found and indicate any necessary steps to be taken to treat, handle, transport or dispose of the material.

7.5.3 The Owner may hire third-party Contractors to perform any or all such steps.

7.5.4 Should compliance with the ODR's instructions result in an increase in the Contractor's cost of performance, or delay the Work, the Owner will make an equitable adjustment to the Contract price and/or the time of completion, and modify the Contract in writing accordingly.

7.6. Trenching Plan. When the project requires excavation which either exceeds a depth of four feet, or results in any worker's upper body being positioned below grade level, the Contractor is required to submit a trenching plan to the ODR prior to commencing trenching operations. The plan is required to be prepared and sealed by a professional engineer registered in the State of Texas, and employed by the Contractor. Said engineer cannot be anyone who is otherwise either directly or indirectly engaged on this project.

Article 8. Quality Control

8.1. Materials & Workmanship. The Contractor shall execute Work in a good and workmanlike matter in accordance with the Contract Documents. The Contractor shall develop and provide a Quality Control Plan specific to this project and acceptable to the Owner. Where Contract Documents do not specify quality standards, complete and construct all Work in compliance with generally accepted construction industry standards. Unless otherwise specified, incorporate all new materials and equipment into the Work under the Contract.

8.2. Testing

8.2.1 Contractor Testing. The Contractor is responsible for coordinating and paying for all routine and special tests required to confirm compliance with quality and performance requirements of the Contract Documents. This "quality control" testing shall include any particular testing required by the Specifications and the following general tests.

8.2.1.1. Any test of basic material or fabricated equipment included as part of a submittal for a required item in order to establish compliance with the Contract Documents.

8.2.1.2 Any test of basic material or fabricated equipment offered as a substitute for a specified item on which a test may be required in order to establish compliance with the Contract Documents.

8.2.1.3 Routine, preliminary, start-up, pre-functional and operational testing of building equipment and s as necessary to confirm operational compliance with requirements of the Contract Documents.

8.2.1.4 All subsequent tests on original or replaced materials conducted as a result of prior testing failure.

8.2.2 Owner Testing. The Owner reserves the right to subject materials and s incorporated into the Project to routine tests as may be specified or as deemed necessary by the ODR or the AE to ensure compliance with the quality and/or performance requirements of the Contract Documents and/or with laws, ordinances, rules, regulations and/or orders of any public authority having jurisdiction. The results of such "quality assurance" testing will be provided to the Contractor and, to the extent provided, the Contractor may rely on findings.

8.2.3 All testing shall be performed in accordance with standard test procedures by an accredited laboratory, or special consultant as appropriate, acceptable to the Owner. Results of all tests shall be provided promptly to the ODR, Architect/Engineer and the Contractor.

8.2.4 Non-Compliance (Test Results). Should any of the tests indicate that a material and/or does not comply with the contract requirements, the burden of proof remains with the Contractor, subject to:

8.2.4.1 Contractor selection and submission of the laboratory for Owner acceptance.

8.2.4.2 Acceptance by the Owner of the quality and nature of tests.

8.2.4.3 All tests taken in the presence of the Architect/Engineer and/or ODR, or their representatives.

8.2.4.4 If tests confirm that the material/s comply with Contract Documents, the Owner will pay the cost of the test.

8.2.4.5 If tests reveal noncompliance, the Contractor will pay those laboratory fees and costs of that particular test and all future tests, of that failing Work, necessary to eventually confirm compliance with Contract Documents.

8.2.4.6 Proof of noncompliance with the Contract Documents will make the Contractor liable for any corrective action which the ODR determines appropriate, including complete removal and replacement of noncompliant work or material.

8.2.5 Notice of Testing. The Contractor shall give the ODR and the AE timely notice of its readiness and the date arranged so the ODR and AE may observe such inspection, testing or approval.

8.2.6 Test Samples. The Contractor is responsible for providing samples of sufficient size for test purposes and for coordinating such tests with their Work Progress Schedule to avoid delay.

8.2.7 Covering Up Work - If the Contractor covers up any Work without providing the Owner an opportunity to inspect, the Contractor shall, if requested by ODR, uncover and recover the work at Contractor's expense.

8.3 Submittals

8.3.1 Contractor's Submittals. Submit with reasonable promptness consistent with the Project Schedule and in orderly sequence all Shop Drawings, Samples, or other information required by the Contract Documents, or subsequently required by Change Order. Prior to submitting, the Contractor shall review each submittal for compliance with Contract Documents and certify by approval stamp affixed to each copy. Submittal data presented without the Contractor's certification will be returned without review or comment, and any delay resulting from such certification is the Contractor's responsibility.

8.3.1.1 Within twenty-one (21) calendar days of the effective date of the Notice To Proceed with construction, submit to the ODR, and the AE, a submittal schedule/register, organized by specification section, listing all items to be furnished for review and approval by the Architect/Engineer and Owner. The list shall include shop drawings, manufacturer's literature, certificates of compliance, materials samples, materials colors, guarantees, and all other items identified throughout the specifications.

8.3.1.2 Indicate the type of item, contract requirements reference, and Contractor's scheduled dates for submitting the item along with the requested dates for approval answers from the Architect/Engineer and Owner. The submittal register shall indicate the projected dates for procurement of all included items and shall be updated at least monthly with actual approval and procurement dates. Show and allow a minimum of thirty (30) calendar days duration after receipt by the Architect/Engineer and ODR for review and approval. If re-submittal is required, allow a minimum of an additional fifteen (15) calendar days for review. Submit the updated submittal register with each request for progress payment. The Owner may establish routine review procedures and schedules for submittals at the preconstruction conference and/or elsewhere in the Contract Documents. ***Failure to update and provide the submittal schedule/register as required shall constitute cause for Owner to withhold payment otherwise due.***

8.3.1.3 Coordinate the submittal register with the Work Progress Schedule. Do not schedule Work requiring a submittal to begin prior to scheduling review and approval of the related submittal. Revise and/or update both schedules monthly to ensure consistency and current project data. Provide to the ODR the updated submittal register and schedule with each application for progress payment. Refer to requirements for the Work Progress Schedule for inclusion of procurement activities therein. Regardless, the submittal register shall identify dates submitted and returned and shall be used to confirm status and disposition of particular items submitted, including approval or other action taken and other information not conveniently tracked through the Work Progress Schedule.

8.3.1.4 By submitting Shop Drawings, Samples or other required information, the Contractor represents and certifies that they have determined and verified all applicable field measurements, field construction criteria, materials, catalog numbers and similar data; and has checked and coordinated each Shop Drawing and Sample with the requirements of the Work and the Contract Documents.

8.3.2 Review of Submittals. AE and ODR review is only for conformance with the design concept and the information provided in the Contract Documents. Responses to submittals will be in writing. The approval of a separate item does

not indicate approval of an assembly in which the item functions. The approval of a submittal does not relieve the Contractor of responsibility for any deviation from the requirements of the Contract unless the Contractor informs the AE and ODR of such deviation in a clear, conspicuous, and written manner on the submittal transmittal and at the time of submission, and obtains the Owner's written specific approval of the particular deviation.

8.3.3 Correction and Resubmission. Make any corrections required to a submittal and resubmit the required number of corrected copies promptly so as to avoid delay, until submittal approval. Direct attention in writing to the AE and the ODR, when applicable, to any new revisions other than the corrections requested on previous submissions.

8.3.4 Limits on Shop Drawing Approvals. The Contractor shall not commence any Work requiring a submittal until approval of the submittal. Construct all such work in accordance with approved submittals. Approval of Shop Drawings and Samples is not authorization to Contractor to perform extra work or changed work unless authorized through a Change Order. The AE's and ODR's approval, if any, does not relieve Contractor from responsibility for defects in the Work resulting from errors or omissions of any kind on the submittal, regardless of any approval action.

8.3.5 No Substitutions Without Approval. The ODR and the AE may receive and consider the Contractor's request for substitution when the Contractor agrees to reimburse the Owner for review costs and satisfies 8.3.5.1, 8.3.5.2, and 8.3.5.3 in combination with one or more of the items in 8.3.5.4 through 8.3.5.11 of the following conditions, as determined by the Owner. If the Contractor does not satisfy these conditions, the ODR and AE will return the request without action except to record noncompliance with these requirements. The Owner will not consider the request if the Contractor cannot provide the product or method because of failure to pursue the Work promptly or coordinate activities properly.

8.3.5.1 The Contract Documents do not require extensive revisions.

8.3.5.2 Proposed changes are in keeping with the general intent of the Contract Documents and the design intent of the AE and do not result in an increase in cost to the Owner.

8.3.5.3 The request is timely, fully documented, and properly submitted.

8.3.5.4 The Contractor cannot provide the specified product, assembly or method of construction within the Contract Time.

8.3.5.5 The request directly relates to an "or-equal" clause or similar language in the Contract Documents.

8.3.5.6 The request directly relates to a "product design standard" or "performance standard" clause in the Contract Documents.

8.3.5.7 The requested substitution offers the Owner a substantial advantage in cost, time, energy conservation or other considerations, after deducting additional responsibilities the Owner must assume.

8.3.5.8 The specified product or method of construction cannot receive necessary approval by an authority having jurisdiction, and the ODR can approve the requested substitution.

8.3.5.9 The Contractor cannot provide the specified product, assembly or method of construction in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.

8.3.6 Unauthorized Substitutions at Contractor's Risk. The Contractor is financially responsible for any additional costs or delays resulting from using materials, equipment or fixtures other than those specified. The Contractor shall reimburse the Owner for any increased design or contract administration costs resulting from such unauthorized substitutions.

8.4 Field Mock-up

8.4.1 Mockups shall be constructed prior to commencement of a specified scope of work to confirm acceptable workmanship.

8.4.1.1 As a minimum, field mock-ups shall be constructed for roofing s, exterior veneer / finishes, glazing, and any other Work requiring a mock-up as identified throughout the Contract Documents. Mockups for s not part of the project scope shall not be required.

8.4.1.2 Mock-ups may be incorporated into the Work if allowed by the Contract Documents and if acceptable to the ODR. If mock-ups are freestanding, they shall remain in place until otherwise directed by the Owner.

8.4.1.3 The Contractor shall include field mock-ups in their Work Progress Schedule and shall notify the ODR and Architect/Engineer of readiness for review sufficiently in advance to coordinate review without delay.

8.5 Inspection During Construction

8.5.1 The Contractor shall provide sufficient, safe, and proper facilities, including equipment as necessary for safe access, at all reasonable times for observation and/or inspection of the Work by the Owner and its agents.

8.5.2 The Contractor shall not cover up any work with finishing materials or other building components prior to providing the Owner and its agents an opportunity to perform an inspection of the Work.

8.5.2.1 Should corrections of the Work be required for approval, do not cover up corrected Work until the Owner indicates approval.

8.5.2.2 Provide notification of at least five (5) working days or otherwise as mutually agreed, to the ODR of the anticipated need for a cover up inspection. Should the ODR fail to make the necessary inspection within the agreed period, the Contractor may proceed with cover up Work, but is not relieved of responsibility for Work to comply with requirements of the Contract Documents.

Article 9. Project Scheduling Requirements

9.1. Contract Time. TIME IS AN ESSENTIAL ELEMENT OF THE CONTRACT. The Contract Time is the time between the dates indicated in the Notice to Proceed for commencement of the Work and for achieving Substantial Completion and Final Completion. The Contract Time can be modified only by Change Order.

Failure to achieve Substantial Completion within the Contract Time, Final Completion within thirty (30) days following Substantial Completion or as otherwise agreed to in writing will cause damage to the Owner and may subject the Contractor to Liquidated Damages as provided in the Contract Documents.

9.2. Notice to Proceed. The Owner will issue a Notice to Proceed which shall state the dates for beginning Work and for achieving Substantial Completion and Final Completion of the Work.

9.3. Work Progress Schedule. Refer to Special Conditions and Division 1 General Administration Specifications for additional schedule requirements. ***This Article pertains to construction phase schedules. Additional requirements for design phase scheduling for*** Contractor ***and Design Build contracts are outlined in Division 1 Project Planning and Scheduling Specification***. Unless indicated otherwise in those documents, Contractor shall submit their initial Work Progress Schedule for the Work in relation to the entire Project not later than twenty-one (21) days after the effective date of the Notice to Proceed to the ODR and the AE. Unless otherwise indicated in the Contract Documents, the Work Progress Schedule shall be computerized Critical Path Method (CPM) with full reporting capability. This initial schedule shall indicate the dates for starting and completing the various aspects required to complete the Work, including mobilization, procurement, installation, testing, inspection, and acceptance of all the Work of the Contract. When acceptable to the Owner, the initially accepted schedule shall be the Baseline Schedule for comparison to actual conditions throughout the contract duration.

9.3.1 Schedule Requirements. Submit electronic and paper copy of the initial Work Progress Schedule reflecting accurate and reliable representations of the planned progress of the Work, the Work to date if any, and of the Contractor's actual plans for its completion. Organize and provide adequate detail so the Schedule is capable of measuring and forecasting the effect of delaying events on completed and uncompleted activities.

9.3.1.1 Re-submit initial Schedule as required to address review comments from AE and ODR until such Schedule is accepted as the Baseline Schedule.

9.3.1.2 Submittal of a schedule, schedule revision or schedule update constitutes the Contractor's representation to the Owner of the accurate depiction of all progress to date and that the Contractor will follow the schedule as submitted in performing the Work.

9.3.2 Schedule Updates. Update the Work Progress Schedule and the Submittal Schedule monthly, as a minimum, to reflect progress to date and current plans for completing the Work, and submit paper and electronic copy of the update to the AE and ODR as directed. The Owner has no duty to make progress payments unless accompanied by the updated Work Progress Schedule. Show the anticipated date of completion reflecting all extensions of time granted through Change Order as of the date of the update. The Contractor may revise the Progress Schedule logic only with the Owner's concurrence when in the Contractor's judgment it becomes necessary for the management of the Work. Identify all proposed changes to schedule logic to Owner and to the AE via an Executive Summary accompanying the updated schedule for review prior to implementation of revisions.

9.3.3 The Work Progress Schedule is for the Contractor's use in managing the Work and submittal of the Schedule, and successive updates or revisions, is for the information of the Owner and to demonstrate that the Contractor has complied with requirements for planning the Work. The Owner's acceptance of a schedule, schedule update or revision constitutes the Owner's agreement to

coordinate its own activities with the Contractor's activities as shown on the schedule.

9.3.3.1 Acceptance of the Work Progress Schedule, or update and/or revision thereto does not indicate any approval of the Contractor's proposed sequences and duration.

9.3.3.2 Acceptance of a Work Progress Schedule update or revision indicating early or late completion does not constitute the Owner's consent, alter the terms of the Contract, or waive either the Contractor's responsibility for timely completion or the Owner's right to damages for the Contractor's failure to do so.

9.3.3.3 The Contractor's scheduled dates for completion of any activity or the entire Work do not constitute a change in terms of the contract. Change Orders are the only method of modifying the completion Date(s) and Contract time.

9.4. Ownership of Float. Unless indicated otherwise in the Contract Documents, the Contractor shall develop the schedule and their execution plan to provide a minimum of 10 percent total float at the project level at acceptance of the Baseline Schedule. Float time contained in the Work Progress Schedule is not for the exclusive benefit of the Contractor or the Owner, but belongs to the Project and may be consumed by either party as needed on a first-used basis.

9.5. Completion of Work. The Contractor is accountable for completing the Work in the time stated in the Contract, or as otherwise amended by Change Order.

9.5.1 If, in the judgment of the Owner, the work is behind schedule and the rate of placement of work is inadequate to regain scheduled progress to insure timely completion of the entire work or a separable portion thereof, the Contractor, when so informed by the Owner, shall immediately take action to increase the rate of work placement by:

9.5.1.1 An increase in working forces.

9.5.1.2 An increase in equipment or tools.

9.5.1.3 An increase in hours of work or number of shifts.

9.5.1.4 Expedite delivery of materials.

9.5.1.5 Other action proposed if acceptable to Owner.

9.5.2 Within ten (10) calendar days after such notice from the ODR, the Contractor shall notify the ODR in writing of the specific measures taken and/or planned to increase the rate of progress. Include an estimate as to the date of scheduled progress recovery and an updated Work Progress Schedule illustrating the Contractor's plan for achieving timely completion of the project. Should the ODR deem the plan of action inadequate, take additional steps or make adjustments as necessary to its plan of action until it meets with the ODR's approval.

9.6 Modification of the Contract Time

9.6.1 Delays and extension of time as hereinafter described are valid only if executed in accordance with provisions set forth in Article 11.

9.6.2 When a delay defined herein as excusable prevents the Contractor from completing the Work within the Contract Time, the Contractor is entitled to an extension of time. The Owner will make an equitable adjustment and extend the number of calendar days lost because of excusable delay, as measured by the Contractor's progress schedule. All extensions of time will be granted in

calendar days. In no event, however, will an extension of time be granted for delays that merely extend the duration of non-critical activities, or which only consume float without delaying the project completion date.

9.6.2.1 "A Weather Day" is a day on which the Contractor's current schedule indicates Work is to be done, and on which inclement weather and related site conditions prevent the Contractor from performing seven continuous hours of Work between the hours of 7:00 a.m. and 6:00 p.m. Weather days are excusable delays. When weather conditions at the site prevent work from proceeding, immediately notify the ODR for confirmation of the conditions. At the end of each calendar month, submit to the ODR and AE a list of Weather Days occurring in that month along with documentation of the impact on critical activities. Based on confirmation by the ODR, any time extension granted will be issued by Change Order. If the Contractor and Owner cannot agree on the time extension, the Owner may issue a ULCO for fair and reasonable time extension.

9.6.2.2 Excusable Delay. The Contractor is entitled to an equitable adjustment of time, issued via change order, for delays caused by the following:

9.6.2.2.1 Errors, omissions and imperfections in design which the AE corrects by means of changes in the drawings and specifications.

9.6.2.2.2 Unanticipated physical conditions at the Site which the AE corrects by means of changes to the drawings and specifications or for which the ODR directs changes in the Work identified in the Contract Documents.

9.6.2.2.3 Changes in the Work that effect activities identified in the Contractor's schedule as "critical" to completion of the entire Work, if such changes are ordered by the ODR or the AE.

9.6.2.2.4 Suspension of Work for unexpected natural events (sometimes called "acts of God"), civil unrest, strikes or other events which are not within the reasonable control of the Contractor.

9.6.2.2.5 Suspension of Work for convenience of the ODR, which prevents Contractor from completing the Work within the Contract Time.

9.6.3 The Contractor's relief in the event of such delays is the time impact to the critical path as determined by analysis of the Contractor's schedule. In the event that the Contractor incurs additional direct costs because of the delay, they are to be determined pursuant to the provisions of Article 11.

9.7 **No Damages for Delay. The Contractor has no claim for monetary damages for delay or hindrances to the work from any cause except when the delay is solely caused by the Owner.**

9.8 Concurrent Delay. When the completion of the Work is simultaneously delayed by an excusable delay and a delay arising from a cause not designated as excusable, the Contractor may not be entitled to a time extension for the period of concurrent delay

9.9 Other Time Extension Requests. Time extensions requested in association with changes to the Work directed or requested by the Owner shall be included with the Contractor's proposed costs for such change. Time extensions requested for inclement weather are covered by paragraph 9.6.2.1 above. If the Contractor believes that the completion of the Work is delayed by a circumstance other than for changes directed to the Work or weather, they shall give the ODR written notice, stating the nature of the delay and the activities potentially affected, within five (5) calendar days after the onset of the event or circumstance giving rise to the excusable delay. Provide sufficient

written evidence to document the delay. In the case of a continuing cause of delay, only one ***notice of delay*** is necessary. State claims for extensions of time in numbers of whole or half calendar days.

9.9.1 Within ten (10) calendar days after the cessation of the delay, the Contractor shall formalize its request for extension of time in writing to include a full analysis of the schedule impact of the delay and substantiation of the excusable nature of the delay. All Changes to the Contract Time or made as a result of such claims is by Change Order, as set forth in Article 11.

9.9.2 No extension of time releases the Contractor or the Surety furnishing a performance or payment bond from any obligations under the contract or such a bond. Those obligations remain in full force until the discharge of the Contract.

9.9.3 Contents of Time Extension Requests. Provide with each Time Extension Request a quantitative demonstration of the impact of the delay on project completion time, based on the Work Progress Schedule. Include with Time Extension Requests a reasonably detailed narrative setting forth:

9.9.3.1 The nature of the delay and its cause; the basis of the Contractor's claim of entitlement to a time extension.

9.9.3.2 Documentation of the actual impacts of the claimed delay on the critical path indicated in the Contractor's Work Progress Schedule, and any concurrent delays.

9.9.3.3 Description and documentation of steps taken by the Contractor to mitigate the effect of the claimed delay, including, when appropriate, the modification of the Work Progress Schedule.

9.9.4 Owner's Response. The Owner will respond to the Time Extension Request by providing to the Contractor written notice of the number of days granted, if any, and giving its reason if this number differs from the number of days requested by the Contractor.

9.9.4.1 The Owner will not grant time extensions for delays that do not affect the Contract Completion Date.

9.9.4.2 The Owner will respond to each properly submitted Time Extension Request within fifteen (15) calendar days following receipt. If the Owner cannot reasonably make a determination about the Contractor's entitlement to a time extension within that time, the Owner will notify the Contractor in writing. Unless otherwise agreed by the Contractor, the Owner has no more than fifteen (15) additional calendar days to prepare a final response. If the Owner fails to respond within forty-five (45) calendar days from the date the Time Extension Request is received, the Contractor is entitled to a time extension in the amount requested.

9.10 Failure to Complete Work Within the Contract Time. **TIME IS OF THE ESSENSE OF THIS CONTRACT.** The Contractor's failure to substantially complete the Work within the Contract Time or to achieve final completion as required will cause damage to the Owner. These damages may be liquidated by agreement of the Contractor and the Owner, as set forth in the Contract Documents.

9.11 Liquidated Damages. The Owner may collect Liquidated Damages due from the Contractor directly or indirectly by reducing the contract sum in the amount of Liquidated Damages stated in the Contract Documents.

Article 10. Payments

10.1. Schedule of Values. The Contractor shall submit to the ODR and the AE for acceptance a Schedule of Values, or Work Breakdown, accurately itemizing material and labor for the various classifications of the Work based on the organization of the specification sections and using the same activity names and terms as the Work Progress Schedule. The accepted Schedule of Values will be the basis for the progress payments under the Contract.

10.1.1 No progress payments will be made prior to receipt and acceptance of the Schedule of Values, provided in such detail as required by the ODR, and submitted not less than twenty-one calendar (21) days prior to the first request for payment. The Schedule of Values shall follow the order of trade divisions of the specifications and include costs for general conditions, fees, contingencies, and Owner cash allowances, if applicable, so that the sum of the items will equal the contract price. As appropriate, assign each item labor and/or material values, the subtotal thereof equaling the value of the work in place when complete.

10.1.2 The Contractor shall retain a copy of all worksheets used in preparation of its bid or proposal, supported by a notarized statement that the worksheets are true and complete copies of the documents used to prepare the bid or proposal. Make the worksheets available to the ODR at the time of Contract execution. Thereafter grant the Owner during normal business hours access to said notarized copy of worksheets at any time during the period commencing upon execution of the Contract and ending one year after final payment.

10.2. Progress Payments. The Contractor will receive periodic progress payments for Work performed, materials in place, suitably stored on site, or as otherwise agreed to by the Owner and the Contractor. Payment is not due until receipt by the ODR or his designee of a correct and complete Pay Application in electronic and/or hard copy format as set forth in Supplementary General Conditions, Special Conditions or Division 1 Specifications, and certified by the AE. Progress payments are made provisionally and do not constitute acceptance of work not in accordance with the Contract Documents. The Owner will not process progress payment applications for Change Order work until all parties execute the Change Order.

10.2.1 Preliminary Pay Worksheet once each month that a progress payment is to be requested, the Contractor shall submit to the Architect/Engineer and the ODR a complete, clean copy of a preliminary pay worksheet or Preliminary Pay Application, to include the following:

10.2.1.1 The Contractor estimate of the amount of Work performed, labor furnished and materials incorporated into the Work, using the established Schedule of Values.

10.2.1.2 An updated Work Progress Schedule including the Executive Summary and all required schedule reports.

10.2.1.3 SB Subcontracting Plan reports.

10.2.1.4 Such additional documentation as Owner may require as set forth in the Supplementary General Conditions or elsewhere in the Contract Documents.

10.2.2 Contractor's Application for Progress Payment. As soon as practicable, but in no event later than seven days after receipt of the Preliminary Pay Worksheet, the AE and ODR will meet with the Contractor to review the Preliminary Pay Worksheet and to observe the condition of the Work. Based on this review, the ODR and the AE may require modifications to the Preliminary Pay Worksheet prior to the submittal of an application for progress payment, and will promptly notify the Contractor of revisions necessary for approval. As soon as practicable, the

Contractor shall submit its Invoice on the appropriate and completed form, reflecting the required modifications to the Schedule of Values required by the AE and/or ODR. Attach all additional documentation required by the ODR and/or AE, as well as an affidavit affirming that all payrolls, bills for labor, materials, equipment, subcontracted work and other indebtedness connected with the Contractor's invoice are paid or will be paid within the time specified in Tex. Gov't Code, Chapter 2251. No invoice is complete unless it fully reflects all required modifications, and attaches all required documentation including the Contractor's affidavit.

10.2.3 Certification by Architect/Engineer. Within five days or earlier following the AE's receipt of the Contractor's formal invoice, the AE will review the application for progress payment for completeness, and forward to the ODR. The AE will certify that the application is complete and payable, or that it is incomplete, stating in particular what is missing. If the Invoice is incomplete, the Contractor shall make the required corrections and resubmit the Invoice for processing.

10.3 Owner's Duty to Pay. The Owner has no duty to pay the Contractor except on receipt by the ODR of; 1) a complete Invoice certified by the AE and 2) the Contractor's updated Work Progress Schedule, and 3) confirmation that the Contractor's as-built documentation at the site is kept current.

10.3.1 Payment for stored materials and/or equipment confirmed by the Owner and AE to be on-site or otherwise properly stored may be limited to 85 percent of the invoice price or 85 percent of the scheduled value for the materials or equipment, whichever is less.

10.3.2 Retainage. The Owner will withhold from each progress payment, as retainage, 5 percent of the total earned amount, the amount authorized by law, or as otherwise set forth in the Supplementary General Conditions. Retainage is managed in conformance with Tex. Gov't Code, Chapter 2252, Government Code, subchapter B.

10.3.2.1 The Contractor shall provide written consent of its Surety for any request for reduction or release of retainage.

10.3.2.2 At least sixty-five (65) percent of the total Contract must be completed before the Owner can consider a retainage reduction or release.

10.3.3 Price Reduction to Cover Loss. The Owner may reduce any Periodic Invoice, or application for Progress Payment, prior to payment to the extent necessary to protect the Owner from loss on account of actions of the Contractor including, but not limited to:

10.3.3.1 Defective or incomplete Work not remedied.

10.3.3.2 Damage to Work of a separate Contractor.

10.3.3.3 Failure to maintain scheduled progress or reasonable evidence that the Work will not be completed within the Contract Time.

10.3.3.4 Persistent failure to carry out the Work in accordance with the Contract Documents.

10.3.3.5 Reasonable evidence that the Work cannot be completed for the unpaid portion of the contract sum.

10.3.3.6 Assessment of fines for violations of Prevailing Wage Rate law; or

10.3.3.7 Failure to include the appropriate amount of retainage for that periodic progress payment.

10.3.4 Title to all material and Work covered by progress payments transfers to the Owner upon payment.

10.3.4.1 Transfer of title to Owner does not relieve the Contractor of the sole responsibility for the care and protection of materials and Work upon which payments have been made until final acceptance of the entire Work, or the restoration of any damaged Work, or waive the right of the Owner to require the fulfillment of all the terms of the Contract.

10.4 Progress payments to the Contractor do not release the Contractor or its surety from any obligations under this Contract.

10.4.1 Upon the Owner's request, the Contractor shall furnish proof of the status of Subcontractor's accounts in a form acceptable to the Owner.

10.4.2 Pay estimate certificates must be signed by a corporate officer or a representative duly authorized by the Contractor.

10.4.3 Provide copies of bills of lading, invoices, delivery receipts or other evidence of the location and value of such materials in requesting payment for materials.

10.4.4 For purposes of Tex. Gov't Code § 2251.021 (a) (2), the date the performance of service is complete is the date when the Owner's representative approves the application for payment.

10.5 Off-Site Storage. With prior approval by the Owner and in the event Contractor elects to store materials at an off-site location, abide by the following conditions, unless otherwise agreed to in writing by the Owner.

10.5.1 Store materials in a Bonded Commercial Warehouse.

10.5.2 Provide separate Insurance Coverage adequate not only to cover materials while in storage, but also in transit from the off-site storage areas to the project site. Copies of duly authenticated Certificates of Insurance, made out to insure the State Agency which is signatory to the contract, must be filed with the Owner's representative.

10.5.3 Inspection by Owner's representative is allowed at any time. The Owner's Inspectors must be satisfied with the security, control, maintenance, and preservation measures.

10.5.4 Materials for this project are physically separated and marked for the project in a sectioned-off area. Only materials which have been approved through the submittal process are to be considered for payment.

10.5.5 Owner reserves the right to reject materials at any time prior to final acceptance of the complete Contract if they do not meet Contract requirements regardless of any previous progress payment made.

10.5.6 With each monthly payment estimate, submit a report to the ODR, AE, and Inspector listing the quantities of materials already paid for and still stored in the off-site location.

10.5.7 Make warehouse records, receipts and invoices available to Owner's representatives, upon request, to verify the quantities and their disposition.

10.5.8 In the event of Contract termination or default by Contractor, the items in storage off-site, upon which payment has been made, will be promptly turned over to Owner or Owner's agents at a location near the jobsite as directed by the ODR. The full provisions of Performance and Payment Bonds on this project cover the materials off-site in every respect as though they were stored on the Project Site.

Article 11. Changes

11.1. Change Orders. A Change Order issued after execution of the Contract is a written order to the Contractor, signed by the ODR, the Contractor, and the Architect/Engineer, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time can only be changed by Change Order. A Change Order signed by the Contractor indicates his agreement with it, including the adjustment in the Contract Sum and/or the Contract Time. The ODR may issue written authorization for the Contractor to proceed with work of a change order in advance of final execution by all parties. ***In the absence of an agreement with the Contractor on a Change Order, the Owner may issue a Unilateral Change Order that will have the full force and effect of a contract modification. The issuance of a Unilateral Change Order does not prejudice the Contractor's rights to make claims or to appeal disputed matters under terms of the Contract.***

11.1.1 The Owner, without invalidating the Contract, ***and without approval of the Contractor's Surety,*** may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, and the Contract Sum and the Contract Time will be adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract, an equitable adjustment shall be made and confirmed in writing in a Change Order.

11.1.2 The parties acknowledge that the specifications and drawings may not be complete or free from errors, omissions or imperfections and that they may require changes or additions in order for the work to be completed to the satisfaction of Owner. Therefore, and notwithstanding any other provisions in this Contract, the parties agree that any errors, omissions or imperfections in the specifications and drawings, or any changes in or additions to them or to the work ordered by Owner and any resulting delays in the work or increases in Contractor's costs and expenses, shall not constitute or give rise to any claim, demand or cause of action of any nature whatsoever in favor of Contractor, whether for breach of contract, *quantum meruit*, or otherwise; provided, however, that Owner shall be liable to Contractor for the sum stated to be due Contractor in any Change Order approved and signed by both parties. The parties agree that the Change Order sum, together with any extension of time contained in the Change Order, shall constitute full compensation to Contractor for all costs, expenses and damages to Contractor, whether direct, consequential or otherwise that are incident to, arise out of, or result directly or indirectly from or indirectly from the work performed by Contractor under such Change Order.

11.1.3 Procedures for administration of Change Orders shall be established by the Owner and stated in Supplementary General Conditions, Special Conditions, or elsewhere in the Contract Documents.

11.1.4 Except as provided above, no order, oral statement, or direction of the Owner or his duly appointed representative shall be treated as a change under this article or entitle the Contractor to an adjustment.

11.1.5 The Contractor agrees that the Owner or any of its duly authorized representatives shall have access and the right to examine any directly pertinent books, documents, papers, and records of the Contractor. Further, the Contractor agrees to include in all its subcontracts a provision giving the Owner or any of its duly authorized representative's access to and the right to

examine any directly pertinent books, documents, papers and records of any Subcontractor relating to any claim arising from this Contract, whether or not the Subcontractor is a party to the claim. The right of access and examination described herein shall continue for the duration of any claims brought under the Disputes article of the Contract, litigation, or the settlement of claims arising out of the performance of this Contract until final disposition of such claims, appeals or litigation.

11.2. Unit Prices: The Contract Documents may require the Contractor to provide certain work or materials on the basis of unit prices. If the quantity originally contemplated in determining any unit price is ***materially*** changed such that application of the agreed unit price to the actual quantity of work required will cause substantial inequity to the Owner or the Contractor, the applicable unit price shall be equitably adjusted as provided in the Special Conditions or as agreed to by the parties and incorporated into Change Order.

11.3. Claims for Additional Costs

11.3.1 The Contractor shall provide written notice to the Owner and the Architect/Engineer within twenty-one (21) days of the occurrence of any event or the discovery of any condition that the Contractor claims will cause an increase in the Contract Sum or Contract Time that is not related to a requested change. The Contractor shall not proceed with any work for which it will assert a claim for additional cost or time before providing the written notices, except for emergency situations governed by Article 7.3. Failure to provide the required notices is sufficient grounds for rejecting any claim for an increase in the Contract Sum or the Contract Time arising from the event or the condition. Any adjustment in the Contract Sum or Contract Time for any additional Work shall be authorized by Change Order.

11.3.2 The notice provisions of Article 11.3.1 apply to, but are not limited to, any claims for additional cost or time brought by the Contractor as a result of: 1) any written interpretation of the Contract Documents, 2) any order by the Owner to stop the Work pursuant to Article 14 where the Contractor was not at fault, or 3) any written order for a minor change in the Work issued pursuant to Article 11.4.

11.3.3 Should the Contractor or his Subcontractors fail to call attention of the AE to obvious discrepancies or omissions in the Bid/Proposal Documents during the pre-bid/pre-proposal period, but claim additional costs for corrective work after contract award, the Owner may assume intent to circumvent competitive bidding for necessary corrective work. In such case, the Owner may choose to let a separate contract for the corrective work, or issue a Unilateral Change Order to require performance by the Contractor. Claims for time extensions or for extra cost resulting from delayed notice of contract document discrepancies or omissions will not be considered by the Owner.

11.4. Minor Changes. The AE, with concurrence of the ODR, will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time. Such changes shall be effected by written order which the Contractor shall carry out promptly and record on as-built record documents.

11.5. Concealed Site Conditions. If, in the performance of the Contract, subsurface, latent or concealed conditions at the site are found to be materially different from the information included in the bid/proposal documents, or if unknown conditions of an unusual nature are disclosed differing materially from the conditions usually inherent in work of the character shown and specified, the ODR and the Architect/Engineer shall be notified in writing of such conditions before they are disturbed. Upon such notice, or upon its own observation of such conditions, the Architect/Engineer, with the approval of the ODR, will promptly make such changes in the Drawings and Specifications as they

deem necessary to conform to the different conditions, and any increase or decrease in the cost of the Work, or in the time within which the Work is to be completed, resulting from such changes will be adjusted by Change Order, subject to the prior approval of the ODR.

11.6. Extension of Time. All Changes to the Contract Time shall be made as a consequence of requests as required under Article 9.6, and as documented by Change Order as provided under Article 11.1.

11.7. Administration of Change Order Requests

All changes in the Contract shall be administered in accordance with procedures approved by the Owner, and when required make use of such electronic information management (s) as the owner may employ.

11.7.1 Routine changes in the Construction Contract shall be formally initiated by the Architect/Engineer by means of a Change Request form detailing requirements of the proposed change for pricing by the Contractor. This action may be preceded by communications between the Contractor, AE and ODR concerning the need and nature of the change, but such communications shall not constitute a basis for beginning the proposed Work by the Contractor. Except for emergency conditions described below, approval of the Contractor's cost proposal by the Architect/Engineer and ODR will be required for authorization to proceed with the Work being changed. The Owner will not be responsible for the cost of work changed without prior approval and the Contractor may be required to remove work so installed.

11.7.2 Any unexpected circumstance which necessitates an immediate change in order to avoid a delay in progress of the Work may be expedited by verbal communication and authorization between the Contractor and Owner, with written confirmation following within twenty-four (24) hours. A limited scope not-to-exceed estimate of cost and time will be requested prior to authorizing Work to proceed. Should the estimate be impractical for any reason, the ODR may authorize the use of detailed cost records of such work to establish and confirm the actual costs and time for documentation in a formal Change Order.

11.7.3 Emergency changes to save life or property may be initiated by the Contractor alone (see Article 7.3) with the claimed cost and/or time of such work to be fully documented as to necessity and detail of the reported costs and/or time.

11.7.4 The method of incorporating approved changes into the parameters of the accepted Schedule of Values must be coordinated and administered in a manner acceptable to the ODR.

11.8. Pricing Change Order Work

11.8.1 All proposed costs for change order work must be supported by itemized accounting of material, equipment and associated itemized installation costs in sufficient detail, following the outline and organization of the established Schedule of Values, to permit analysis by the AE and ODR using current estimating guides and/or practices.

11.8.1.1 Photocopies of Subcontractor and vendor proposals shall be furnished unless specifically waived by the ODR.

11.8.1.2 Contractor shall provide written response to change request within twenty-one (21) calendar days of receipt.

11.8.1.3 If the parties cannot agree on an equitable adjustment for labor hours attributable to a change, they shall use the Means Facility Cost Data as a guide for labor hours as a basis of negotiation.

11.8.1.4 If the parties cannot agree on an equitable adjustment for equipment rental charges attributable to a change, they shall use the Rental Rate Blue Book for Construction Mobilization as a basis of negotiation.

11.8.2 The amounts that the Contractor and/or its Subcontractors add to a Change Order for profit and overhead will also be considered by the Owner before approval is given. The amounts established hereinafter are the maximums that are acceptable to the Owner.

11.8.2.1 For work performed by its forces, the Contractor will be allowed their actual costs for materials, the total amount of wages paid for labor, the total cost of Federal Old Age Benefit (Social Security Tax) and of Worker's Compensation and Comprehensive General Liability Insurance, plus Bond cost if the change results in an increase in the Bond premium paid by the Contractor. To the total of the above costs, the Contractor will be allowed to add a percentage as noted below to cover overhead and profit combined. Overhead shall be considered to include insurance other than mentioned above, field and office supervisors and assistants, including safety and scheduling personnel, use of small tools, incidental job burdens and general Home Office expenses, and no separate allowance will be made therefore. Allowable percentages for overhead and profit on changes will not exceed 15 percent if the total of self-performed work is less than or equal to $10,000, 10 percent if the total of self-performed work is between $10,000 and $20,000 and 7.5 percent if the total of self-performed work is over $20,000, for any specific change priced.

11.8.2.1.1 On contracts based on a Guaranteed Maximum Price (GMP), the Contractor or Design Build Firm shall NOT be entitled to a percentage mark-up on any change order work unless the Change Order increases the Guaranteed Maximum Price.

11.8.2.2 For subcontracted Work each affected Subcontractor shall figure its costs, overhead and profit as described above for Contractor's work, all Subcontractor costs shall be combined, and to that total Subcontractor cost the Contractor will be allowed to add a maximum mark-up of 10 percent if the total of all subcontracted work is less than or equal to $10,000, 7.5 percent if the total of all subcontracted work is between $10,000 and $20,000 and 5 percent if the total of all Subcontractor work is over $20,000.

11.8.2.3 On changes involving both additions and deletions, percentages for overhead and profit will be allowed only on the net addition. The Owner does not accept and will not pay for additional contract cost identified as indirect, consequential, or as damages caused by delay.

Article 12. Project Completion and Acceptance

12.1. Closing Inspections

12.1.1 Substantial Completion Inspection. When the Contractor considers the entire Work or part thereof Substantially Complete, it shall notify the ODR in writing that the Work will be ready for Substantial Completion Inspection on a specific

date. The Contractor shall include with this notice the Contractors Punchlist to indicate that it has previously inspected all the Work associated with the request for inspection, has corrected items where possible, and includes all items scheduled for completion or correction prior to final inspection. The failure to include any items on this list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. If any of the items on this list prevents the building from the use to which it is intended, the Contractor shall not request a Substantial Completion Inspection. The Owner and its representatives will review the list of items and schedule the requested inspection, or inform the Contractor in writing that such an inspection is premature because the Work is not sufficiently advanced or conditions are not as represented on the Contractor's list.

12.1.1.1 Prior to the Substantial Completion Inspection, the Contractor shall furnish a copy of its marked-up As-Built Drawings and a preliminary copy of each instructional manual, maintenance and operating manual, parts catalog, wiring diagrams, spare parts, specified written warranties and like publications or parts for all installed equipment, s and like items. Delivery of these items is a prerequisite for requesting the Substantial Completion Inspection.

12.1.1.2 On the date requested by Contractor, or as mutually agreed upon, the AE, ODR, the Contractor and other Owner representatives as determined by the Owner, will jointly attend the Substantial Completion Inspection, which shall be conducted by the ODR or their delegate. If the ODR ***concurs with the AE and Contractor in a determination***–that the Work is Substantially Complete, the ODR will issue a Certificate of Substantial Completion to be signed by the AE, Owner and Contractor, establishing the date of Substantial Completion ***and identifying responsibilities for security, maintenance, and insurance***. AE will provide with this certificate a list of punchlist items (the Pre-Final Punchlist) for completion prior to final inspection. This list may include items in addition to those on the Contractor's punchlist, which the inspection team deems necessary to correct or complete prior to Final Inspection. If the Owner occupies the facility upon determination of Substantial Completion, the Contractor shall complete all corrective Work at the convenience of the Owner, without disruption to Owner's use of the facility for its intended purposes.

12.1.2 Final Inspection. The Contractor shall complete the list of items identified on the Pre-Final Punchlist prior to requesting a Final Inspection. Unless otherwise specified, or otherwise agreed in writing by the parties as documented on the Certificate of Substantial Completion, the Contractor shall complete and/or correct all Work within thirty (30) days of the Substantial Completion date. Upon completion of the Pre-Final Punchlist work, the Contractor shall give written notice to the ODR and AE that the Work will be ready for Final Inspection on a specific date. The Contractor shall accompany this notice with a copy of the updated Pre-Final Punchlist indicating resolution of all items. On the date specified or as soon thereafter as is practicable, the ODR, AE and the Contractor will inspect the Work. The AE will submit to the Contractor a Final Punchlist of open items that the inspection team requires corrected or completed before final acceptance of the Work.

12.1.2.1 Correct or complete all items on the Final Punchlist before requesting Final Payment. Unless otherwise agreed to in writing by the parties, complete this work within seven (7) days of receiving the Final

Punchlist. Upon completion of the Final Punchlist, notify the AE and ODR in writing stating the disposition of each Final Punchlist item. The AE, Owner and Contractor shall promptly inspect the completed items. When the Final Punchlist is complete, and the Contract is fully satisfied according to the Contract Documents the ODR will issue a certificate establishing the date of Final Completion. Completion of all Work is a condition precedent to the Contractor's right to receive Final Payment.

12.1.3 Annotation. Any Certificate issued under this Article may be annotated to indicate that it is not applicable to specified portions of the Work, or that it is subject to any limitation as determined by the Owner.

12.1.4 Purpose of Inspection. Inspection is for determining the completion of the Work, and does not relieve the Contractor of its overall responsibility for completing the Work in a good and competent fashion, in compliance with the Contract. Work accepted with incomplete punchlist items or failure of the Owner or other parties to identify Work that does not comply with the Contract Documents or is defective in operation or workmanship does not constitute a waiver of the Owner's rights under the Contract or relieve the Contractor of its responsibility for performance or warranties.

12.1.5 Additional Inspections

12.1.5.1 If the Owner's inspection team determines that the Work is not Substantially Complete at the Substantial Completion Inspection, the ODR or AE will give the Contractor written notice listing cause(s) of the rejection. The ***Contractor*** will set a time for completion of incomplete or defective work ***as acceptable to the ODR***. Complete or correct all work so designated prior to requesting a second Substantial Completion Inspection.

12.1.5.2 If the Owner's inspection team determines that the Work is not complete at the Final Inspection, the ODR or the AE will give the Contractor written notice listing the cause(s) of the rejection. The ***Contractor*** will set a time for completion of incomplete or defective work ***as acceptable to the ODR***. The Contractor shall complete or correct all Work so designated prior to again requesting a Final Inspection.

12.1.5.3 The Contract Agreement contemplates three (3) comprehensive inspections: the Substantial Completion Inspection, the Final Completion Inspection, and the Inspection of Completed Final Punchlist Items. The cost to the Owner of additional inspections resulting from the Work not being ready for one or more of these inspections is the responsibility of the Contractor. The Owner may issue a Unilateral Change Order deducting these costs from Final Payment. Upon the Contractor's written request, the Owner will furnish documentation of any costs so deducted. Work added to the Contract by Change Order after Substantial Completion Inspection is not corrective work for purposes of determining timely completion, or assessing the cost of additional inspections.

12.1.6 Phased Completion. The contract may provide, or project conditions may warrant, as determined by the ODR, that designated elements or parts of the Work be completed in phases. Where phased completion is required or specifically agreed to by the parties, the provisions of the contract related to Closing Inspections, Occupancy and Acceptance apply independently to each designated element or part of the Work. For all other purposes, unless

otherwise agreed by the parties in writing, Substantial Completion of the Work as a whole is the date on which the last element or part of the Work completed receives a Substantially Completion certificate. Final Completion of the Work as a whole is the date on which the last element or part of the Work completed receives a Final Completion certificate ***or notice***.

12.2 Owner's Right of Occupancy. The Owner may occupy or use all or any portion of the Work following Substantial Completion, or at any earlier stage of completion. Should the Owner wish to use or occupy the Work, or part thereof, prior to Substantial Completion, the ODR will notify the Contractor in writing ***and identify responsibilities for security, maintenance, and insurance***. Work performed on the premises by third parties on the Owner's behalf does not constitute occupation or use of the Work by the Owner for purposes of this Article. All Work performed by the Contractor after occupancy, whether in part or in whole, shall be at the convenience of the Owner so as to not disrupt Owner's use of, or access to occupied areas of the project.

12.3 Acceptance & Payment

12.3.1 Request for Final Payment. Following the certified completion of all work, including all punch list items, cleanup, and the delivery of record documents, the Contractor shall submit a certified Application for Final Payment that includes all sums held as retainage and forward to the AE and the ODR for review and approval.

12.3.2 Final Payment Documentation. Prior to or with the Application for Final Payment, Contractor shall submit final copies of all close out documents, maintenance and operating instructions, guarantees and warranties, certificates, record documents and all other items required by the Contract. Submit Consent of Surety to Final Payment and an affidavit that all payrolls, bills for materials and equipment, subcontracted work and other indebtedness connected with the Work, except as specifically noted, are paid, will be paid, or otherwise satisfied within the period of time required by Tex. Gov't Code, Chapter 2251. Furnish documentation establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of claims and liens arising out of the Contract. The Contractor may not subsequently submit a claim on behalf of a Subcontractor or vendor unless the Contractor's affidavit notes that claim as an exception.

12.3.3 Architect/Engineer Approval. The AE will review a submitted Application for Final Payment promptly but in no event later than ten (10) days after its receipt. Prior to the expiration of this deadline, the AE will either 1) return the Application for Final Payment to Contractor with corrections for action and resubmission or 2) accept it, note their approval and send to Owner.

12.3.4 Offsets and Deductions. The Owner may deduct from the Final Payment all sums due from the Contractor. If the Certificate of Final Completion notes any Work remaining, incomplete, or defects not remedied, the Owner may deduct the cost of remedying such deficiencies from the Final Payment. On such deductions, the Owner will identify each deduction, the amount, and the explanation of the deduction on or by the 21st day after Owner's receipt of an approved Application for Final Payment. Such offsets and deductions shall be incorporated via a final Change Order, including Unilateral Change Order as may be applicable.

12.3.5 Final Payment Due. Final Payment is due and payable by the Owner, subject to all allowable offsets and deductions, on the 31st day following the Owner's approval of the Application for Payment. If the Contractor disputes any amount deducted by the Owner, the Contractor shall give notice of the dispute on or

before the thirtieth (30th) day following receipt of Final Payment. Failure to do so will bar any subsequent claim for payment of amounts deducted.

12.3.6 Effect of Final Payment. Final Payment constitutes a waiver of all claims by the Owner, relating to the condition of the Work except those arising from:

12.3.6.1 Faulty or defective Work appearing after Substantial Completion (latent defects); and/or

12.3.6.2 Failure of the Work to comply with the requirements of the Contract Documents; and/or

12.3.6.3 Terms of any warranties required by the Contract, or implied by law; and/or

12.3.6.4 Claims arising from personal injury or property damage to third parties.

12.3.7 Waiver of Claims. ***Submission of an Application for*** Final Payment ***by the Contractor*** constitutes a waiver of all claims and liens by the Contractor except those specifically identified in writing and submitted to the ODR prior to the application for Final Payment.

12.3.8 Effect on Warranty. Regardless of approval and issuance of Final Payment, the Contract is not deemed fully performed by the Contractor and closed until the expiration of all warranty periods.

Article 13. Warranty & Guarantee

13.1. Contractor's General Warranty and Guarantee. Contractor warrants to the Owner that all Work is executed in accordance with the Contract, complete in all parts and in accordance with approved practices and customs, and of the best finish and workmanship. The Contractor further warrants that unless otherwise specified, all materials and equipment incorporated in the Work under the Contract are new. The Owner may, at its option, agree in writing to waive any failure of the Work to conform to the Contract, and to accept a reduction in the Contract Price for the cost of repair or diminution in value of the Work by reason of such defect. Absent such a written agreement, the Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute and is not waived by any inspection or observation by the Owner, Architect/Engineer or others, by making any progress payment or final payment, by the use or occupancy of the Work or any portion thereof by the Owner, at any time, or by any repair or correction of such defect made by the Owner.

13.2. Warranty Period. Except as may be otherwise specified or agreed, the Contractor shall repair all defects in materials, equipment, or workmanship appearing within one year from the date of Substantial Completion of the Work. ***If less than all of the Work is accepted as substantially complete (Partial Substantial Completion), the warranty period for the Work accepted begins on the date of Partial Substantial Completion, or as otherwise stipulated on the Certificate of Partial Substantial Completion for the Work***.

13.3 Limits on Warranty. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

13.3.1 Modification or improper maintenance or operation by persons other than Contractor, Subcontractors, or any other individual or entity for whom Contractor is not responsible, unless Owner is compelled to undertake maintenance or operation due to the neglect of the Contractor.

13.3.2 Normal wear and tear under normal usage after acceptance of the Work by the Owner.

13.4 Events Not Affecting Warranty. Contractor's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

13.4.1 Observations by Owner and/or AE.

13.4.2 Recommendation to pay any progress or final payment by AE.

13.4.3 The issuance of a certificate of Substantial Completion or any payment by Owner to Contractor under the Contract Documents.

13.4.4 Use or occupancy of the Work or any part thereof by Owner.

13.4.5 Any acceptance by Owner or any failure to do so.

13.4.6 Any review of a Shop Drawing or sample submittal; or

13.4.7 Any inspection, test or approval by others.

13.5 Separate Warranties. If a particular piece of equipment or component of the Work for which the contract requires a separate warranty is placed in continuous service before Substantial Completion, the Warranty Period for that equipment or component will not begin until Substantial Completion, regardless of any warranty agreements in place between suppliers and/or Subcontractors and the Contractor. The ODR will certify the date of service commencement in the Substantial Completion Certificate.

13.5.1 In addition to the Contractor's warranty and duty to repair, the Contractor expressly assumes all warranty obligations required under the Contract for specific building components, s and equipment.

13.5.2 The Contractor may satisfy any such obligation by obtaining and assigning to the Owner a complying warranty from a manufacturer, supplier, or Subcontractor. Where an assigned warranty is tendered and accepted by the Owner which does not fully comply with the requirements of the Contract, the Contractor remains liable to the Owner on all elements of the required warranty not provided by the assigned warranty.

13.6 Correction of Defects. Upon receipt of written notice from the Owner, or any agent of the Owner designated as responsible for management of the Warranty Period, of the discovery of a defect, the Contractor shall promptly remedy the defect(s), and provide written notice to the Owner and designated agent indicating action taken. In case of emergency where delay would cause serious risk of loss or damage to the Owner, or if the Contractor fails to remedy within 30 days, or within another period agreed to in writing, the Owner may correct the defect and be reimbursed the cost of remedying the defect from the Contractor or its Surety.

13.7 Certification of No Asbestos Containing Materials or Work. The Contractor shall ensure compliance with the Asbestos Hazard Emergency Response Act (AHERA– 40 CFR 763-99 (7)) from all Subcontractors and materials suppliers, and shall provide a notarized certification to the Owner that all equipment and materials used in fulfillment of their contract responsibilities are non Asbestos Containing building Materials (ACBM). This certification must be provided no later than the Contractor's application for Final Payment.

Article 14. Suspension and Termination

14.1. Suspension of Work for Cause. The Owner may, at any time without prior notice, suspend all or any part of the Work if the Owner determines it is necessary to do so to prevent or correct any condition of the Work which constitutes an immediate safety hazard or which may reasonably be expected to impair the integrity, usefulness or longevity of the Work when completed.

14.1.1 The Owner will give the Contractor a written notice of suspension for cause, setting forth the reason for the suspension and identifying the Work suspended. Upon receipt of the notice, the Contractor shall immediately cease all activities related to the identified Work. As soon as practicable following the issuance of a suspension notice, the Owner will conduct an investigation into the circumstances giving rise to the suspension, and issue a written determination of the findings.

14.1.2 If the cause of the suspension is due to actions or omissions within the control of the Contractor, the Contractor will not be entitled to an extension of time for delay resulting from the suspension. If the cause of the suspension is something not within the control of the Contractor and the suspension will prevent the Contractor from completing the Work within the Contract Time, the suspension is an Excusable Delay and a Time Extension will be granted through a Change Order.

14.1.3 Suspension of work under this provision will be no longer than is reasonably necessary to remedy the conditions giving rise to the suspension.

14.2. Suspension of Work for Owner's Convenience. Upon seven (7) calendar days written notice to the Contractor, the Owner may at any time without breach of the Contract suspend all or any portion of the Work for its own convenience. Upon resumption of the Work, if the suspension prevents the Contractor from completing the Work within the Contract Time, it is an Excusable Delay. A notice of suspension for convenience may be modified by the Owner at any time on seven

(7) calendar days written notice to the Contractor. If the Owner suspends the Work for its convenience for more than 60 consecutive calendar days, the Contractor may elect to terminate the contract pursuant to the provisions of the contract.

14.3. Termination by Owner for Cause

14.3.1 ***Upon thirty (30) days written notice to the Contractor and its Surety,*** the Owner may, without prejudice to any right or remedy, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, under any of the following circumstances:

14.3.1.1 Persistent or repeated failure or refusal, except during complete or partial suspensions of work authorized under the Contract, to supply enough properly skilled workmen or proper materials; and/or

14.3.1.2 Persistent disregard of laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, including the ODR; and/or

14.3.1.3 Persistent failure to prosecute the work in accordance with the Contract, and to insure its completion within the time, or any approved extension thereof, specified in this Contract; and/or

14.3.1.4 Failure to remedy defective work condemned by the ODR; and/or

14.3.1.5 Failure to pay Subcontractors, laborers, and material suppliers pursuant to Tex. Gov't Code Chapter 2251; and/or

14.3.1.6 Persistent endangerment to the safety of labor or of the Work; and/or

14.3.1.7 Failure to supply or maintain statutory bonds or to maintain required insurance, pursuant to the contract; and/or

14.3.1.8 Any material breach of the Contract; and/or

14.3.1.9 The Contractor's insolvency, bankruptcy, or demonstrated financial inability to perform the work.

14.3.2 Failure by the Owner to exercise the right to terminate in any instance is not a waiver of the right to do so in any other instance.

14.3.3 Upon receipt of a termination notice, the Contractor or its Surety has thirty days to cure the reasons for the termination or demonstrate to the satisfaction of the Owner that it is prepared to remedy to the condition(s) upon which the notice of termination was based. If the Owner is satisfied that the Contractor or its Surety can remedy the reasons for the termination and complete the Work as required, the notice of termination shall be rescinded in writing by the Owner and the Work shall continue without an extension of time.

14.3.4 If at the conclusion of the thirty day cure period the Contractor or its Surety is unable to demonstrate to the satisfaction of the Owner its ability to remedy the reasons for termination, the Owner may ***immediately terminate the employment of the Contractor***, make alternative arrangements for completion of the Work and deduct the cost of completion from the unpaid Contract Sum.

14.3.4.1 Recoverable costs include additional Owner expenses for items such as AE services, other consultants, and contract administration.

14.3.5 The Owner will make no further payment to the Contractor or its Surety until all costs of completing the Work are paid. If the unpaid balance of the Contract Sum exceeds the costs of administering and finishing the Work, the Contractor will receive the excess funds. If costs of completing the Work exceed the unpaid balance, the Contractor or its Surety will pay the difference to the Owner.

14.3.5.1 This obligation for payment survives the termination of the Contract.

14.3.6 The owner reserves the right in termination for cause to take assignment of all contracts between the Contractor and its Subcontractors, vendors and suppliers. The ODR will promptly notify the Contractor of the contracts the Owner elects to assume. Upon receipt of such notice, the Contractor shall promptly take all steps necessary to effect such assignment.

14.4 Termination for Convenience of Owner. Upon written notice to the Contractor and the AE, the Owner may, without breach, terminate the Contract for any reason.

14.4.1 The notice will specify the reason for and the effective date of contract termination. The notice may also contain instructions necessary for the protection, storage or decommissioning of incomplete work or s, and for safety.

14.4.2 Upon receipt of the notice of termination, the Contractor shall immediately proceed with the following obligations:

14.4.2.1 Stop all work.

14.4.2.2 Place no further subcontracts or orders for materials or services.

14.4.2.3 Terminate all subcontracts.

14.4.2.4 Cancel all materials and equipment orders as applicable.

14.4.2.5 Take appropriate action to protect and preserve all property related to this Contract which is in the possession of the Contractor.

14.4.3 When the Contract is terminated for the Owner's convenience, the Contractor may recover from the Owner payment for all Work executed ***before the notice of termination along with the actual and reasonable cost of any additional work required to secure the project and property related to the Contract following the notice of termination. The Contractor will not be entitled to recover any other costs or damages arising from the termination for convenience of the Owner including, but not limited to, claims for lost profits or lost business opportunities.***

14.5 Termination By Contractor. If the Work is stopped for a period of ninety (90) days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon thirty

(30) additional days' written notice to the ODR, terminate the Contract and recover from the Owner payment for all Work executed ***before the work stoppage and the actual and reasonable cost of securing the project and property related to the Contract during the work stoppage. The Contractor will not be entitled to recover any other costs or damages arising from the work stoppage including, but not limited to, claims for lost profits or lost business opportunities.*** If the cause of the work stoppage is removed prior to the end of the thirty (30) day notice period, the Contractor may not terminate the Contract.

14.6 Settlement on Termination. Within 180 days of the effective date of Contract termination for any reason, the Contractor shall submit a final termination settlement proposal to the Owner based upon recoverable costs as provided under the contract. If the Contractor fails to submit a settlement proposal within the time allowed, the Owner may ***unilaterally*** determine the amount due to the Contractor because of the termination.

Article 15. Dispute Resolution

15.1 Unresolved Contractor Disputes. The dispute resolution process provided for in Tex. Gov't Code, Chapter 2260, shall be used by the Owner and the Contractor to attempt to resolve any claim for breach of contract made by the Contractor, that is not resolved under procedures described throughout the Uniform General Conditions, Supplemental Conditions, or Special Conditions of the Contract.

15.2 Alternative Dispute Resolution Process. The Owner may establish a dispute resolution process to be utilized in advance of that outlined in Tex. Gov't Code, Chapter 2260.

15.3 Before submitting any matter not resolved in the ordinary course of business to the dispute resolution process provided for in Tex. Gov't Code, Chapter 2260, the Contractor shall make a written request to the Owner's designated official in charge of construction contract administration for a determination of the matter in dispute. The written request shall clearly state the disputed issue and include or incorporate by specific reference all information or documents that the Contractor wants the official to consider in reaching his/her determination. The official shall issue a written notice of decision on the request. Within 30 days of the notice of decision, the Contractor may submit a request for reconsideration to the official that particularly states the factual and legal basis for the

Contractor's objections to the official's decision. The official will review his/her decision and consider the basis for reconsideration asserted in the request. The official will issue a written notice of decision following reconsideration which shall be final and conclusive on all matters except for claims of breach of contract which are then subject to the dispute resolution process provide by Chapter 2260.

15.4 ***Nothing herein shall hinder, prevent or be construed as a waiver of Owner's right to seek redress on any disputed matter in a court of competent jurisdiction.***

15.5 ***Nothing herein shall waive or be construed as a waiver of the state's sovereign immunity.***

Article 16. Miscellaneous

16.1. Supplemental and Special Conditions. When the Work contemplated by the Owner is of such a character that the foregoing Uniform General Conditions of the Contract cannot adequately cover necessary and additional contractual relationships, the Contract may include Supplemental and Special Conditions as described below:

16.1.1 Supplemental Conditions may describe the standard procedures and requirements of contract administration followed by a contracting agency of the State. Supplemental Conditions may expand upon matters covered by the Uniform General Conditions, where necessary, provided the expansion does not weaken the character or intent of the Uniform General Conditions. Supplemental Conditions are of such a character that it is to be anticipated that a contracting agency of the State will normally use the same, or similar, conditions to supplement each of its several projects.

16.1.2 Special Conditions shall relate to a particular project and be peculiar to that project but shall not weaken the character or intent of the Uniform General Conditions.

16.2. Federally Funded Projects. On Federally funded projects, the Owner may waive, suspend or modify any Article in these Uniform General Conditions which conflicts with any Federal statue, rule, regulation or procedure, where such waiver, suspension or modification is essential to receipt by the Owner of such Federal funds for the project. In the case of any project wholly financed by Federal funds, any standards required by the enabling Federal statute, or any Federal rules, regulations or procedures adopted pursuant thereto, shall be controlling.

16.3. Internet-based Project Management s. At its option, the Owner may administer its design and construction management through an Internet-based management. In such cases, the Contractor shall conduct communication through this media and perform all project related functions utilizing this database. This includes correspondence, submittals, requests for information, vouchers or payment requests and processing, amendment, change orders and other administrative activities.

16.3.1 Accessibility And Administration.

16.3.1.1 When used, the Owner will make the software accessible via the Internet to all project team members.

16.3.1.2 The Owner shall administer the software.

16.3.2 Training. When used, the Owner shall provide training to the project team members.

End of Uniform General Conditions

HOUSTON COMMUNITY COLLEGE

CONSTRUCTION PROJECT
DIVISION 1 SPECIFICATIONS

Houston Community College
Construction Project Division 1 Specifications
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Section 010000 Miscellaneous Requirements

1. Summary

These Miscellaneous Requirements are issued as supplements to the Uniform General Conditions for Construction Contracts (UGCs) and any Special Conditions that form a part of the Contract for Construction between the Owner and the General Contractor (or Construction Manager, or Design-Build Contractor). The term "Contractor", as used herein, is meant to refer to a General Contractor, or a Design-Build Contractor, or a Construction Manager. Should any provision of these Division 1 Specifications conflict with the Contract, the UGCs or the Special Conditions, the latter shall govern.

2. Removal of Debris (see Section 015240)

The Contractor shall remove and legally dispose of all demolition debris and all unused construction materials off-site. Unless specifically noted otherwise, all excess earth and rock excavation materials shall be removed and disposed of offsite. Such demolition debris, unused construction materials and excess excavated earth and rock shall be handled, transported and legally disposed of at the Contractor's expense.

3. Drawings and Specifications (also see UGC Article 6)

3.1 The Drawings and Specifications are intended to describe and provide for a finished and complete piece of Work that meets the requirements of all the applicable governing laws, ordinances, rules, and regulations of the locality. It is mandatory that all work must meet these requirements.

3.1.1 No extra compensation will be allowed for the Contractor's rework due to its failure to conform to any such requirements unless the original installation was directed by written order issued by the A/E or the Owner.

3.1.2 Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be like effect as if shown or mentioned in both. If the Contractor believes that some information is missing then that information should be requested of the Owner or A/E in writing. Should the Drawings disagree among themselves, or with the Specifications, the better quality and/or greater quantity of work and/or materials shall be included with the Contractor's project proposed pricing. In the case where the Specifications do not fully agree with the material schedules, the material schedules shall govern.

3.1.3 The general character of the detail work is shown on Drawings, but minor modifications may be made by A/E in full size Drawings, shop drawings, or models. Contractor shall not attempt to execute any part of the Work requiring such drawings until he has received approved copies of same.

3.1.4 Where the word "similar or typical" occurs on Drawings, they shall be understood in their general sense and not as meaning identical. All details shall be worked out in relation to their location and their connection to other parts of the Work. If the Contractor finds this to be beyond its capability, interpretations and directions should be requested of the A/E.

3.1.5 Small scale and large scale drawings are intended to be mutually compatible and explanatory. In case of variances, the following order of preferences is established to define the intent of the work.

3.1.6 Explanatory notes on Drawings;

3.1.6.1 Recorded dimensions;

3.1.6.2 Large scales details;

3.1.6.3 Small scale details;

3.1.6.4 Scaled measurements

3.2 The "Scope of Work" description placed in the front portion of each section of the Specifications is intended to designate the scope and locations of all items of Work included in that section, either generally or specifically. It is not, however, intended to limit the scope of the work where plans, schedules, or notes indicate a larger scope.

4. Interpretations of Documents (see UGC 3.2.2)

Whether bidding or building the Project, if there is any doubt as to the meaning of any part of the Construction Documents, the Contractor shall submit a written request to the Owner seeking an interpretation. If the question has to do with technical requirements, the Contractor should provide the A/E with a copy of the request as the Owner will typically ask the A/E for the technical interpretation. If such a request is made during bidding, it should be made at least ten days before bid opening. Interpretations shall then be issued by written response only and during bidding only by issuing an "Addendum" to the bid documents. When in doubt during construction, the Contractor should proceed only with a written interpretation by the Owner, or in its absence, proceed only after notifying the Owner in writing about the interpretation that is being used. Failure of the Contractor to request an interpretation shall not relieve the Contractor from responsibility to complete the Work to the Owner's satisfaction. If the Contractor does not agree that an interpretation received is satisfactory and without cost or time implications, the Owner should be notified immediately in writing of that fact.

5. Materials and Work (see UGC 8.1)

5.1 Unless otherwise specified, all materials shall be new and free of asbestos, noxious or toxic fumes, urea-formaldehyde and lead (lead in potable water system) and both workmanship and materials shall be of the best quality. If requested by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of his materials and workmanship. Any work installed that does not meet the requirements of the Construction Documents shall be removed and replaced with conforming Work. **(UGC 3.3.5)**

5.2 The Contractor and subcontractors shall be responsible for the proper care and protection of all materials and equipment furnished both during and after installation. Such materials and equipment may be staged inside the construction fence, or areas designated by the Owner, but only consistent with a Staging Plan acceptable to the Owner. All materials affected by the weather shall be covered and protected to keep them free from damage while being transported to the site. When stored on site, they shall be placed in watertight storage shed/compartments or otherwise protected from the weather. Any material damaged by water or other causes shall be removed from the site and replaced with new material.

5.3 When necessary to avoid delay or to protect work or equipment, provide suitable watertight coverings over windows, doors, skylights, hatchways, and such other openings admitting rain, including the Owner's materials within the building area when working on a combined effort.

5.4 The Contractor and subcontractors shall protect and be responsible for their Work and any damage to their Work from the date of delivery or installation until Substantial Completion when the Owner will take possession and assume responsibility. They shall make good, without cost to the Owner, any damage or loss that may occur to their Work during this period.

5.5 When any room in one of Owner's buildings has been provided for use as a shop, storeroom, etc., the Contractor shall restore the room to equal, or better, condition by providing repairs, patching, cleaning, and painting at its sole expense.

5.6 During the execution of the Work the open ends of all piping, conduit and mechanical ducts and openings in equipment shall be sealed in such a way as to prevent the entrance of foreign matter. All heating, ventilating, plumbing and electrical equipment shall be covered and protected. All plumbing fixtures shall be protected and boarded over to prevent their usage by any person. All drains shall be covered until they are placed into service.

5.7 The Contractor shall provide all scaffolding and ladders necessary for performing the Work. All scaffolding shall be so constructed, anchored and braced to comply in all respects with OSHA guidelines to afford safety and protection to both workers and their Work, the inspectors and the Work of other contractors.

5.8 Except as otherwise specified, the Contractor shall furnish at its own cost and risk all tools, apparatus, hoists or cranes, derricks, etc. needed for the Work.

5.9 Temporary equipment shall be installed in such a manner that finished Work will not be damaged by smoke, falling mortar, concrete or other causes. The location and arrangement of temporary equipment shall be subject to the approval of the Owner.

5.10 All temporary shoring required for the installation of Work shall be provided by the Contractor who will take all responsibility.

5.11 The Contractor and its subcontractors shall provide on the premises, at locations approved by the Owner, suitable watertight storage sheds for the storage of tools and equipment. Such sheds shall be at least 6 inches off the ground on heavy joists. The Contractor shall maintain such sheds in good condition and remove them when directed by the Owner.

5.12 **Also see Sections 013100, 013523 and 015000 for related requirements.**

6. Intent of the Documents (see UGC 11.1.2)

6.1 It is the intention of the Construction Documents to describe and require the complete installation of the various systems and the Contractor is to furnish all items necessary to make the various systems complete, although each and every item required may not be specifically mentioned in the Construction Documents.

6.2 It is not the intent of the Construction Documents to limit materials, equipment or fixtures to the product of any particular manufacturer. Where definite materials, equipment or fixtures have been specified by name, manufacturer or catalog number, it has been done to set a quality standard, applicability, physical conformity and other characteristics. It is not the Owner's intent to discriminate against or prevent any dealer, jobber or manufacturer from furnishing materials, equipment or fixtures that meet or exceed the characteristics of the specified items. However, substitutions of materials shall not be made without a specific written request by the Contractor having been approved by the Owner in writing. **(See paragraph 18 of this Section).**

6.3 Any discrepancies in the Specifications must be reported to the Owner for clarification, correction and interpretation from the A/E before the work is executed.

7. Existing Underground Utilities

If existing underground lines occur in the site where the work is to be accomplished, such lines will be located and staked by the Contractor for the benefit of the Owner and the Contractor prior to start of the work. Contractor shall maintain these markings throughout the duration of the construction project. Prior to any excavation, the Contractor shall review with the Owner the locations of all underground utilities and receive the Owner's written permission to proceed.

8. Pumping, Shoring, Etc.

8.1. Pumping: When necessary to avoid delay or to protect the Work or the premises, provide suitable pumping equipment and keep excavations, pits and other areas involved free of water that may leak, seep, or rain in. Do not allow water to flow into excavations. Do not allow water to flow off site in quantities or at rates that exceed the quantities or rates that existed prior to the start of construction

8.2. Shoring: The Contractor shall provide and be responsible for all temporary shoring required for execution and protection of the work. After all construction is secure and stable, and when authorized by the Structural Engineer or Civil Engineer, the Contractor shall remove all shoring.

9. Hazardous Materials

9.1 If during the course of his work, the Contractor observes the existence of asbestos, or asbestos bearing materials, the Contractor shall immediately terminate further operations and notify Owner of the condition. The Owner will, after consultations, determine a further course of action. **(UGC 7.5)**

9.2 Contractor shall furnish Manufacturer's Safety Data Sheets (MSDS) on all materials and products installed by the Contractor and subcontractors on this project to indicate no asbestos-containing materials have been installed.

10. Substantial Completion (see UGC 1.26 and 12.1.1)

"Substantial Completion" constitutes a stage of project completion that will allow Owner beneficial occupancy for the purpose of safely installing furnishings, maintaining normal security over them, and use of the facility for its intended purpose. Substantial Completion shall not be considered as Final Completion as there may be minor correction items outstanding and there are additional completion items required to achieve Final Completion. Upon acceptance that an entire Project,

or a portion of a Project, as Substantially Complete the Owner will take possession from the Contractor and assume operations, maintenance and insurance liability responsibilities for that portion of the Project.

11. Coordination (see UGC 3.3.6.2 and 4.4 of the CSP contract)

The Contractor and subcontractors on the project shall coordinate their work with each other, advising on work schedules, equipment locations, etc. It shall be the responsibility of Contractor to assure this coordination and to schedule and supervise the work of all subcontractors performing work under this contract. Contactor shall be responsible for the proper fit of the various parts of the Work and for the coordination of operations of all trades, the subcontractors and the material suppliers engaged upon or in connection with the Work as well as those of his own employees. Contractor shall accommodate and coordinate with other independent contractors and Owner personnel on site during construction to allow them necessary access to perform their work.

12. Observation of Work (see UGC 8.5.1)

The Owner's representatives, as well as the A/E, shall have access to the work at all times wherever it is in preparation or progress. The Contractor shall provide proper and safe facilities for such access and for observation.

13. Cooperation with Building Officials

Contractor, Subcontractor and all related suppliers, vendors and employees will cooperate with applicable utility and government officials and inspectors at all times. If such official or inspector deems special inspections necessary, provide assistance and facilities that will expedite such inspection or observation.

14. Notification

The Contractor shall notify the Owner at least 48 hours in advance (Monday thru Friday) of concrete pours, roofing installation, start of each new section of classification of work, concealment of plumbing, heating, air conditioning, or electrical work.

15. Ongoing Operations/Construction Personnel

15.1 The facilities of the campus will only be available during the scheduled construction time-period as specified by the Owner, and if not specified, then from 8:00 a.m. until 6:00 p.m., Monday through Friday. Work during other times, including weekends, shall only be allowed with prior request and written authorization from the Owner. In addition, the Contractor shall accommodate and coordinate its construction work force and activities to allow the Owner's forces and Owner's separate contractors (i.e. telephone, data, IT, computer, and furniture installation) to enter the jobsite to perform their work.

15.2 This project is surrounded by continuously functioning campus facilities, including student housing, academic and research efforts. The Contractor shall make every effort to avoid disruptions to ongoing campus activities and to maintain a safe environment for students, faculty, and staff in the areas adjacent to the Project.

15.3 Adjacent facilities will continue to be used for their intended purpose while this Project is underway and the following requirements shall apply:

15.3.1 Contractor, Subcontractors, Owner and A/E shall meet regularly to coordinate and schedule any construction activities affecting ongoing operations including, but not limited to: testing days, student/staff holidays, special events, etc.

15.3.2 The Owner may have other contractors, or its own employees, performing work on the campus and in the vicinity of the Contractor's Work. The Contractor shall not commit any act, or allow any act, that will interfere with the performance of work by these other work forces. The Contractor shall cooperate with all performing parties so that the Owner can realize the best possible outcome of all projects involved and requiring coordination.

15.3.3 Student, faculty and general public safety is of utmost importance. Fire and life safety exiting from buildings must be maintained at all times and closely

monitored. Review and receive approval for changes in existing conditions with the local fire marshal for each phase of construction. Provide temporary signage as required by the fire marshal and/or the Owner.

15.3.4 Fire arms, drugs, intoxicating beverages, X-rated materials, etc. are banned from the Owner's property.

15.3.5 Smoking is not allowed inside any campus building or anywhere on the campus except in designated areas. Smoking will not be allowed in any enclosed area of the building(s) of this project. Enclosed, as used here, refers to erection of exterior walls and overhead structure for any portion of the project; it does not mean to limit the term to only "dried in" situations. Use of or possession of illegal drugs or alcohol on the project site or anywhere on campus is prohibited.

15.3.6 Construction personnel are not to communicate or interact with students and faculty on site. Only the Project Superintendent, Project Manager and/or their appointed representatives may communicate with the faculty and administrative staff on an as needed basis.

15.4 Campus utilities must not be interrupted except when scheduled and approved in advance through Owner-designated campus channels. The Contractor or his personnel shall NOT open or close any valves of the central campus utility systems. Valve operation is to be done by College utilities personnel only. The Contractor shall not activate or de-activate any campus utility system or component of any system, without express written direction from the Owner.

15.5 Chemical cleaning of new utility additions shall be done by circulating a good non-phosphate cleaner through as much of the new system as possible. Prior to dumping the cleaning agent, the Contractor shall notify the local City/County industrial water treatment department to sample the effluent. If the City/County officials approve of dumping to drain, then the Contractor will dump into the sanitary sewer. The Contractor shall refill the new system with water and again have the City/County water treatment officials sample the effluent prior to dumping. If at any stage the City/County water treatment officials refuse to accept the effluent, then the Contractor must make special arrangements for legal disposal at its expense and provide the Owner with copies of the resulting shipping and disposal manifests.

16. Field Measurements (see 014518 – Field Engineering)

16.1 The Contractor will employ an experienced, competent staff to establish or survey the building lines, elevations, and field dimensions. Each subcontractor shall verify all existing grades, lines, levels and dimensions affected by their work.

16.2 Before ordering any materials or doing any work, each subcontractor shall verify all measurements and shall be responsible for their correctness. Any difference between the actual dimensions and conditions on the site and those indicated on the drawings shall be submitted to the Owner for instructions and consideration before proceeding with the work.

17. Substitutions (see UGC 8.3.5 and 8.3.6)

The Contractor may submit and Owner and A/E will consider substitutions that have not been submitted and approved prior to receipt of proposals. Contractor shall submit a written substitution request on an Owner approved form and the substitution shall be fully identified for product or method being replaced by substitution, including related specification section and drawing number(s) and fully documented to show compliance with the requirements of the Construction Documents. Include product data/drawings, description of methods, samples where applicable and Contractor's detailed comparison of significant qualities between the specified item and the proposed substitution. The Contractor shall include a statement of effect on construction time, coordination and other affected work, cost information or proposal and a written guarantee indicating the proposed substitution will result in overall work equal to or better than work originally indicated. Contractor shall allow sufficient time for review and approval of such proposed substitutions.

18. Wage Rates

The Contractor and its Subcontractors must pay the general prevailing wage rates for building and engineering construction per Document 00820 and Document 00821, which are included at

the end of the Division 1 section. It is the Contractor's responsibility to use the most current City of Houston prevailing wage rates when construction on the project commences.

Section 012000 Project Meetings

1. Pre-Construction Conferences (see UGC 3.1.1 and CSP Contract 5.1 and Exhibit G)

1.1 Prior to commencing construction, the Contractor shall schedule a meeting to review all aspects of the Construction Project. The time of the Pre-Construction Conference and the attendees shall be determined through discussions between the Owner and Contractor prior to scheduling.

1.2 The following is a tentative agenda for the Pre-Construction Conference:

- Critical work sequencing;
- Designation of responsible personnel;
- Procedures for processing submittals, substitutions, applications for payment, proposal requests, change letters and Contract Close-out procedures;
- Parking and access to the site;
- Office, storage areas and temporary facilities;
- Utility information;
- Testing procedures;
- Procedures for maintaining record documents.

1.3 Minutes of the Pre-Construction Conference will be kept and distributed to all attendees and to all team members not present at the meeting. All final decisions recorded in the minutes shall become binding on the parties.

2. Pre-Installation Conferences

Conduct a Pre-installation Conference at the site before each construction activity that requires extensive coordination and for those activities where a preinstallation meeting is specifically required by the specification section.

3. Progress Meetings (see UGC 8.5 and 8.6)

3.1 The Contractor shall schedule progress meetings at regular intervals to discuss and monitor the construction project. The Contractor shall determine the meeting times and required attendees.

3.2 Minutes of the Progress Meeting shall be kept and distributed to all attendees and to all team members not present at the meeting.

4. Close-out Meetings

4.1 When the Contractor determines that a Project, including all punch list items, has been substantially completed and an acceptance date established, a formal project close-out meeting will be scheduled and attended by the parties designated by the Owner and A/E.

4.2 At the close-out meeting, upon documentation of exceptions and assignment of completion responsibilities, the close-out documents required by the Construction Documents will be released to the Owner.

4.3 Minutes of the Project Close-out meeting will be kept by the A/E and any exceptions identified will be recorded. Specific completion dates for the exceptions will be established and tracked by the Owner to ensure expeditious completion. Copies of the minutes will be distributed to all attendees.

Section 013100 Project Administration

1. Subcontracts (see UGC 3.3.6)

1.1 Contractor agrees to bind every subcontractor, and every subcontractor agrees to be bound by the terms and conditions of the Owner's contract.

1.2 The Contractor is required to submit a list of all first tier subcontractors to the Owner as subcontracts are executed.

2. Flow of Communications (see UGC 3.2, 3.3.1 and 3.3.6)

2.1 The Owner's Designated Representative (ODR) is the Owner's primary representative for the Project who will be designated to the Contractor in writing. The ODR is the only party authorized to issue written/or oral instructions directly to the Contractor that involve changes to the contract scope, cost or time of the Work. If any other party directs the Contractor to make changes to the Work that will involve scope, cost or time the Contractor should notify the ODR immediately in writing. **(see UGC 1.17)**

2.2 Normally, the Owner will also designate in writing an Owner's Designated Site Representative (ODSR). The ODSR will have the authority, delegated by the ODR, to make decisions on behalf of the Owner concerning coordination with the College of Work on the site including: traffic controls, site safety, scheduling of utility outages, and all matters within the contract that do not involve changes to the scope, cost and/or time for completion. The ODSR, or a designee, will coordinate and conduct quality inspections of the construction work as it is installed or performed, authorize payments (except first and final) and conduct final acceptance inspections. The ODSR will be the Contractor's primary point of contact on the site.

2.3 The Architect/Engineer (A/E) is responsible to the Owner for the technical aspects of the Design, including the review of Contractor Submittals and for interpretation of the technical requirements of the Construction Documents. The Owner's written instructions to the Contractor on these matters will generally be issued through the A/E.

2.3.1 The A/E may issue clarifications and other information not affecting the contract scope, cost or time by means of an A/E's Supplemental Instructions (ASI), or similar clarification form, that will be sequentially numbered. Both the A/E and Contractor will maintain separate ASI registers. **(See UGC 3.2.2).**

2.3.2 If Contractor believes such a clarification will create a change in the contract scope, cost or time for performance, a written notification of such must be provided to the ODR before performing the Work involved. The Contractor should proceed with such Work only after being directed to do so in writing by the ODR.

2.4 Any oral direction to the Contractor by the ODR, ODSR or the A/E should be confirmed in writing prior to the Contractor proceeding with the direction.

2.5 All Project correspondence shall include the Project Number and Name in the title or reference.

2.6 All correspondence originated by the Contractor should include simultaneous copies to the ODSR and the A/E. Such correspondence that involves changes, or proposed changes, to the scope, cost or time for the Work, or any dispute or potential dispute, should also include copies to the ODR.

2.7 All subcontractor correspondence to either the Owner or the A/E shall be routed through the Contactor.

2.8 All subcontractor Requests for Information (RFIs) shall be submitted by and under cover of the Contractor, who is to carefully review and ensure the completeness and appropriateness of the question prior to submission. The Contractor should sequentially number each RFI and submit them directly to the A/E, with copies to the ODSR. The Contractor and A/E will maintain separate RFI logs.

2.9 The preparation and handling of Pay Applications, Request for Information, Change Proposals, Submittals, etc. are to be processed as discussed in the Pre-Construction Conference meeting.

3. Project Changes (see UGC 9.1, 9.3.3.3, 9.6.2.2 and Article 11)

3.1 All changes to the Contract involving scope, cost, or time will be issued on the standard Houston Community College (HCC) Change Order form. Such Change Orders are valid only if signed by either the Chancellor of HCC or by the Executive Director for Construction Administration. A single Change Order may include several different change issues and they will not be required to be related to each other.

3.2 Prior to issuing a Change Order, the Owner must have received from the Contractor a Change Order Proposal that is complete in its description of the changes in scope and its detailed presentation of cost and time implications of the proposed change. If the Owner and Contractor do not agree on the implications of a proposed change, they will meet and discuss and resolve their differences prior to proceeding with the changes to the Work.

3.2.1 The Contactor shall summarize all costs for each change at each level of subcontractor and supplier by preparing a "Cost Analysis", and shall provide each subcontractor's cost

summary as backup. Additional support documentation from both the Contractor and its subcontractors is encouraged.

3.2.2 Where the Contractor believes it is entitled to a time extension, it shall so state as part of its response to the Change Proposal, including a justification for such request. Time extensions will be granted only if a Change Order Proposal affects the activities on the Critical Path of the Owner approved Project Schedule (i.e., when the work impacts the "Contract Substantial Completion Date").

3.2.3 If the Owner and Contractor cannot mutually agreed upon a fair and reasonable cost and time settlement, the Owner may: 1) Reject the quotation and void the Change Order Proposal, 2) Issue instruction to the Contractor to proceed on a time and material basis for a price to be determined later not to exceed a fixed maximum dollar and time, or 3) Issue a Unilateral Change Order.

3.2.4 The Owner may issue Field Orders directly to the Contractor for minor changes to the contract, which can be negotiated in the field. Pricing backup shall be the same as a Change Order Proposal and is to be outlined as noted above. Once the Owner and the Contractor have signed the Field Order, the work is authorized and the Field Order will be included in the next Change Order.

4. Liquidated Damages (see UGC 9.11, 12.1.4 and 25.2)

If assessed, liquidated damages will be withheld from progress payments beginning with the first payment after the Contract completion date and until all work of the contract is complete. The amount assessed shall be deducted from the contract price through a written Change Order.

5. Site Use Issues

5.1 The Contractor is responsible for the actions of its entire work force, including Subcontractor and Supplier employees, whenever they are on the campus. Harassment of any kind toward any person will not be tolerated. Offending workers will be removed from the project immediately and permanently. Harassment includes any action such as jeering, whistling, calling-out, staring, snickering, making rude or questionable comments, or similar behavior. Any offending worker or employee will be removed.

5.2 The Contractor shall provide and submit a program plan for worker orientation, identification and control of access to the site and for managing personnel records, including payroll records. All workers on the project shall participate in this program before beginning work of the project. This plan shall include, as a minimum:

5.2.1 Employee identification badges with a photo of the employee, the employer and employees' name. Badges shall be provided for all employees and produced by a system on site. This identification shall be worn at all times while on the project site. Lack of an ID badge shall be grounds for removal from the project until the badge is produced.

5.2.2 Identification badges for workers, busing of workers from remote parking lots, frequent written and verbal reminders to the work force of appropriate behavior and avoidance of campus facilities and publication of acceptable access and egress routes from the work site are all minimum requirements of the plan.

6. Shop Drawings and Submittals (see UGC 8.3 and CSP contract 4.5)

6.1 Refer to the UGC for requirements not identified in this section.

6.2 The Contractor shall assign an identifying number to each submittal following a format to be established at the Pre-Construction Conference. The same number with a numerical or alphabetical suffix will be used to identify re-submittals.

6.3 The burden of timeliness to complete the submittal process is on the Contractor. The Contractor shall allow sufficient time within the construction schedule for the A/E and Owner to review and approve all submittals, including time for all re-submittals on any unaccepted/rejected submittal.

6.4 Any deviation from the Construction Documents shall be conspicuously noted on the submittal and the transmittal cover sheet. Failure to so note deviations will void any action taken on the submittal.

6.5 All manufacturers' data contained within the submittal shall have all inapplicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.

6.6 Equipment of larger sizes than shown, even though of a specified manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operations and maintenance.

6.7 The Owner will not be responsible for payment of any item that has not been submitted and approved through the established submittal process. **(UGC 10.5.1.4)**

6.8 The exact number of submittal copies required for distribution will be determined at the Pre-Construction Conference. The Contractor shall anticipate providing a minimum of four (4) copies of each submittal in addition to those needed by the Contractor and its subcontractors. Two (2) of the approved copies will be returned to the Contractor and one (1) shall be set aside for subsequent turn over to Owner at Project Closeout.

7. Substitution of Materials, Labor and Equipment (see UGC 8.3.5 and 010000 paragraph 17)

7.1 Refer to the UGC for requirements not identified in this section.

7.2 The specified products referenced in the Construction Documents establish minimum qualities for which substitutions shall at least equal to be considered acceptable. The burden of proof of equality rests with the Contractor. The Owner retains sole authority for acceptance of substitutions.

7.3 All substitutions shall be submitted with ninety (90) days of the Notice to Proceed for Construction and be clearly marked as such on the transmittal cover sheet for the submittal.

7.4 The Contractor shall allow a minimum of four (4) weeks for review of each substitution by the A/E and/or Owner in addition to the requirements identified in Section 7.3 above.

7.5 When requested by the A/E, the Contractor shall provide a sample of the proposed substitution item. In some cases, samples of both the specified item and the proposed item shall be required for comparison purposes.

7.6 Acceptance of materials and equipment will be based on the supplier/manufacturer's published data and will be tentative subject to submission of complete shop drawings and/or specifications indicating compliance with the Construction Documents. Acceptance of materials and/or equipment under this provision shall not be construed as authorizing any deviation from the Construction Documents, unless specifically directed in writing from the A/E.

7.7 Any and all additional costs or time resulting from the acceptance or rejection of any substitution shall be the sole responsibility of the Contractor. These include costs that are not presented at the time of the substitution request and those costs that become known after the approval of the substitution. This includes direct as well as indirect costs.

7.8 If a substitution is accepted, and the substitute proves defective, or otherwise unsatisfactory as determined by the Owner for the service intended within the warranty period, the substitute shall be replaced with the material or equipment specified in the Construction Documents, or as approved by the Owner, at no additional cost to the Owner.

8. Allowances (see 13.1 and Exhibit 7 of CSP contract)/Contingencies

8.1 Allowances/Contingencies shall include:

- Cost of materials to Contractor.
- Delivery to project site; handling, storage and installation at project site.
- Protection, security, including insurance.
- Contractor's overhead, profit and other costs shall be included in the Contract Sum but not in the allowances/contingencies.

8.2 At contract closeout, monies remaining in any allowance/contingency line item will be credited to the Owner by Change Order.

9. Alternates

9.1 Alternates will be exercised and added to the proposed contract sum at the option of the Owner.

9.2 For any or all additive alternates selected or otherwise approved for addition to the contract sum by the Owner, the Contractor shall coordinate all related work and modify the surrounding work as required to complete the work, including changes under each alternate, only if acceptance is designated in the contract.

10. Unit Prices (see UGC 11.2 and paragraph 5.4.2 of CSP contract)

The Contractor shall provide unit prices for specific portions of the work identified by the Owner during the pre-bid process. Unit pricing shall include all costs of materials, including, but not limited to shipping, and their related labor cost, including, but not limited to all appropriate burdens and markups.

11. Applications for Payment (see UGC Article 10 and 12.3 as well as Article 12 of the CSP contract)

11.1 Such requests shall be presented on (AIA) style G702 & G703 Pay Application forms. The G702 & G703 forms which may be supplemented with columnar continuation sheets shall separately identify each update to the original contract or GMP amounts.

11.2 The Contractor's project accounting records shall be kept on the basis of generally accepted accounting principles in accordance with cost accounting standards issued by the Federal Office of Management and Budget Cost Accounting Standards Board and organized by each pay request period.

11.3 Prior to the submission of the initial Application for Payment the Contractor shall submit the following documents to the A/E and Owner for review:

11.3.1 Contract Price of GMP Schedule of Values: A single document itemizing the breakdown of the Contract Price/GMP, including general conditions, contingencies and allowances shall be submitted using HCC standard Schedule of Values format. The Contractor shall submit a draft breakdown and such submittal shall be a condition precedent to the processing of the first pay application. The Contractor shall submit subsequent draft copies of the Schedule of Values no later than five (5) working days prior to formal submission of each monthly pay request.

11.3.1.1 The breakdown shall follow the trade divisions of the specifications.

11.3.1.2 No adjustment to the original detailed breakdown of the contract line item shall be made once accepted by the Owner and A/E, unless such adjustment is directed by the Owner in writing.

11.3.1.3 Construction Manager or Design-Builders will be allowed to reallocate among General Conditions line items after consultation with, and agreement from, the Owner. In the event the contractual limits on General Condition's costs are exceeded, the overruns shall be subtracted from the Fee.

11.3.2 The Contractor shall not use subcontractor invoices/pay applications in lieu of a single Schedule of Values from the Contractor.

11.3.3 The breakdown shall anticipate future Change Orders and make provisions for incorporating all changes into the breakdown listing. If issued, Change Orders shall be identified separately and shall itemize the GMP Change Orders, Change Proposals and/or Field Orders, which are incorporated into each Change Order for payment on a line-item basis. Contracts with Guaranteed Maximum Price proposals shall repeat the process outlined in this section every time a subcontract is added to the monthly Schedule of Values for payment.

11.3.4 Submission and approval of Construction Staging Plans, Parking Plans, Quality Control Plans and Trenching Plans are a prerequisite for starting Work at the site and for receiving the first monthly partial payment.

11.4 At a minimum, the Contractor shall provide attachments to each month's payment request as follows:

11.4.1 Four copies of the monthly Small Bossiness Progress Assessment reports.

11.4.2 Four copies of the updated Submittal Schedule.

11.4.3 Four copies of all invoices required by the contract.

11.4.4 Four copies of the certified wage rate notification form for each member of the workforce not previously submitted.

11.4.5 Four copies of the updated RFI and ASI logs.

11.4.6 Four copies of the updated Work Progress Schedule as specified herein.

11.5 All regular monthly applications for payment shall be submitted to the Owner and A/E for review and approval in draft form no less than five working days prior to the formal submission. The Contractor shall be prepared to review the draft copy at the project site, or at such other location

as may be agreed to by the parties. Failure to comply with the requirements outlined in this section shall relieve the Owner from its obligation to make payments on any/all line items until the Contractor meets all requirements.

11.5.1 Payments cannot exceed the contract, work in-place, or subcontract amounts as noted on the Schedule of Values line items.

11.5.2 All as-built drawings shall be up to date and available for review by the A/E and Owner.

11.5.3 When requesting payment for materials stored off site, all such materials shall be specifically identified, including supporting documentation, photos and insurance. The Contractor should be available to escort the Owner to visit and personally verify the stored materials in a physically separated and secure area.

11.6 Request for payments in association with release of, or reduction in retainage, or completion of work have additional requirements outlined in the UGC.

12. Procurement of Subcontracts (Applies to Construction Manager at Risk and Design-Build Contracts Only) – (see 5.6 & 5.7 of the CM@R contract)

12.1 The Construction Manager at Risk (CM) or Design/Build Contract (DB) shall provide a written Bid/Proposal Package Strategy (B/PPS) for procuring subcontracts including self-performance work (other than General Conditions), prior to the approval of the Guaranteed Maximum Price, but no later than twenty calendar days prior to the first advertisement for subcontractor proposals. The B/PPS shall be a written plan submitted to, and reviewed by the Owner.

12.1.1 The plan shall identify bid packages that are most advantageous to the Project and align with the CM/DB's HCC SB Good Faith Effort by providing at least three qualified respondents (including CM/DB). Each bid package shall include the UGC, Owner's Division 1 Specifications, Drawings and Specifications and any other HCC requirements included in the CM/DB Contract pertaining to the scope of work covered in the packages.

12.1.2 The B/PPS shall include the following for each bid package contemplated:

- Anticipated scope of work to be procured;
- A current Work Progress Schedule;
- Anticipated selection criteria and questions;
- Self-perform work proposals to be submitted by the CM/DB;
- Proposed advertising dates;
- Proposed pre-proposal meeting(s) dates;
- Proposed receipt, review and award dates;
- Anticipated notice to proceed dates.

12.2 The CM/DB shall update the B/PPS monthly at a minimum, as conditions change, or as proposed dates are revised.

12.3 Per the Texas Higher Education Code 51.782: "A Construction Manager at-Risk shall publicly advertise, in the manner prescribed by HCC, and receive bids or proposals from trade contractors or subcontractors for the performance of all major elements of the work other than the minor work that may be included in the general conditions".

12.4 The goal of the Project Team shall be to have all work procured through advertised competitive proposals, however, if a "minor procurement" condition arises during the process, the following procurement guidelines may be used by the CM/DB, with Owner approval, for procurement of work: Less than $5,000.00 No requirements Between $5,000.01 to $25,000.00 Obtain three solicitations Greater than $25,000.00 Advertised competitive proposals If the CM does not receive at least three competitive proposals on procurements over $5,000.00, the CM shall re-package the scope and reissue the proposal without additional cost to the Owner, or delay to the project "Substantial Completion" date. This solicitation requirement does not pertain to Change Orders to existing subcontracts.

12.5 Work shall be divided into reasonable lots; however, material and labor acquired through purchase order/vendor type contracts are subject to the entire project (i.e. Concrete material shall be procured as a unit price time an estimated total project quantity provided by the CM/DB to equal a total construction cost). Work shall not be incrementally divided for the purpose of circumventing the procurement guidelines of 12.4 above.

12.6 The CM/DB may establish selection criteria for each phase of work for review and approval by the Project Team. Criteria shall be qualifications based and consistent with the information needed by

the CM/DB to make a proper evaluation and selection. The CM/DB shall establish a selection matrix including cost, criteria, weighting and ranking procedures for evaluation and work with the Project Team to tailor the selection criteria to be project and scope specific to ensure the questions are proper and relevant to the goals of the project. SB participation/status cannot be used as criteria for determining "best value," only for determining if the respondent is responsive.

12.6.1 The CM/DB shall establish clear criteria and questions so that those reading the Request for Proposals will understand how they will be evaluated.

12.6.2 If criteria are not included in the advertisement for proposals, the proposal shall be considered a lump sum bid, and the CM/DB shall award the work to the lowest qualified, responsive bidder.

12.6.3 After selection criteria have been established, the CM/DB shall publicly advertise the work in general circulations and trade associations in accordance with TEC 51.782 for CM, Article 7 of the current Contract for DB and the Texas Administrative Code 111.14 –"HUB" for both CM and DB. This advertisement shall include, at a minimum, the following:

- HCC Project Number and Project Name;
- Institution/Campus name;
- CM/DB name and address;
- CM/DB contract name and phone number;
- Location for viewing of plans and specifications;
- Date, time and location of Pre-proposal meeting(s);
- Date, time deadlines(s), and location for receiving proposals;
- Instruction to respondents for submitting proposals;
- Selection criteria, questions and submittal requirements.

12.7 At the time and location identified in the advertisement, the CM/DB shall hold a Pre-proposal meeting(s) for all potential subcontractors with the Project Team and Owner present. The CM/DB shall review the following at a minimum:

- The general scope of the project and specific scope of work included in this package;
- Instructions to respondents for submitting proposals;
- Selection criteria and questions;
- HUB Good Faith Effort requirements;
- Project safety requirements;
- Project schedule requirements;
- Payment procedures and requirements, including retainage;
- Commissioning and Close-out requirements.

12.8 If the CM/DB identifies any self-performance in the B/PPS (work to be performed by its own employees), the CM/DB shall submit a proposal to the Owner at least 24 hours before the advertised time and location in a manner so as not to compromise the competitive process.

12.9 The CM/DB shall accept all proposals at the advertised location until the advertised deadline. Upon receipt, the Owner shall be allowed to review the proposal and confirm the time and date received. Any proposals received after the deadline shall not be considered by the CM/DB, and shall be returned to the respondent unopened. Fax proposals shall not be accepted unless the ODR, prior to the initial advertisement for proposals, approves a detailed plan by the CM/DB for proper care and custody.

12.10 After compiling, reviewing and verifying the costs and scope associated with all proposals, the CM/DB shall provide a "bid tabulation" matrix and a proposed Schedule of Values for review by the project team.

12.10.1 The bid tabulation matrix shall compare all equivalent scope proposals to the CM/DB's estimate.

12.10.2 Each matrix shall indicate the CM/DB estimate(s) for each scope of work and identify the respective cost savings/over-runs.

12.10.3 The CM/DB may use values/quantities from its own estimate to provide full scope comparisons between each respondent, however, these "plug" numbers shall be clearly identified in the matrix to the Project Team and be used only to compare various proposals.

12.10.4 The proposed updated Schedule of Values shall summarize all executed and recommended "best value" subcontracts to provide a current status of the Guaranteed Maximum Price Proposal.

12.10.5 Once the proposals are compiled into a bid tabulation matrix and the proposed Schedule of Values has been updated, the CM/DB shall request a meeting with the Project Team to review the proposals.

12.11 The CM/DB shall lead the proposal review meeting and identify any exclusions or conditions, identify any non-qualifying respondents and any other problems that may have occurred during the process.

12.11.1 The CM/DB shall confirm that the respondents are qualified, meet the established selection criteria, and identify the amount of the proposals.

12.11.2 The CM/DB shall identify the "best values" and the current status of the buyout savings to the project team. If the "best value" causes the CM/DB to exceed the Cost of Work line item, including contingencies in the GMP the CM/DB shall acknowledge that the overage will be deducted from the CM/DB's Construction Phase Fee.

12.12 Once the "best value" respondent has been identified by the CM/DB, without exception by the Owner, the CM/DB shall finalize negotiations with the selected "best value" respondent. If the CM/DB is unsuccessful in its negotiations with the selected respondent, the CM/DB shall notify the ODR that it intends to begin negotiations with the second "best value" and report the cost implications to the Schedule of Values. Once negotiations are successfully completed the CM/DB shall notify the Owner in writing that it intends to write a subcontract to the selected "best value" respondent and identify the bid package number, value of the contract, along with any changes from the bid day value, changes in scope, report the current status of the GMP identifying the current savings/overages and provided a copy of the executed subcontract or purchase order prior to any request for payment by the CM/DB for applicable work.

12.13 The Owner reserves the right to object to the "best value" identified by the CM/DB and may conduct an evaluation of the selection process. If after evaluation the Owner disagrees with the CM/DB "best value" recommendation, the Owner may instruct the CM/DB to re-bid the scope of work or use the Owner's "best value" selection. If the value of the Owner's selection causes an increase in the Total Contract Price, the increase will be the responsibility of the Owner.

12.14 The process identified in this section shall be repeated for each bid package until the project is entirely bought-out.

13. Contractor Daily Reports

The Contractor shall provide the Owner with a report detailing its daily activities on the Project in a format acceptable to the Owner. All tests performed by the Contractor are to be attached to these daily reports. All work reports required of subcontractors shall be attached to the Contractor's daily report. As a minimum, the report shall include the following information as it relates to the day's activities on site: subcontractors on site, equipment on site, areas of work, type of work performed, materials received, tests performed, any injuries or accidents, any oral instructions received from the Owner or A/E, any material damage, any change in supervisory personnel and anything that might impact the projects quality or schedule. These reports shall be submitted to the Owner on a daily basis. Not receiving these reports in a timely manner may be grounds for the Owner withholding payments until they are submitted.

14. As-Built Drawings and Record Drawings (see UGC 10.3 and 11.4 as well as paragraph 25.7 of the CSP contract)

14.1 One copy of all record documents shall be kept up to date and available at the Project Site. "As-Built" drawings, specifications, detail manuals, and submittals shall be continuously annotated by the Contractor to reflect actual record field conditions, addenda, issuance of all Change Orders and clarifications, and actual dimensional records for underground and all other services. One copy of all approved submittals and material selections shall also be kept available.

14.2 Maintenance of current documentation by the Contractor is required in order to process pay applications. The Owner and A/E will review the status of such documentation monthly, at a

minimum. Also refer to the Commissioning Procedures and Project Close-out Procedures for detailed instructions on As-Built drawings and specifications.

15. Utility Outages

15.1 The Contractor shall notify the Owner, in writing, of any planned utility outages ten business days in advance of the anticipated outage date. The notice shall identify the utility(s) to be shutdown, the anticipated duration of the outage and the subcontractor responsible for initiating and terminating the outage. The Owner has final authority to approve or disapprove of the requested outage date and time.

15.2 A standard form for processing a request for utility shutdown or any other disruption shall be provided by the Owner at the Pre-Construction Conference. The Contractor shall utilize this form, with attachments as necessary, in requesting an outage.

16. Coordination of Space (see UGC section 3.3 and 3.3.6.2 in particular. Also see paragraph 4.4 of the CSP contract)

16.1 The Contractor and subcontractors should coordinate the use of Project space and sequence of installation of mechanical, electrical, plumbing, HVAC and Communications work which is indicated diagrammatically on the drawings. The Contractor and subcontractors should follow routing shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space. The Contractor and subcontractors should utilize space efficiently to maximize accessibility for other and future installations, maintenance and repairs. Making adjustments due to field conditions is considered a part of the work.

16.2 Within finished areas all pipes, ducts and wiring should be concealed, unless otherwise directed in the plans and specifications. The Contractor and subcontractors should coordinate locations of fixtures and outlets with finish elements.

16.3 The Contractor and subcontractors should verify that mechanical and electrical controls, valves, cut-offs, cleanouts, switches and other items are located in such as manner as to make them readily accessible to the user.

16.4 In no case shall locations of equipment be established by scaling the drawings. In the event exact dimensions are not provided with the drawings either supplemental instructions should be obtained from the A/E, or approval of placement from the Owner, should be obtained prior to final placement.

16.5 All work should be arranged in a neat and orderly manner while maximizing clearances.

16.6 All operating system components which will be approved through the submittal process should be reviewed prior to submittal to confirm there is physically adequate space to accommodate the device.

17. Repair of Damage (see UGC 3.3.11.3)

The Contractor shall be responsible for any loss or damage caused by Contractor, his workers or his subcontractors, to the Work, materials stored on site, to tools and equipment, to adjacent property and to persons. The Contractor shall make good any loss, damage or injury at Contractor's own expense and take particular care to protect adjacent buildings, utilities, landscape and lawn sprinkler systems.

18. Deliveries

18.1 The Owner will not accept delivery of products and materials bound for the Contractor. The Owner will not be responsible for material losses, or make arrangements to have someone present for acceptance of deliveries.

18.2 The name and address of Owner shall not be used for delivery of materials and equipment.

18.3 The Contractor should make arrangements for deliveries in accordance with construction schedules and in ample time to facilitate inspection prior to installation without causing delay to the project.

19. Protection of Utilities, Etc. (see UGC 3.3.11.3)

The Contractor and all subcontractors and vendors should take precaution to protect and leave intact the streets, site and work previously accomplished, including buildings, streets, utility poles, fire hydrants, utility lines, catch basins and storm drainage systems.

20. Project Management Software

20.1 Attention is directed to the Contract and General Conditions and all Sections within Division 1 – General Requirements, which are hereby made a part of this Section.

20.2 Refer to specification Section 01 31 00, Paragraph 6 – Shop Drawings and submittals.

20.3 Project Management Communications: The Contractor shall use the Internet web based project management communications tool, e-Builder® ASP software and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.

20.3.1 Project management communications is available through e-Builder® as provided by "e-Builder®" in the form and manner required by HCC.

20.3.2 The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

20.4 Training: e-Builder® will provide a group training sessions scheduled by HCC, the cost of which is included in the initial users' fee. Users are required to attend the scheduled training sessions they are assigned to. Requests for specific scheduled classes will be on a first come first served basis for available spaces. Companies may also obtain group training from E-Builder at their own expense, please contact e-Builder® for availability and cost.

20.5 Support: e-Builder® will provide on-going support through on-line help files.

20.6 Project Archive: The archive shall be available to each team member at a nominal cost. The archive set will contain only documents that the firm has security access to during construction. All legal rights in any discovery process are retained. Archive material shall be ordered from e-Builder®.

20.7 Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.

20.8 Purpose: The intent of using e-Builder® is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files

20.9 Authorized Users: Access to the web site will be by individuals who are licensed users.

20.9.1 Individuals may use the User Application included in these specifications or may request the User Application.

20.9.2 Submit completed user application forms with check made payable to "e-Builder, Inc.".

20.9.3 Authorized users will be contacted directly by the web site provider, e-Builder®, who will assign the temporary user password.

20.9.4 Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

20.10 Administrative Users: Administrative users have access and control of user licenses and <u>all posted items</u>. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!** Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).

20.11 Communications: The use of fax, email and courier communication for this project is discouraged in favor of using e-Builder® to send messages. Communication functions are as follows:

20.11.1 Document Integrity and Revisions:

a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.

b. The system shall make it easy to identify revised or superseded documents and their predecessors.
c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.

20.11.2 Document Security:
a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!**

20.11.3 Document Integration:
a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.

20.11.4 Reporting:
a. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.

20.11.5 Notifications and Distribution:
a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.

20.11.6 Required Document Types:
a. RFI, Request for Information.
b. Submittals, including record numbering by drawing and specification section.
c. Transmittals, including record of documents and materials delivered in hard copy.
d. Meeting Minutes.
e. Application for Payments (Draft or Pencil).
f. Review Comments.
g. Daily Field Reports.
h. Construction Photographs.
i.. Drawings.
j. Supplemental Sketches.
k. Schedules.
l. Specifications.

20.12 Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the e-Builder® web site by licensed users.

20.12.1 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier shall respond to documents received in electronic form on the web site, and consider them as if received in paper document form.

20.12.2 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.

20.12.3 The Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.

20.12.4 The following are some but not all of the paper documents which require original signature:
a. Contract

b. Change Orders
c. Application & Certificates for Payment
d. Construction Change Directives (CCD)
e. Forms and reports in Division 0

20.13 Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:

20.13.1 Providing suitable computer systems for each licensed user at the users normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.

20.13.2 Each of the above referenced computer systems shall have the following minimum system (The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area) and software requirements:

20.13.3 Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)

a. PC system 500 MHz Intel Pentium III or equivalent AMD processor
b. 128 MB Ram
c. Display capable of SVGA (1024 x 768 pixels) 256 colors display
d. 101 key Keyboard
e. Mouse or other pointing device

20.13.4 Operating system and software shall be properly licensed.

a. Internet Explorer or other browser (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
b. Adobe Acrobat Reader (current version is a free distribution for download).
c. Or, users intending to scan and upload to the documents area of e-Builder® should have Adobe Acrobat (current version must be purchased).
d. Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

20.14 Contact the following person at e-Builder® to purchase licenses & Project Archive:

Pam Whitmore
Executive Account Manager
1800 N.W. 69th Avenue, Suite 201
Plantation, FL 33313
(954) 513-3105
pwhitmore@e-builder.net

Section 013200 Project Planning and Scheduling
(see UGC Article 9 and Section 5.3 of the CSP contract)

1. Definitions:

1.1 Project Schedule (a.k.a. Work Progress Schedule) – the schedule developed, monitored Construction phases of the project.

1.2 Project Team – refers to the Owner, Architect/Engineer (A/E), Design Consultants, Users, Contractor and Subcontractors that are contracted and/or specifically assigned to the Project.

1.3 Work Day – refers to a day in which work is planned, excluding weekends and legally recognized state holidays.

1.4 Critical Path – is the sequence of activities that determines the longest duration for the project when the Total Float is equal to, or less than zero.

1.5 Total Float – the number of days an activity on the longest path can be delayed without delaying the Substantial Completion Date. Total float should not be shown as a single activity, but rather the relationship between the early and late finish dates or early and late start dates of each activity.

2. Purpose

2.1 Time is an essential part of this contract. Therefore, the timely and successful completion of the Work requires careful planning and scheduling of all activities inherent in the completion of the project.

2.2 The Contractor shall participate with the Owner and A/E in a project planning workshop promptly upon execution of the contract unless specified differently in the Construction Documents. The Schedule shall be coordinated with the Contract Price Breakdown, or Schedule of Values, and shall include all significant procurement actions (including long lead time delivery items and related approval activities), all work placement activities (including start and completion dates), identification of the timing of overhead inspections, system startup and commissioning activities, pre-final and final inspections, and punch list corrections as a minimum.

2.3 Acceptance of the Project Schedule; or any subsequent update thereof, by the Owner is for format and extent of detail of the Project Schedule only. Such "acceptance" does not indicate approval of the Contractor's means or methods, or of any change to the contract terms including without limitation any required contract milestones.

2.4 The Project Schedule shall be developed with a certain amount of float time. This float, which shall be no less than ten percent of the total duration of the project, shall be presented in a format which facilitates reporting of progress and trends and can be used to identify risk and opportunities, project upcoming activities and forecast project milestones.

2.5 The Owner must be able to reasonably rely on the Contractor's Project Schedule in order to make accurate commitments to the Project Team, campus administration and other parties as necessary.

3. Contractor Responsibilities

3.1 The Contractor is responsible for planning, managing, coordinating and scheduling all activities from a Notice to Proceed to Final Completion of the project within the time allotted by the contract.

3.2 The Contractor is responsible for keeping the Owner and Project Team fully informed of schedule status and upcoming activities throughout the project.

3.3 The Contractor's Pre-Construction and Construction project management personnel shall actively participate in the planning and development of the Project Schedule and shall be prepared to review such development and progress with the Owner, A/E and any other members of the Project Team so the planned sequences and procedures are clearly understood by all parties.

3.4 The Contractor is to plan for appropriate activity durations to allow for thorough review, procurement, submittal, installation, inspection, testing and commissioning of all work in order to confirm compliance with the project plans and specifications.

4. Schedule Development Requirements

4.1 Appropriate logic relationships must be in place and complete, while the Project Schedule shall be free of any mandatory and/or late finish constraints, except for the Substantial Completion Date.

4.2 The estimated activity duration of an activity shall be expressed in work days only.

4.3 During Pre-Construction Services, the Project Team will establish the maximum duration for every activity included in the schedule.

4.4 The Project Schedule should be coordinated with the Contractor's Submittal Schedule and Schedule of Values.

5. Planning and Scheduling Workshop

5.1 Within fifteen calendar days after the Notice of Proceed is issued the Contractor will conduct a Planning and Scheduling Workshop with the Contractor's Project Manager, Superintendent, the

Owner, A/E, User Representative and any available subcontractors prior to submitting the initial Project Schedule to the Owner.

5.2 Two separate Planning and Scheduling Workshops should be held with the aforementioned parties prior to the Contractor submitting the baseline Preconstruction Project Schedule.

5.3 The baseline schedule shall be submitted within 10 work days after the Planning and Scheduling Workshops are complete.

6. Construction Phase Baseline Schedule Submittal

6.1 The Baseline Project Schedule shall be submitted to the Owner with the required Total Float and a current data date (within five days of the date of submission). The Baseline Schedule will be updated within ten days of the date when each subcontractor is procured and brought on to the project.

6.2 Once the full scope of the Project has been approved (i.e. the last stage GMP Change Order has been executed), the Project Manager shall coordinate with the Owner to reset the Baseline Project Schedule.

6.3 The Owner reserves the right to withhold any and all payments related to the Project Schedule and/or General Conditions if a Baseline Project Schedule is not submitted, or is not acceptable to the Owner.

6.4 The Project Schedule shall be presented in a graphic time-scaled view including all activities, early start and finish dates, estimated durations and total float, sorted by early start.

7. Updating the Project Schedule

7.1 Once the Baseline Project Schedule has been accepted, the Project Manager shall update the Project Schedule on at least a monthly basis and submit the updated Project Schedule with the draft application for payment.

7.2 Project Schedule updates shall be based on actual work progress, current logic and remaining durations.

7.3 Total Float is intended to be used proportionally with the duration of the project; therefore, there should be no remaining Total Float at the actual Substantial Completion Date.

8. Excusable Delays and Time Extensions

8.1 Excusable delays shall be administered per the UGC.

8.2 If an excusable delay extends the Contract Substantial Completion Date, the ODR may extend the contract time by the number of excusable calendar days lost on the Project Schedule, or take other actions as appropriate under the terms of the contract.

8.2.1 Any Change Order Proposal that the Contractor claims, or will claim, justifies an extension of contract time must contain the information necessary to justify the time extension.

8.2.2 Change Order Proposals that do not affect the Critical Path for the Project and delay the Substantial Completion Date, or does not include a request for additional time prior to approval by the ODR, shall not be due a time extension.

8.3 Once the ODR accepts a time extension, and authorizes the Contractor to proceed with the contract change, the proposed revision shall be incorporated in the Project Schedule.

Section 013220 Photographic Documentation

1. Photographic Media

1.1 Digital Images: Provide images in uncompressed TIFF format produced with a minimum 4.0 mega pixels and image resolution of not less than 1024 by 768 pixels.

2. Construction Photographs

2.1 Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photos with blurry or out-of-focus areas will not be accepted.

2.2 Maintain key plan with each set of construction photos that identifies each photo location.

2.3 Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

2.4 Date and Time: Include date and time filename for each image.
2.5 Preconstruction Photos: Before commencement of work on the project take digital photos of the project site and surrounding properties, including existing items to remain during construction, for different vantage points.
2.6 Take photos to show existing conditions adjacent to the project site.

3. Construction DVDs - Preconstruction DVDs: Before starting construction on the project site prepare a DVD recording of the site and surrounding properties from different vantage points. Show existing conditions of the site and adjacent buildings. Show protection efforts by Contractor including, but not limited to, tree protection and storm water controls.

Section 013520 LEED Requirements (If LEED PROJECT)

1. Definitions - LEED – Leadership in Energy and Environmental Design.

2. Submittals

The Contractor shall provide preliminary submittals of its LEED Action Plan, indicating how the Owner's requirements will be met, within thirty days after the Start date established by the Notice to Proceed. Submit additional LEED submittals required by other specification sections.

3. Quality Assurance

LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

Section 013523 Project Safety Requirements (see UGC Article 7 and Section 5.8 of the CSP contract)

1. Purpose

1.1 The Contractor shall bear overall responsibility for all aspects of safety at the project.
1.2 The Contractor shall, at all times, provide adequate resources, equipment, training and documentation to:
  1.2.1 Assure compliance with all applicable regulatory and contract requirements.
  1.2.2 Assure a safe work environment at the Project.
  1.2.3 Instill a culture for safe behavior in all supervisors and workers.
  1.2.4 Ensure a universal understanding that safety and health issues take precedence over all other considerations at the Project.
1.3 The Contractor and every subcontractor shall comply with the requirements of this section and all Federal, State, and local statures, standards, and regulations. In any circumstance where this Section differs from, or is in conflict with any statutory requirement, the more stringent shall apply.
1.4 The Owner reserves the right to have any manager, supervisor or worker removed from the project for disregarding the Project's safety requirements.
1.5 The Owner reserves the right to deduct from the contract any safety related expenses that the Owner incurs as a result of the Contractor's, or any subcontractor's, failure to comply with the requirements of this section.
1.6 The Owner will deny requests for time extensions and/or monetary considerations whenever the Owner intercedes on behalf of safety compliance as a result of Contractor failure to act as required by the contract.

2. Contractor's Project Safety Coordinator (PSC)

2.1 The Contractor shall provide a Project Safety Coordinator, who shall be responsible for safety training, inspections, investigations, record keeping, reporting, incident response, and claims management, and shall serve as the technical advisor to the Contractor's Project staff for all safety issues.
2.2 If the contract value is less than $3,000,000 the Contractor's project superintendent may perform these duties. If the contract value exceeds $3,000,000 the Contractor shall furnish a construction safety specialist.

3. Subcontractors' Project Safety Representative (PSR)

Every subcontractor shall identify one employee to be its Project Safety Representative who will be on-site during all the subcontractor's activities and will participate in all training activities, audits, etc. related to the safety program.

3.1 The PSR shall attend all safety meetings while the company is actively performing work at the project and shall be responsible for reporting all incidents to the PSC.

3.2 The PSR shall transport or accompany any injured co-worker that requires medical attention at facilities outside the project.

3.3 The PSR shall be responsible for either conducting or making arrangements for all training, equipment and materials that workers need to perform their duties in the safest possible manner.

4. Project Safety Program

4.1 The Contractor shall develop a written, site specific, safety program. It shall be printed in English and an initial draft shall be submitted to the Owner for review and comment as a prerequisite to issuance of the Notice to Proceed with construction services'

4.2 The Contractor shall incorporate Owner comments into a final draft which shall be resubmitted to the Owner for concurrence.

5. Personal Protective Equipment (PPE)

5.1 PPE shall be required for all workers in construction areas. The followings items shall be furnished, inspected, and maintained by the employer. The Contractor shall maintain an adequate inventory to furnish these items for five Owner representatives who may visit the project from time to time:

5.1.2 Hard Hats (safety helmets): shall be ANSI stamped (Z89.1-1997, Type I, Class E, G and C and be worn at all times while in the construction areas.

5.1.3 Eye protection (safety glasses): shall be ANSI stamped Z87. If a worker wears prescription glasses (plastic lenses only) that are marked Z87, the employer shall furnish goggles or safety glasses that are designed to fit over another pair of glasses and be worn at all times while in the construction areas.

5.1.4 Vests shall be at a minimum a Class II reflective traffic vests and be worn at all times while in the construction areas.

5.1.5 Hand protection, Hearing Protection, Respiratory Protection, Fall Arrest Equipment, Other PPE: shall all be furnished as required to comply with OSHA Standards.

6. Medical Equipment - The Contractor shall maintain at least one first aid kit on the project site at all times per ANSI Z308.1.

7. Certifications

Supervisors, Competent Persons, Equipment and Crane Operators, and Emergency Responders shall all be identified in lists submitted by employers to the PSC prior to commencement of work. In addition to lists, the employers shall include copies of all available training certificates or formal documentation to support the declared positions. For all operations that require a "competent person" (per OSHA definition), the PSC shall maintain a project file containing the transmittals from each employer naming each person declared to be competent for each operation. For operations requiring independent certification, a copy of the certificates shall be attached.

8. Project Safety Signs and Posters

8.1 The Contractor shall post safety regulation signs at every point of entry to the project in English and Spanish. The content of the sign should at a minimum indicate that visitors are required to check in at the project office, persons entering the construction area must be appropriately attired, no weapons, tobacco, alcohol, controlled substances and related paraphernalia may be brought onto the premises, a posted speed limit will be identified and copies of the MSDS sheets are available at the project office.

8.2 The Contractor shall post emergency contacts and notification, including phone numbers, notification of insurance carrier for Worker's Compensation Coverage and any and all other required State and Federal postings.

9. Project Safety Training and Meetings

9.1 Within fifteen days of the issuance of the Notice to Proceed the Contractor shall hold the initial safety meeting and all Project Team members are strongly encouraged to participate.

9.2 The PSC shall present orientation training to every person who is to be allowed into the construction area without an escort. A translator shall be present when there are workers in attendance who do not speak English.

9.3 The PSC shall maintain a site safety orientation log signed by all persons receiving safety training.

9.4 Project safety meetings will be held on a weekly basis and will be chaired by the PSC and attended by all companies' PSRs who are currently on site. The topics of discussion should focus on safety and loss control issues.

9.5 "Tool Box Talks" shall be conducted on a weekly basis by each PSR and will cover safety issues related to upcoming work, current site conditions and review of any recent incidents.

9.6 Special task training should occur when new equipment or non-routine activities are scheduled.

10. Safety Inspections

10.1 Daily – The PSC shall observe work operations in all areas of the project and note any violations in the daily progress reports.

10.2 Weekly – A comprehensive safety inspection shall be conducted by the PSC and each PSR for their respective work areas. A written record of the observations and recommended corrections should be made and placed in the project files.

10.3 Quarterly – The PSC shall facilitate an inspection which shall include, but not be limited to the following: fall arrest equipment, fire extinguishers, rigging, ladders, hand tools, power tools, cords, welding leads, hoses, alarms, respirators, ground fault circuit interrupters, first aid stations, eye wash stations, and emergency rescue equipment.

10.4 Semi-annually – The PSC shall facilitate an inspection of all hoists, cranes, mobile equipment, motorized lift platforms, stages, generators and compressors to assure proper operational condition.

10.5 The PSC shall notify the Owner within one hour of the arrival at the project site by any representative of a regulatory agency and provide the Owner with a copy of any published findings or citations issued to any employer and shall ensure that statutory posting requirements are met.

11. Records and Reports - The PSC shall prepare a written report for each incident that involves any injury that may not be resolved by first aid response and/or each incident that involves damage to property or equipment. The report should contain a list of factual details that created the incident, the responsive actions that occurred during and immediately following the incident and recommendations for modifications to prevent repetition of the incident. A copy of the report should be submitted to the Owner within 24 hours of the incident.

12. Construction Operations

12.1 Cranes

12.1.1 Tower cranes and related power supply equipment shall be surrounded by at least an eight foot high, 5/8" plywood enclosure with lock controlled entrance.

12.1.2 Operators of cranes, derricks and/or hoisting equipment shall possess certification from a nationally accredited training organization.

12.2 Demolition - Safe egress paths and barrier isolation of impacted areas shall be monitored and maintained to prevent entry by other trades and members of the public. This includes removal of materials and trash from elevated locations.

12.3 Electrical Power

12.3.1 Ground fault circuit interruption (GFCI) shall be the primary protection from exposure to electrical current for all workers on the project. Only exit lighting and medium-high (greater than 240) voltage service will not be GFCI protected.

12.3.2 All strings of temporary lights shall be fully lamped and guarded regardless of height, and shall be continuously maintained. Adequate levels of illumination for the work operations must be maintained at all times.

12.3.3 All receptacles and switches shall have trim plates installed before they are energized.

12.3.4 All power distribution panels shall have full covers installed before primary power is brought into the panel.

12.4 Excavations

12.4.1 Prior to starting, each excavation shall be reviewed with the Owner to obtain any historical knowledge about existing utilities in the area. Where applicable, “utility locates” will be called for seventy two hours in advance of commencement of the excavation. Potholing and/or hand excavation shall be required within two horizontal feet of located centerlines and in areas where knowledge is lacking.

12.4.2 When trench excavations cannot be backfilled in the same day as it is created, a highly visible barricade shall be erected no less than six feet from all approachable edges. All portable means of access shall be removed at the end of each workday.

12.4.3 Earth ramps that are to be used for walking access shall not exceed twenty percent in grade slope. Steeper slopes shall be gated and used for equipment only.

12.5 Fall Protection and Prevention

12.5.1 Any walking/working surface shall be defined to have a fall exposure that has one or more sides, ends or edges without a guardrail system attached or a solid continuous wall of at least forty-two inches in height above the walking/working surface, and within twelve horizontal inches from the edge. The Contractor shall require engineered or conventional fall protection measures for each and every fall exposure that involves vertical distances equal to or greater than six feet. The recognized exemptions/exceptions are as follows:

- Portable step ladders
- Extension and straight ladders
- Erection and dismantling of scaffolding
- Limited exposure for engaging and disengaging a hook
- Vertical fall exposure protected by a warning line and six foot setback

12.5.2 Provide covers over holes which are secured and clearly marked as covers.

12.5.3 Job built ramps and bridges must be covered with non-skid materials.

12.5.4 Materials, scraps, waste and tools shall never be allowed to freefall from a height greater than twenty feet, unless it is contained within a chute or controlled by a hoist.

12.6 Fire Protection

12.6.1 The Contractor shall review fire prevention needs and procedures with the Owner and shall post appropriate information and warnings.

12.6.2 The Contractor shall maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways and other access routes.

12.6.3 The Contractor shall provide supervision of welding operations, combustion type temporary heating units and similar sources of ignition.

12.6.4 All floors that have combustible materials present shall be accessible from ground level by a usable stair system. For structures greater than three stories in height shall have a fire sprinkler stand pipe installed and it shall be charged to within two stories (or thirty vertical feet) of all floors containing combustible materials. A Siamese connection shall be installed at every second level to provide access for fire hoses.

12.6.5 All fire extinguishers that are not task-specific shall be adequate in number and description to comply with OSHA declared limits for egress points, floor area and travel distances. They shall be situated in highly visible locations.

12.6.6 All fire extinguisher that are task specific shall be inspected and furnished in advance by the employer that will be conducting the work that requires such fire fighting provisions. Such extinguishers shall be located with twenty-five feet from the perimeter of the task operation.

12.7 Housekeeping - The Contractor shall ensure that all subcontractors effectively clean the project site continuously throughout each workday. Effective cleanup shall address all of the following housekeeping issues:

12.7.1 All construction waste, trash, and debris shall be placed in designated receptacles. No glass bottles will be permitted on the project site.

12.7.2 Stack all whole and scrap materials in locations that do not obstruct a clear pathway nor create a risk of toppling causing injury or damage to the work.

12.7.3 Place all hoses, cords, cables and wires in locations that prevent them from being damaged by tires, sharp edges, or pinch points and from creating trip or hook hazards.

12.7.4 Secure and effectively cover all materials on roofs and elevated levels to prevent displacement by wind.

12.7.5 All materials and equipment shall be protected from the elements while staged on the project site.

12.7.6 All signs, barricades, fire extinguishers, guardrails, gates, etc. are to be restored to their proper locations in sound condition after they have been moved for work purposes.

12.7.7 Properly store and secure all flammable and combustible liquids and gases.

12.7.8 Collect and place all cut-off or waste pieces of rolling stock into waste and scrape containers as they are created.

12.7.9 Live rounds ejected from powder-actuated tools shall be immediately placed in designated containers and periodically returned to the tool dealer or law enforcement agency for proper disposal.

12.7.10 All puncture and impalement exposures shall be covered or eliminated as soon as they are created.

12.8 Ladders

12.8.1 Portable aluminum ladders are prohibited.

12.8.2 Extension, straight and job built ladders shall be secured from movement at the top and bottom.

12.8.3 Manufactured portable ladders shall display ANSI heavy duty rating (Class 1-A) and be inspected daily.

12.9 Medical Assistance and Screening

12.9.1 The PSC shall maintain a First Aid Log for all treatment administered on the project.

12.9.2 Drug and alcohol screening shall be mandatory for every supervisor and/or worker who sustains or contributes to the cause of any injury (beyond first aid) or property damage incident.

12.9.3 Minimum requirements for chemical screening shall at least match the threshold limits for a NIDA 5-panel protocol and for alcohol screening shall at least match the Texas DOT vehicle operator's limit for blood alcohol content.

12.9.4 Any supervisor or worker who tests positive shall be ejected and excluded from return to work at the project. Successful completion of an acceptable rehabilitation program may be considered by the Owner for restoring a person's ability to return to the project. The final decision rest solely with the Owner.

12.10 Petroleum Fuel Operated Equipment

12.10.1 Where possible, equipment operator cabs shall be locked during non-working hours. Only equipment operators and direct supervisors shall have access to keys.

12.10.2 Any combustion engine equipment with less than ninety-eight percent clean air exhaust shall not be operated in enclosed spaces unless the exhaust is piped to outside air, and fresh air is brought into the space to replace the amount being consumed. This includes generators/welders and compressors as well as mobile equipment.

12.10.3 For hose and termination fittings on air compressors, whip checks shall be used at all connection points. Emergency shut off valves shall be installed on every discharge fitting of all air compressors.

12.11 Public Protection - The public boundary perimeter shall be secured from public intrusion. Attractive nuisance items such as tower cranes, tall ladders, fire escapes, large excavations, etc. shall require additional and separate security measures.

12.12 Project Service Water

12.12.1 Potable water: comply with city health requirements.

12.12.2 Non-potable water: Water storage containers, hose bibs and faucet shall be posted in English and Spanish “Danger – Do Not Drink”

12.13 Welding and Burning

12.13.1 Oxygen and fuel gas cylinders shall not be stored together, including on bottle carts. At the end of any workday bottles must be moved to OSHA prescribed storage arrangements.

12.13.2 Anti-flashback arrestors shall be installed at the pressure regulator gauges of all Oxy-Acetylene cutting rigs.

12.13.3 Welding operations shall not be allowed to present an opportunity for flash burn exposures to the eyes of any workers in the vicinity. All welding operations shall provide appropriate screening measures, erected in advance to contain the high energy light.

Section 014200 Reference Standards

1. Governing Regulations/Authorities - The Architect/Engineer (A/E) has contacted the appropriate authorities having jurisdiction for the listed regulations and codes to obtain information for preparation of the Construction Documents. The Contractor may contact the authorities having jurisdiction directly for information and decisions having bearing on the work. **Refer to the coversheet of the plans issued for construction to identify the appropriate authorities having jurisdiction.**

2. Standards

2.1 Reference to standards, codes, Specifications, recommendations and regulations refer to the latest edition or printing prior to the date of issue of the Construction Documents.

2.2 Applicable portions of standards listed that are not in conflict with the Construction Documents are hereby made a part of the Specifications

2.3 Modifications or exceptions to Standards shall be considered as amendments and unmodified portions shall remain in full effect. In cases of discrepancies between standards, the more stringent requirements shall govern.

2.4 Copies of Standards: Each entity engaged in construction of the Project is required to be familiar with industry standards applicable to its respective construction activity. Copies of applicable standards are not bound with the Construction Documents. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

3. Schedule of Standards

AA Aluminum Association
1525 Wilson Blvd. Suite 600
Arlington, VA 22209
703.358.2960
Fax 703.358.2961
www.aluminum.org

AABC Associated Air Balance Council
1518 K St. NW
Washington, DC 20005
202.737.0202
www.aabchq.com

AAMA American Architectural Manufacturers Assoc.
1827 Walden Office Square, Suite 550
Schaumburg, IL 60173-4268
847.303.5664
Fax 847.303.5774
www.aamanet.org

AAN American Association of Nurserymen

1250 Eye St., NW, Suite 500
Washington, DC 20005
202.789.2900

ANLA American Nursery and Landscape Association
1000 Vermont Ave., NW, Suite 300
Washington, DC 20005-4914
202.789.2900
www.anla.org

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol St., Suite 225
Washington, DC 20001
202.624.5800
www.transporation.org

ACI American Concrete Institute
38800 Country Club Dr.
Farmington Hills, MI 48331
248.848.3700
Fax 248.848.3701
www.aci-int.org

ACIL American Council on Independent Laboratories
1629 K St. NW
Washington, DC 20006
202.887.5872
www.acil.org

ACPA American Concrete Pipe Association
1303 West Walnut Hill Lane, Suite 305
Irving, TX 75038-3008
972.506.7216
Fax 972.506.7682
www.concrete-pipe.org

ADC Air Diffusion Council
1901 N. Roselle Rd., Suite 800
Schaumburg, IL 60195
847.706.6750
Fax 847.706.6751
www.flexibleduct.org

AF&PA American Forest & Paper Products
(Formerly National Forest Products Assoc. (NFPA)
1111 Nineteenth St., NW, Suite 800
Washington, DC 20036
800.878.8878
Fax 202.463.2700
www.afandpa.org

AI Asphalt Institute
2696 Research Park Dr.
Lexington, KY 40512-4052

606.288.4960
http://wwwashpaltinstitute.org

AIA American Institute of Architects
1735 New York Ave. NW
Washington, DC 20006
202.626.7300
www.aia.org

AIHA American Industrial Hygiene Assoc.
P 2700 Prosperity Ave., Suite 250
Fairfax, VA 22031
703.849-888
www.aiha.org

AISC American Institute of Steel Construction
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001
312.670.2400
www.aisc.org

AISI American Iron and Steel Institute
1140 Connecticut Ave., NW, Suite 705
Washington, DC 20036
202.452.7100
www.steel.org

AITC American Institute of Timber Construction
7012 S. Revere Parkway, Suite 140
Centennial, CO 80112
303.792.9559
303.792.0669
www.aitc-glulam.org

ALI Associated Laboratories, Inc.
500 S. Vermont St.
Palatine, IL 60067
800.685.0026
www.associatedlabs.org

ALSC American Lumber Standards Committee
P.O. Box 210
Germantown, MD 20875
301.972.1700
www.alsc.org

AMCA Air Movement and Control Assoc.
30 W. University Dr.
Arlington Heights, IL 60004-1893
847.394.0150
www.amca.org

ANSI American National Standards Institute
1819 L St., NW, 6th Fl.
Washington, DC 20036

202.293.8020
Fax 202.293.9287
www.ansi.org

APA American Plywood Assoc.
7011 S. 19th
Tacoma, WA 98466
253.565.6600
Fax 253.565.7265
www.apawood.org

ARI Air Conditioning and Refrigeration Institute
4100 North Fairfax Dr., Suite 200
Arlington, VA 22203
703.524.8800
Fax 703.528.3816
www.ari.org

ARMA Asphalt Roofing Manufacturers Assoc.
Public Information Dept.
1156 15th St., NW, Suite 900
Washington, DC 20005
202.207.0917
Fax 202.223.9741
www.asphaltroofing.org
ASA Acoustical Society of America
2 Huntington Quadrangle, Suite 1N01
Melville, NY 11747-44502
516.576.2360
Fax 516.576.2377
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Date 3/02/09
www.asaa.aip.org

ASC Adhesive and Sealant Council
7979 Old Georgetown Rd. Suite 500
Bethesda, MA 20814
301.986.9700
Fax 301.986.9795
www.ascouncil.org

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, GA 30329
404.636.8400
Fax 404.321.5478
www.ashrae.org

ASME American Society of Mechanical Engineers
Three Park Ave.
New York, NY 10016-5990
800.843.2763
www.asme.org

ASPE American Society of Plumbing Engineers

8614 Catalpa Ave., Suite 1007
Chicago, IL 60656-1116
773.693.2773
Fax 773.695.9007
www.aspe.org

ASSE American Society of Sanitary Engineers
901 Canterbury, Suite A
Westlake, OH 44145
440.835.3040
Fax 440.835.3488
www.asse-plumbing.org

ASTM American Society for Testing and Materials
100 Barr Harbor Dr.
West Conshohocken, PA 19428-2959
610.832.9500
Fax 610.832.9555

AWCMA American Window Covering Manufacturers Assoc.
355 Lexington, AVE, 17th Fl.
New York, NY 10017
212.297.2122
Fax 212.370.9047
www.wcmanet.org

AWI Architectural Woodwork Institute
46179 Westlake Dr., Suite 120
Potomac Falls, VA 20165
571.323.3636
Fax 571.323.3630
www.awinet.org

AWPA American Wood-Preservers' Assoc.
P.O. Box 361784
Birmingham, AL 35236-1784
205.733.4077
www.awpa.com

AWPB American Wood Preservers Bureau
4 D. Washington, St
Newnan, GA 30263
404.254.9877

AWS American Welding Society
50 N.W. LeJeune Rd.
Miami, FL 33126
800.443.9353
Fax 305.443.9353
www.aws.org

BHMA Builder's Hardware Manufacturers Assoc.
355 Lexington Ave., 15th Fl.
New York, NY 10017
212.297.2122

Fax 212.370.9047
www.buildershardware.com

BIA The Brick Industry Association
1850 Centennial Park Dr., Suite 301
Reston, VA 20191
703.620.0010
Fax 703.620.3928
www.bia.org

BIFMA Business and Institutional Furniture Manufacturers Assoc.
2680 Horizon, Dr., SE, Suite A-1
Grand Rapids, MI 49546-7500
616.285.3963
Fax 616.285.3765
www.bifma.org

CFFA Chemical Fabrics & Film Assoc., Inc.
c/o Thomas Assoc., Inc
1300 Sumner Ave.
Cleveland, OH 44115-2851
216.241.7333
www.chmicalfabricsandfilm.com

CISCA Ceiling and Interior Systems Construction Assoc.
5700 Old Orchard Rd., 1st Fl.
Skokie, IL 60077
708.965.2776
www.cisca.org

CISPI Cast Iron Soil Pipe Institute
5959 Shallowford Rd., Suite 419
Chattanooga, TN 37421
615.892.0137
Fax 615.892.0817
www.cispi.org

CRI Carpet and Rug Institute
P.O. Box 2048
Dalton, GA 30722
706.278.8835
Fax 706.278.8835 www.carpet-rug.org

CRSI Concrete Reinforcing Steel Institute
933 North Plum Grove Rd.
Schaumburg, IL 60173-4758
847.517.1200
Fax 847.517.1206
www.crsi.org

CTIOA Ceramic Tile Institute of America
12064 Jefferson, Blvd.
Culver City, CA 90230-6219
310.574.7800
Fax 310.821.4655

www.ctioa.org

DHI Door and Hardware Institute
14150 Newbrook Dr., Suite 200
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Date 3/02/09
Chantilly, VA 20151
703.222.2010
Fax 703.222.2410
www.dhi.org

ETL ETL Testing Laboratories, Inc.
P.O. Box 2040
Route 11, Industrial Park
Cortland, NY 13045
607.753.6711
www.etl.com

ECDS Energy Conservation Design Standards for New State Buildings
State Energy Conservation Office
Texas Facilities Commission
P.O. Box 13047
Austin, TX 78711-3047

\\FGMA Flat Glass Marketing Assoc.
(The Flat Glass Marketing Assoc. included Glass Tempering Association, and members of the Laminators Safety Glass Association consolidated to form the Glass Assoc. of North America)
2495 SW Wanamaker Dr., Suite A
Topeka, KS 66614
785.271.0208
Fax 785.271.0166
www.glasswebsite.com

FM Factory Mutual Research Organization
500 River Ridge
P.O. Box 9102
Norwood, MA 02062
617.762.4300

GA Gypsum Association
810 First St., NE #510
Washington, DC 20002
202.289.5440
Fax 202.289.3707
www.gypsum.org

HMA Hardwood Manufacturers Assoc.
400 Penn Center Blvd., Suite 350
Pittsburg, PA 15235
412.829.0770
Fax 412.829.0844
www.hmamembers.org

HPMA Hardwood Plywood Manufacturers Assoc.

1825 Michael Farraday Dr.
Reston, VA 20190
703.435.2900
Fax 703.435.2537
www.hpva.org

IBC International Building Code
International Code Council
500 New Jersey Ave., NW 6th Fl.
Washington, DC 20001-2070

IBD Institute of Business Designers
341 Merchandise Mart
Chicago, IL 60654
312.647.1950

ICC International Code Council
500 New Jersey Ave., NW, 6th Floor
Washington, DC 20001
888.422.7233
Fax 202.783.2348
www.iccsafe.org

IECC International Energy Conservation Coder
www.iccsafe.com

IEEE Institute of Electrical and Electronic Engineers
3 Park Ave., 17th Fl.
New York, NY 10016-5997
212.419.7900
Fax 212.752.4929
www.ieee.org

IESNA Illuminating Engineering Society of North American
120 Wall Street, Fl. 17
New York, NY 10005
212.248.5000
Fax 212.248.5017
www.iesna.org

IFC International File Code
www.iccsafe.org

IGCC Insulating Glass Certification Council
c/o ETL Testing Laboratories, Inc.
P.O. Box 9
Henderson Harbor, NY 13651
315.646.2234
Fax 315.646.2297
www.igcc.org

ILI Indiana Limestone Institute of American
400 Stone City Bank Bldg.
Bedford, IN 47421
812.275.4426
Fax 812.279.8682

www.iliai.com

IPC International Plumbing Code
www.iccsafe.org

ISA Instrument Society of America
67 Alexander Dr.
Research Triangle Park, NC 27709
919.549.8411
Fax 919.549.8288
www.isa.org

LIA Lead Industries Assoc., Inc.
Sparta, New Jersey
www.leadinfo.com

LPI Lightning Protection Institute
25475 Magnolia Dr.
P.O. Box 99
Maryville MO 64468
800.488.6864
www.lightning.org

MBMA Metal Building Manufacturers Assoc.
1300 Sumner Ave.
Cleveland OH 44115-2851
216.241.7333
Fax 216.241.0105
www.mbma.com

MCAA Mechanical Contractors Assoc. of America
1385 Piccard Dr.
Rockville, MD 20850
301.869.5800
Fax 301.990.9690
www.mcaa.org

MFMA Maple Flooring Manufacturers Assoc.
60 Revere Dr., Suite 500
Northbrook, IL 60062
888.480.9138
Fax 847.480.9282
www.maplefloor.org

MIA Marble Institute of America
28901 Clemens Rd., Suite 100
Cleveland, OH 44145
440.250.9222
Fax 440.250.9223
www.marble-institute.com

ML/SFA Metal Lath/Steel Framing Assoc.
(A Division of the National Association of Architectural Metal Manufacturers)
800 Roosevelt Rd., Bldg. C, Suite 312
Glen Ellyn, IL 60137

630.942.6591
Fax 630.7903095
www.naamm.org

NAAMM National Association of Architectural Metal Manufacturers
800 Roosevelt Rd., Bldg. C, Suite 312
Glen Ellyn, IL 60137
630.942.6591
Fax 630.7903095
www.naamm.org

NAIMA North American Insulation Manufacturers Assoc,
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
703.684.0084
Fax 703.684.0427
www.naima.org

NAPA National Asphalt Pavement Association
NAPA Building
5100 Forbes Blvd.
Lanham, MD 20706
888.468.6499
www.hotmix.org

NCMA National Concrete Masonry Assoc.
13750 Sunrise Valley Dr.
Herndon, VA 20171-4662
703.713.1900
Fax 703.713.1910
www.ncma.org

NEC National Electrical Code (NFPA)

NECA National Electrical Contractors Assoc.
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814
301.657.3110
Fax 301.215.4500
www.necanet.org

NEII National Elevator Industry, Inc.
1677 County Route 64
P.O. Box 838
Salem, NY 127865-0838
518.854.3100
Fax 518.854.3257
www.neii.org

NEMA National Electrical Manufacturers Assoc.
1300 North 17th St., Suite 1752
Rosslyn, VA 22209
703.841.3200
Fax 703.841.5900
www.nema.org

NFPA National Fire Protection Assoc.
1 Batterymarch Park
Quincy, MA 02169-7471
617.770.3000
Fax 617.770.0700
www.nfpa.org

NHLA National Hardwood Lumber Assoc.
6830 Raleigh-LaGrange Rd.
Memphis, TN 38184-0518
901.377.1818
www.natlhardwood.org

NLGA National Lumber Grades Authority
#302 960 Quayside Dr.
New Westminister, BC V3M 6G2 Canada
604.524.2393
Fax 604.524.2893
www.nlga.org

NPA National Particleboard Assoc.
18928 Premiere Court
Gaithersburg, MD 20879-1569
301.670.0604
Fax 301.840.1252
www.pbmdf.org

NPCA National Paint and Coatings Assoc.
1500 Rhode Island Ave., NW
Washington, DC 20005
202.462.6272
Fax 202.462.8549
www.paint.org

NRCA National Roofing Contractors Assoc.
10255 W. Higgins Rd., Suite 600
Rosemont, IL 60018-5607
708.299.9070
Fax 847.299.1183

NTMA National Terrazzo and Mosaic Assoc.
201 North Maple, Suite 208
Purcellville, VA 20132
540.751.0930
Fax 540.751.0935
www.ntma.com
NWWDA National Wood Window and Door Assoc.
1400 E. Touhy Ave.
Des Plains, IL 60018
800.223.2301
Fax 708.299.1286

PCA Portland Cement Assoc.
5420 Old Orchard Rd.
Skokie, IL 60077

847.966.6200
Fax 847.966.8389
www.cement.org

PCI Precast/Prestressed Concrete Institute
209 W. Jackson Blvd. #500
Chicago, IL 60606
312.786.0300
Fax 312.786.0353
www.pci.org

RFCI Resilient Floor Covering Institute
401 E. Jefferson St., Suite 102
Rockville, MC 20850
301.340.8580
Fax 301.340.7283
www.rfci.com

RMA Rubber Manufacturers Assoc.
1400 K St., NW, Suite 900
Washington DC 20005
202.682.4800
www.rma.org

SDI Steel Deck Institute
P.O. Box 25
Fox River Grove, IL 60021
847.458.4647
Fax 847.458.4648

SECO State Energy Conservation Office
LBJ State Office Bldg.
111 E. 17th St., Rm 1114
Austin, TX 78701
512.463.1931
Fax 512.475.2569
www.seco.cpa.stat.tx.us
SGCC Safety Glazing Certification Council
P.O. Box 730
Sackets Harbor, NY 13685
315.646.2234
Fax 315.646.2297
www.sgcc.org

SIGMA Sealed Insulating Glass Manufacturers Assoc.
401 N. Michigan
Chicago, IL 60611
312.644.8610
www.sigmaonline.org

SJI Steel Joist Institute
3127 Mr. Joe White Ave.
Myrtle Beach, SC 29577-6760
843.626.1995
Fax 843.626.5565
www.steeljoist.org

SMACNA Sheet Metal and Air Conditioning Contractors National Assoc.
4201 Lafayette Center Dr.
Chantilly, VA 20151-1209
703.803.2980
703.803.3732
www.smacna.org

SPIB Southern Pine Inspection Bureau
P.O. Box 10915
Pensacola, FL 32524-0915
850.434.2611
Fax 850.433.5594
www.spib.org

SPRI Single Ply Roofing Institute
77 Rumford Ave., Suite 3B
Waltham, MA 02453
781.647.7026
Fax 781.647.7222
www.spri.org

TCA Tile Council of America
100 Clemson Research Blvd.
Anderson, SC 29625
864.646.8453
Fax 864.646.2821
www.tileusa.com

TIMA Thermal Insulation Manufacturers Assoc.
29 Bank St.
Stanford, CT 06901
203.324.7533

(Standards now issued by NAIMA, www.naima.org
UFAC Upholstered Furniture Action Council
Box 2436
High Point, NC 27261
919.885.5065
www.ufac.org

UL Underwriters Laboratories, Inc.
333 Pfingsten Rd.
Northbrook, IL 60062-2096
847.272.8800
Fax 847.272.8129
www.ul.com

WSFI Wood and Synthetic Flooring Institute
4415 W. Harrison St., Suite 242-C
Hillside, IL 60162
708.449.2933

WWPA Western Wood Products Assoc.
522 SW Fifth Ave., Suite 500
Portland, OR 97204-2122

503.224.3930
Fax 503.224.3934
www.wwpa.org

W.W.P.A. Woven Wire Products Assoc.
2515 N. Nordica Ave.
Chicago, IL 60635
312.637.1359
www.wovenwire.org

Government Agencies
CPSC Consumer Products Safety Commission
4330 E. West Highway
Bethesda, MD 20814
301.504.7923
Fax 301.504.0124
www.cpsc.gov
CS Commercial Standard
(U.S. Department of Commerce)
1401 Constitution Ave., NW
Washington, DC 20230
Page 49 of 69
Date 3/02/09
202.482.2000
www.commerce.gov

DOC U.S. Department of Commerce
1401 Constitution Ave., NW
Washington, DC 20230
202.482.2000
www.commerce.gov

EPA Environmental Protection Agency
1445 Ross Ave., Suite 1200
Dallas, TX 75202
214.665.6444
www.epa.gov

FS Federal Specifications (from GSA Specifications Unit WFSIS)
7th and D St., SW
Washington DC 20407
202.708.9205
www.apps.fss.gsa.gov/pub/fedspecs

GSA General Services Administration
1800 F. St., SW
Washington DC, 20405
202.708.9205
www.gsa.gov

GSC Texas Building and Procurement Commission
1711 San Jacinto
Austin, TX 78701
512.463.6363
www.tbpc.state.tx.us

NIST National Institute of Standards and Technology
100 Bureau Dr., Stop 1070
Gaithersbury, MD 20899-1077
301.975.6478
Fax 301.975.8295
www.nist.gov

OSHA Occupational Safety and Health Administration
Federal Office Building
1205 Texas Ave., Rm 806
Lubbock, TX 79401
806.472.7681
Fax 806.472.7686
www.osha.gov

PS Product Standard of NBS
(U.S. Department of Commerce)
Washington, DC 20230
202.482.2000
www.thenbs.com

USDA U.S. Department of Agriculture
1400 Independence Ave., SW
Washington, DC 20250
202.447.2791
www.usda.gov

Section 014300 Quality Assurance

1. General Requirements

1.1 The Contractor is responsible for controlling the quality of the Work of its forces and its subcontractors and all of the Work of the Project in general and as set forth in the Construction Documents. The Contractor shall provide qualified personnel, approved by the Owner, to perform daily supervision, reviews and inspections of subcontractor work to insure quality, accuracy, completeness and compliance.

1.2 The Owner will employ a testing laboratory and/or geotechnical engineering service to perform quality assurance test and to transmit copies of test reports to the Contractor. Sampling and testing that the Owner may require is specified in this section and in the various technical sections requiring quality assurance testing. The Contractor shall cooperate with the Owner's testing personnel, provide access to the work, to manufacturer's and fabricator's operations, furnish incidental labor and facilities and samples for test and inspection as specified.

1.2.1 Employment of the testing laboratory to perform quality assurance tests is for the benefit of Owner in confirming that performance and quality of the work is in conformance with the Construction Documents.

1.2.2 Employment of the testing laboratory by Owner in no way relieves Contractor's obligation to perform the work in accordance with the Construction Documents and Owner's testing laboratory shall not be the same as Contractor's testing laboratory.

1.2.3 The testing firm shall make all inspections and perform all tests in accordance with the rules and regulations of the building code, local authorities, the specifications of the ASTM and these Construction Documents.

1.2.4 Any costs incurred by the Owner due to re-testing of materials or re-inspection of work due to non-compliance with the Construction Documents by the contractor shall be at the expense of the Contractor and shall be deducted from the next pay request accordingly.

1.3 Limits of testing laboratory authority: Laboratory is not authorized to:

1.3.1 Approve or reject any portion of the work.

1.3.2 Perform any duties of the Contractor and subcontractors.

1.3.3 Revoke, alter, relax, expand, or release any requirement of the Construction Documents or to approve or accept any portion of the Work, except where such approval is specifically called for in the specifications.

1.3.4 Work will be checked as it progresses, but failure to detect any defective work or materials shall not, in any way, prevent later rejection when such defect(s) are discovered.

1.4 When requested by the Owner, the Contractor will demonstrate a material's compliance with the specifications in one of the following ways:

- Manufacturer's Certificate of Compliance
- Mill Certificate
- Testing Laboratory Certifications
- Report of actual test results from Owner's designated laboratory, or a laboratory satisfactory to the Owner. Materials so tested shall be provided by the Contractor and selected by the Owner, or in the presence of the Owner, and the method of testing shall comply with the professional societies' standard specifications.

1.5 The Owner may require Special Inspections, Testing or Approval of certain materials or Work in addition to those clearly specified in the Construction Documents. Upon notification by the Owner of such requirements, the Contractor shall promptly arrange for such Special Inspections, Testing and Approval procedures. The costs associated with these efforts shall be borne by the Owner, except that if such materials or Work fail the initial Owner-paid inspections, tests and approvals, then subsequent tests required to prove the materials or Work suitable for inclusion in the Project Work shall be borne by the Contractor.

1.6 If the Contractor covers any of the Work that is required to be inspected, tested or approved by the Construction Documents, then that Work shall be uncovered, inspected, tested or approved and then recovered at the Contractor's sole expense.

1.7 The Contractor shall have the right to have tests performed on any material at any time for its own information and job control so long as the Owner is not charged for these tests or forced to rely on these tests when appraising quality of the materials. The tests specified in the Construction Documents for a specific material shall take precedence over any testing initiated by and paid for by the Contractor.

1.8 The Contractor will shall reimburse the Owner any and all costs incurred by the materials testing laboratory for performing quality assurance tests at a location greater than 50 miles from the project location.

2. Below Grade Inspections - Before covering or backfilling of any improvement below grade, cover up inspections will be conducted to see that all items meet the plans and specifications. Only after all the deficiencies have been corrected will the Contractor be allowed to install any backfill.

3. Concrete Inspections - Before the placing of any cast-in-place concrete structure, an inspection will be conducted to see that all items meet the intent of the Construction Documents. Only after all deficiencies have been corrected will the Contractor be allowed to proceed.

4. Wall Closure/Above-Ceiling Inspections - Before the installation of any ceiling or the closing of walls chases, an inspection will be conducted to see that all items fully meet the contract document requirements before being covered. Only after all the deficiencies have been corrected will the Contractor be allowed to install the ceiling or close-up the wall. As a minimum, the following should be in place before an above-ceiling inspection is scheduled:

- All light fixtures installed and working;
- All plumbing installed and insulation complete;
- All rigid and flexible ducts installed;
- All required valve identification tags installed;
- All air devices installed and connected;
- All control wiring and devices installed and connected;
- The ceiling support structure installed.

5. Substantial Completion Inspection (see UGC 12.1.1)

When the Contractor feels that the work is complete and ready for the Owner's intended use, it will notify the A/E and Owner at least seven days prior to the date the Contractor is ready for a Substantial Completion Inspection. The A/E and appropriate members of the design team along with the Owner will perform a detailed inspection of the all work and furnish the Contractor with a list of incomplete or unsatisfactory items. When the Contractor has completed all the work related to these items the Pre-Final Inspection will be complete.

6. Final Inspection & Acceptance (see UGC 12.1.2 & 12.3)

Upon verification by the A/E and Owner that the deficiencies found during the Pre-Final Inspection have been corrected, and the work is ready for Final Inspection and Acceptance, the A/E and Owner will schedule a Final Inspection. When the work is found to be acceptable under the Construction Documents without exception and the contract is fully performed, then a Final Acceptance Notice will be issued by the A/E.

7. One-year Warranty Inspection

Within thirty-days prior to the expiration of the one year anniversary of the Substantial Completion date the Owner shall prepare a list of deficiencies related solely to the workmanship and material warranties provided by the Contractor through the Construction Documents. The Contractor shall make the necessary repairs and replacements and notify the Owner that all work is complete and Owner shall review and approve the work and provide written acceptance.

8. Execution

8.1 Pier Drilling Operations

8.1.1 A representative of the soils testing laboratory shall make continuous inspections to determine that proper bearing stratum is obtained and utilized for bearing and that shafts are properly clean and dry before pouring concrete.

8.1.2 Soils testing laboratory shall furnish complete pier log showing the diameter, top and bottom elevations of each pier, casing required or not required, bell size, actual penetration into bearing stratum, elevation of top of bearing stratum, and volume of concrete used.

8.2 Reinforcing Steel Mechanical Splices

8.2.1 Visually inspect and report on the completed condition of each mechanical splice of reinforcing steel.

8.2.2 Each mechanical splice shall be visually inspected to ensure compliance with building code and the manufacturer's published criteria for acceptable completed splices.

8.2.3 Special emphasis shall be placed on inspection of the end preparation of each bar to be spliced.

8.2.4 Submit copies of manufacturer's published criteria for acceptable completed splices prior to observing mechanical splices.

8.2.5 Reports on each splice shall indicate location, size of bars and acceptability or rejection of splice. Reasoning for rejection shall be provided in the report.

8.3 Reinforcing Steel and Embedded Metal Assemblies - Inspect all concrete reinforcing steel for compliance with Construction Documents and approved shop drawings prior to placing concrete. All instances of noncompliance shall be immediately brought to the attention of the Contractor for correction and then, if not corrected, reported to the A/E.

Observe and report on the following:

- Number and size of bars;
- Bending and lengths of bars;
- Splicing;
- Clearance to forms including chair heights;
- Clearance between bars or spacing;
- Rust, form oil and other contaminants;
- Grade of steel;
- Securing, tying and chairing of bars;

- Excessive congestion of reinforcing steel;
- Installation of anchor bolts and placement of concrete around such bolts;
- Fabrication of embedded metal assemblies, including visual inspection of all welds;
- Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with the Construction Documents.

8.4 Concrete Inspection & Testing

8.4.1 Receive, evaluate and certify all proposed concrete mix designs submitted by the Contractor which comply with the Construction Documents. Mix designs not complying shall be returned by the laboratory as unacceptable.

8.4.2 Secure composite samples of concrete at the jobsite and perform the appropriate tests as specified in the Construction Documents. Test results will be provided to the appropriate design team members, the Contractor and the Owner.

8.4.3 Inspect the application of curing compounds and monitor all curing conditions to assure compliance with the Construction Documents.

8.5 Post-tensioning of Concrete

8.5.1 Verify certification of calibration of jacking equipment used in the post-tensioning operations.

8.5.2 Observe and report on placement and anchorage of tendons immediately prior to placement of concrete.

8.5.3 Provide a registered professional engineer experienced in posttension operations to observe and report on the placement, posttensioning and elongation measurement of each tendon.

8.5.4 Observe and report on grouting of tendons noted to be bonded.

8.6 Masonry

8.6.1 Provide a qualified inspector to inspect all structural masonry work on a periodic basis.

8.6.2 Inspect the following:

- Preparation of masonry prisms for testing;
- Placement of reinforcing;
- Grout spaces;
- Mortar mix operations;
- Bedding of mortar for each type of unit and placing of units;
- Grouting operations;
- Condition of units before laying for excessive absorption.

8.6.3 Provide a report of each inspection.

8.7 Structural Steel

8.7.1 Inspect all structural steel during and after erection for conformance with the Construction Documents and shop drawings. Any cases of insufficient bracing or guying, or other unsafe conditions shall be immediately called to the attention of the Contractor and reported to the A/E and Owner.

8.7.2 Inspect the following:

- Proper erection of all pieces;
- Proper installation of all bolts;
- Plumbness of structure and proper bracing;
- Proper field painting;
- Visual examination of all field welding;
- Inspect all shop fabricated members upon arrival at the jobsite.
- Inspection of shop and field welding shall be in accordance with the AWS Structural Welding Code – Steel, latest edition;
- Inspection of bolted construction shall be in accordance with AISC specifications for structural steel buildings;
- Review all shop and field welder certifications:
- Perform magnetic particle testing in accordance with ASTM E709 and at the discretion of the testing agency for all questionable welds;

- □ Ultrasonically test 100% of all complete penetration welds in accordance with AWS Structural Welding Code – Steel, latest addition, buy ASNT Level II technicians;
- Inspection of stud field welding shall be in accordance with AWS structural welding code latest edition.

8.8 Expansion Bolt Installations

8.8.1 Inspect the drilling of holes and installation of expansion bolts for compliance with the Construction Documents and shop drawings.

8.8.2 Verify the installation torque of the expansion bolts for compliance with the manufacturer's installation instructions.

8.9 Metal Floor Deck - Field inspection shall consist of the following:

- Check types, gauges and finishes for conformance with Construction Documents and shop drawings;
- Exam for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting and other coatings.

8.10 Metal Roof Deck - Field inspection shall consist of the following:

- Check types, gauges and finishes for conformance with Construction Documents and shop drawings;
- Exam for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting and other coatings.

Section 014339 Site Mock-ups (see UGC 8.4)

1. General

1.1 The Contractor shall direct all the appropriate subcontractors in the construction of all site mock-ups for review by the Owner and Architect/Engineer (A/E) as required by the Construction Documents.

1.2 The mock-up(s) when approved by the A/E and Owner shall become the site reference for quality of the incorporated features of materials and workmanship.

1.3 The mock-up shall not be part of the work and shall remain in place until Substantial Completion, or otherwise directed by the Owner.

Section 014500 Quality Control (see 014000)

1. General Requirements

1.1 Quality control shall be the sole responsibility of the Contractor, unless specifically noted otherwise. The Contractor shall be responsible for all testing, coordination, start-up, operational checkout and commissioning of all items of work included in the project. All costs for these services shall be included in the Contractor's cost of work and general conditions.

1.2 Specific quality control requirements for individual construction activities are specified in sections that govern those activities.

1.3 The Contractor employed testing agency shall comply with the requirements of ASTM C - 1021, 1077, 1093, E - 329, 543 and 548.

1.4 The Contractor shall develop design mixes for products to be used and have the appropriate test performed by the Contractor's employed testing agency at its own expense.

Section 014518 Field Engineering

1. Quality Assurance - Surveyor Qualifications: Engage a land surveyor, registered in the State of Texas, to perform required land surveying services.

2. Examination - Verify layout information shown on the construction documents, in relation to the property survey and existing benchmarks and building locations and finish floor elevations before

proceeding to lay out the work. Protect existing benchmarks and control points. Preserve permanent reference points during construction.

2.1 Do not change or relocate benchmarks or control points without prior written approval from the Owner.

2.2 Establish and maintain a minimum of two permanent benchmarks on the site.

3. Performance

3.1 Work from lines and levels established by the Construction Documents. Calculate and measure required dimensions with indicated and recognized tolerances. Do not scale drawings to determine dimensions.

3.2 Record deviations from required lines and levels and advise A/E immediately when deviations exceed indicated or recognized tolerances.

3.3 Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines services, or other appurtenances located in or affect by construction.

3.4 The as-built documents shall include a final Title I property survey.

Section 015000 Construction Facilities and Temporary Controls
(see UGC 3.3.4, 8.1 & 13.1; also see 5.6.8, 5.8.2 13.13 & 13.1.4 of the CSP contract)

1. General Requirements

1.1 Contractor shall provide all construction facilities and temporary controls specified in this section and as necessary for the proper and expeditious prosecution of the work. The Contractor will be provided with a description of the Project Site and the Limits of Construction either by the Construction Documents, or by the Owner. At any time such a description has not been provided, the Contractor should request it of the Owner in writing.

1.2 The Contractor shall erect a wire mesh fence around the Project Site. The Contractor and all its personnel, assigns, material suppliers and subcontractors shall confine and limit their work to the Project Site and shall confine their construction activities to within the Limits of Construction. All areas beyond these defined areas are patrolled either by the Campus Police or by the Police Department of the City. All public and College laws, ordinances, rules and regulations shall be obeyed. No tools, construction vehicles or construction materials shall be permitted to be outside the Project Site. Loitering of construction-related personnel in areas outside the Project Site is strongly discouraged and it will be discontinued if it becomes persistent, or otherwise a nuisance to the ordinary and normal functioning of the campus. **(UGC 3.3.11)**

1.3 All campus roads, drives, fire lanes and sidewalks/pedestrian routes (other than those specifically given over to the Contractor for its use) must be kept open and clean at all times. The Contractor shall make advanced preparations for, and obtain security clearance for, all significant materials and equipment movements that will disrupt traffic and pedestrian flows. The Contractor shall provide all traffic controls, warning signs, barricades and flag persons needed to minimize disruptions during such approved movements. When such movements cause damage or leave debris, the Contractor shall immediately repair and clean up afterwards. **(UGC 3.3.11.3)**

1.4 Contractor shall pay all charges for all connections to and distribution from existing services and sources of supply.

1.5 Requirements of service and utility companies relating to the work shall be ascertained by Contractor, and the Contractor shall comply with all requirements, including those relating to continued protection and maintenance until completion of the work.

1.6 Materials and construction for construction facilities and temporary controls may be new or used, must be in adequate capacity, must not create unsafe conditions and shall not be unsightly.

1.7 Contractor shall relocate temporary services and facilities at its own expense, as required by progress of construction. **(See UGC 7.2.1)**

1.8 Contractor shall remove all temporary services and facilities when their use is no longer required or at completion of the project. **(See UGC 3.3.11)**

1.9 Contractor shall clean and repair damage caused by temporary services and facilities to new condition for new work and to a condition as good as or better than existing prior to start of work for existing construction projects. **(See UGC 3.3.11.3)**

2. Yard Repairs

Where compaction of the soil has occurred in turf or other plant material areas within the limits of construction, the areas shall be rejuvenated by deep cultivation of the compacted soil. After completion of construction, the Contractor shall scarify the construction site within the limits of construction to a minimum depth of eight inches, except within thirty feet of trees where it shall be a six inch depth. The Contractor will either place sod or hydro mulch on the rejuvenated areas, as may be mutually agreed to between the Owner and the Contractor, depending on the season and availability of irrigation.

3. Temporary Utilities and Services

3.1 The Contractor shall provide for all necessary and appropriate temporary utilities and services for execution and protection of the work.

3.2 Schedule of Costs and Fees for Utility Services are different on different campuses. The Contractor must review the Construction Documents carefully and communicate with the Owner to determine the status on each Project.

3.2.1 **Temporary Water** – The Contractor shall provide and install temporary lines for all water required for the Work and will arrange with the Owner's Utility Department for connection to the campus system and for services.

3.2.2 **Temporary Electrical** – The Contractor shall arrange with the local Utility Company for temporary power and for metering. When using this temporary power, the Contractor shall be responsible for all related costs, including energy costs and fuel costs. If such power if available from the campus power systems, then the Contractor will make the same arrangements, but the Owner will pay for the power used unless the Contractor wastes energy and is not consuming it in a reasonable and prudent manner. The Contractor shall not energize the permanent power on the Project it is constructing until the Owner specifically approves.

3.2.3 **Temporary Heating, Cooling and Ventilation –** If temporary heating/cooling/ventilation is required for the protection of the Work or the work forces, the Contractor shall provide, at its cost, Owner-approved apparatus.

3.2.4 **Temporary Lighting** – The Contractor shall provide adequate temporary lighting to facilitate quality workmanship and appropriate inspection of the Work. Temporary lighting provided by the Contractor also must be adequate for site security, inspections of excavations, night work if pursued and for personal and general safety of operations. Provide the following minimum standards:

3.2.4.1 Provide and maintain lighting for construction operations to achieve a minimum lighting level of two watts per square foot.

3.2.4.2 Provide and maintain one watt per square foot lighting for exterior staging and storage areas after dark for security purposes.

3.2.4.3 Provide and maintain one-quarter watt per square foot lighting to interior work areas after dark for security purposes.

3.2.4.4 Permanent building lighting may be utilized during construction.

3.2.5 **Temporary Services Provided by Owner** – When approved by the Owner, the Contractor may request that Project mechanical and electrical systems be put into service prior to Substantial Completion, even if only to facilitate Contractor operations. However, the Contractor shall NOT open or close any valve connecting to the campus systems without specific Owner approval. During operation of the equipment prior to Substantial Completion the Contractor shall keep the equipment in good operating condition, properly and legally flushed with chemical treatment systems, properly started and stopped, properly maintained, including regular replacement and/or cleaning of filters. Without exception the filters will be newly replaced just prior to turning the equipment over to the Owner for operation. The actual warranty periods will not start until the equipment is officially turned over to the Owner at Substantial Completion.

3.2.6 **Temporary Facilities/Equipment Removal** – Prior to turning the Project over to the Owner for operation and maintenance, the Contractor shall completely remove all temporary facilities and equipment from the Project Site and shall repair or replace any

material, equipment, finished surfaces or landscaping that has been damaged by its activities on the site.

4. Construction Aids

4.1 Material and Personnel Hoists: The Contractor shall provide material and personnel hoist as required for normal use by all trades without charge. All necessary guards, signals and safety devices required for safe operation of these hoists shall be provided and properly maintained at all times.

4.2 Stairs: Provide temporary protective treads, handrails and wall coverings at stairways.

5. Barriers and Enclosures

5.1 Contractor shall construct temporary barricades, warning signs, hazard and warning lights, walks, passage-ways and similar temporary barriers and enclosures that are necessary to protect persons and property from hazards or damage due to construction operations, and required by the Owner, city, state or federal laws, ordinances or codes.

5.2 Contractor shall furnish and install construction fences and gates within the limits of construction, prior to beginning any other work on the project.

5.3 Contractor shall furnish and install movable fences as may be necessary and appropriate to facilitate execution of the work.

5.4 The Contractor shall be responsible for the protection of existing building surfaces (both interior and exterior), utilities, exterior structures, pavements, sidewalks, landscape, vegetation and irrigation systems. Any damage to existing areas will be repaired by the Contractor at its expense and to the satisfaction of the Owner. Such needed repairs that are not timely undertaken or completed by the Contractor may, at the Owner's sole discretion, be repaired by the Owner and the related expenses deducted from the Contract Amount by change order.

5.5 All existing trees, shrubs or endangered plants within the Project Site or near access ways to the Project Site, shall be protected by the Contractor as indicated on the Drawings and maintained in sound condition unless ordered by the Owner to remove them. Contractor shall furnish and install barricades, fences and guards as necessary to prevent damage to existing trees, shrubs or endangered plants indicated to remain after construction is completed. Contractor shall not remove, cut or trim any tree, shrub or endangered plant before first notifying the Owner and receiving prior approval for the action. The Contractor will be responsible for repair or replacement in kind of damaged vegetation including watering and maintenance until fully restored.

5.6 All fencing, gates, barricades and guards shall be maintained to be straight, level and having a neat and uniform appearance while in place. Upon removal all holes and damage caused by the placement and use of the fences shall be repaired to its original condition.

5.7 Contractor shall provide temporary roofing and weather tight insulated closures for openings in exterior surfaces as required to maintain specified working conditions and moisture content of all project materials.

6. Security

6.1 The Contractor shall provide security and facilities to protect the Work, materials and equipment from unauthorized entry, vandalism, or theft until Substantial Completion has been achieved. If deemed necessary the Contractor may, at its own expense, employ unarmed security personnel. The Contractor must first must notify the Owner and provide particulars about the security firm and its personnel prior to its employment.

6.2 The Campus Police will not provide security for the Project Site or the areas that are given over to the Contractor's control.

7. Temporary Controls

7.1 Cleaning during construction: Contractor at all time shall keep the premises free from accumulation of waste materials and rubbish caused by operations for the work. Provide a collection can at each area used for eating. Pick up garbage daily. Keep project site free of garbage, trash, vermin and rodent infestation. Require each subcontractor to collect and deposit waste and rubbish caused by subcontractor operations at designated locations. Clean interior

areas prior to start of finish work and maintain areas free of dust and other contaminates during finishing operations. Protect installed equipment and seal installed ductwork and piping to prevent intrusion of dust. When the Work is within or adjacent to existing spaces that continue to be occupied, protect finishes, seal off occupied spaces and open ductwork and piping. The Contractor shall provide personnel for janitorial work to clean up (both on the Project Site and in adjacent spaces) any dust or debris that results from its operations. **(see UGC 3.3.8)**

7.2 Noise control: In and around occupied areas, minimize use of noise producing equipment and sequence the Work to minimize its affect of occupants. Work with noise producing equipment adjacent to occupied spaces will be coordinated with the Owner. Curtail such use to accommodate specific meetings or activities when requested by the Owner.

7.3 Water control: Provide methods to control surface water to prevent damage to the project and adjoining properties. Control fill, grade and ditch to direct surface drainage away from excavations, pits, tunnels and other construction areas. Direct runoff to proper runoff paths.

7.4 Storm Water Pollution Prevention Plan (SWPPP): Contractor shall be responsible for securing the appropriate SWPPP permit and paying all related fees, penalties, fines, etc., related thereto, from Texas Commission on Environmental Quality (TCEQ). The Contractor shall implement the SWPPP plan and insure that all devices and structures are properly maintained through the course of the project. Upon completion of the project the Contractor shall provide TCEQ with a Notice of Termination within thirty days of final stabilization achievement. Refer to SWPPP for additional requirements and to ensure compliance with its requirements.

7.5 Pollution controls: Provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by discharge of noxious or hazardous substances from construction operations. The Contractor shall notify the Owner immediately of all pollutant spills. The Contractor shall be solely responsible for cleaning up and properly disposing of, in accordance with applicable laws and regulations, all spilled pollutants brought to the Site as a part of the Work including oil, paint, fuels, antifreeze, solvents, etc. The Contractor must keep accurate records of these clean up and disposal actions.

7.6 Protection of installed work: **(see UGC 10.3.4.1)**

- 7.6.1 Protect installed work and provide special protection where specified in individual specification sections.
- 7.6.2 Provide temporary and removable protection of installed products and control activity in the immediate area to prevent damage.
- 7.6.3 Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- 7.6.4 Protect finished floors, stairs and other surfaces from dirt traffic, wear, damage, or movement of heavy objects.
- 7.6.5 Prohibit traffic or storage upon waterproofed or roofed surfaces, or in the alternative obtain the manufacturer's recommendations for protection.
- 7.6.6 Prohibit traffic from landscaped areas.

8. Parking: (see UGC 3.3.11.1)

8.1. Parking for workmen employed on the site shall be provided within the Limits of Construction or on such remote site as may be designated by the Owner from time to time. Any costs involved in Contractor parking shall be borne by the Contractor. The Contractor's forces shall not park on campus in areas outside the Project Site.

8.2. In some, but not all circumstances, Owner may provide remote parking spaces near the campus. In these cases the parking may be available for Contractor use at no cost, but permits issued by the campus police will be necessary to use this parking. In providing remote parking the Owner will not take on any responsibility for the vehicles, or contents of the vehicles, when they are parked in the remote locations provided.

8.3. The Contractor shall provide adequate reserved parking for the Owner's and the A/E's Project Team members who regularly visit the Project Site.

8.4. The Contractor shall be responsible for restoration of all pavement, curbs, signage, sidewalks, etc., damaged by the construction operations and/or the workmen.

9. Field Offices and Sheds

9.1. The office shall be weather tight, with lighting, electrical outlets, highspeed internet connection, telephone, heating, cooling and ventilation and equipped with sturdy furniture, a drawing table and plan racks.
9.2. Provide adequate space for projects meetings.

10. Temporary Toilets (see UGC 3.3.4)

10.1 Provide, maintain and pay for required temporary sanitary facilities and enclosures. Provide at time of project mobilization and do not remove until Substantial Completion. Locate these facilities away from public view as much as practical.
10.2 Clean and empty these facilities at least weekly unless it is needed more often to keep them sanitary. Post notices, remove deposited debris and take all steps necessary to keep the facilities clean and sanitary.
10.3 Do not use the Owner's toilet facilities, unless specifically approved by the Owner.

Section 015010 Project Signage

1. Installation of Temporary Project Signage

1.1 When permitted by the Owner, an exterior construction project sign shall be installed immediately after contract award. The sign will make specific reference to the Houston Community College Campus Location.
1.2 Prior to any construction or installation of the sign, submit to the Owner for approval a quarter scale drawing, complete with all graphics and lettering.
1.3 The Contractor shall ensure the exterior construction project signage is properly set-back from all street intersections and pedestrian walkways such that it does not conflict with or impede fields of view necessary to vehicular and pedestrian traffic circulation.
1.4 The Contractor may install one sign bearing the company name, logo, project address and point of contact.
1.5 The sign shall remain the property of the Contractor and shall be removed from the Project Site and legally disposed of at the completion of the Work.

2. Signage Dimensions and Materials

The exterior construction project sign shall be constructed of a single four foot by eight foot sheet of three-quarter inch thick marine plywood placed on two four inch by four inch treated posts. The Architect/Engineer (A/E) shall provide the Contractor with the lettering, font background and rendering of the project, which will be installed by a professional sign company. All related costs shall be included in the General Conditions costs of Contractor's contract.

Section 015240 Construction Waste Management

1. Definitions

1.1 Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
1.2 Disposal: Removal off-site of demolition and construction waste and deposited in landfill or incinerator acceptable to authorities having jurisdiction.
1.3 Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
1.4 Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
1.5 Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the work.

2. Performance Goals - The Contractor shall develop a waste management plan that will result in end of project rates for salvage/recycling as directed by the Owner during the Pre-construction conference.

3. Quality Assurance - The Contractor shall continuously monitor the disposal, recycling, salvage and reuse of materials generated by the Project to confirm compliance with the waste management plan and provide a report to the project team at each progress meeting.

4. Waste Management Plan - The Contractor shall develop a plan consisting of waste identification, waste reduction work plan and cost/revenue analysis. The plan should include separate sections for demolition and construction waste.

5. Salvaging Demolition Waste

5.1 Salvage of items for sale or donation by the Contractor or subcontractors is not permitted.

5.2 Salvaged items for Owner's use:

5.2.1 Clean salvaged items;

5.2.2 Pack or crate items and properly identify contents on the container;

5.2.3 Store items in a secure area until delivery to Owner;

5.2.4 Transport items to Owner's designated storage area.

6. Recycling Demolition and Construction Waste, General - Separate recyclable waste by type at project site to maximum extent practical.

6.1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from the project site.

6.2. Remove recyclable waste off Owner's property and transport to recycling receiver or processor within a reasonable time after an appropriate amount has been accumulated.

Section 017000 Contract Close-out

1. General (see UGC Article 12)

1.1 Project closeout is hereby defined to include requirements near the end of the contract time, in preparation for Substantial Completion acceptance, occupancy by Owner, release of retainage, final acceptance, final payment and similar actions evidencing completion of the work.

1.2 Time of closeout is directly related to completion and acceptance and may either be a single time period for the entire project, or a series of times for individual portions or phases of the project that have been certified as substantially complete at different times.

1.3 If the project is to be accepted in phases, whether by originally specified project scope or by subsequent agreement between the parties, then the project closeout requirements shall pertain to each separately accepted portion or phase of the project. All required documentation for the portion of the project to be occupied early shall be furnished by the Contractor to the Owner on, or before, the date of early occupancy by the Owner. Such early occupancy of any portion of the Work will not waive the Contractor's obligations to complete the remaining Work within the Contract Time specified in the contract.

2. Record Documents (see UGC 6.2)

2.1 Record documents for project closeout shall include, but not necessarily limited to the following, which are required for substantial completion:

- As-built record drawings, hard copy and electronic file;
- As-built record specifications, hard copy and electronic file;
- Operating & maintenance manuals, hard copies and electronic file;
- Record approved submittals and samples;
- Certificate of no asbestos products incorporated in project;
- Completed punch lists.

3. Required Documents

3.1 Required documents (2 copies each) for final payment to be released included final versions of all of the above and the following:

- Final release of claims and liens; **(see 12.3.5 through 12.3.8 of the CSP contract)**
- Affidavit of payment of debts and claims;
- Consent(s) of surety;

- □ Certificate of Substantial Completion;
- □ City of Houston Certificate of Compliance (Occupancy) for Project;
- □ Final Change Order, if applicable;
- □ Final Application for Payment;
- □ Contractor's Letter for Confirmation of General Guarantee;
- □ Subcontractors & Material Suppliers Release & Guarantee, notarized;
- □ Transmittal Listing Keys turn over to HCC Director of Operation & Maintenance;
- □ Completed SWPPP documents and Notice of Termination;
- □ Completed commissioning and closeout manuals.

4. Requirements for Substantial Completion (see UGC 12.1.1)

4.1 Prior to requesting Architect/Engineer (A/E) and Owner to schedule a Substantial Completion, or Pre-Final inspection, the Contractor shall complete the following and list known exceptions in the request:

4.1.1 Contractor's payment request should reflect a minimum of 95% completion for all applicable work.

4.1.2 Provide A/E and Owner with a complete copy of the Contractor's most current punch list.

4.1.3 Submit to the A/E for review a full set of as-built record drawings and specifications.

4.1.4 Submit to the A/E for review preliminary copies of the operating and maintenance manuals.

4.1.5 Submit release enabling Owner's full and unrestricted use of the work and access to service and utilities, including operating certificates and similar releases.

4.1.6 Contractor shall make provisions for final changeover of locks with the Owner's personnel.

4.1.7 Complete initial clean up requirements as described in the specifications.

4.2 The Contractor shall ensure that the work is ready for inspection and/or reinspection. If the work is found not to be as stated in the Contractor's punch list or the items have not been substantially corrected/completed; the inspection will be terminated.

5. Requirements for Final Acceptance (see UGC 12.1.2)

Prior to requesting A/E and Owner to schedule final inspection for the project, the Contractor shall complete the following:

5.1 Prepare draft payment request showing 100% completion for each line item on the schedule of values, including all appropriate releases and supporting documentation.

5.2 Submit a copy of the pre-final punch list which includes evidence that each item has been completed or otherwise resolved.

5.3 Submit final meter readings for utilities as of the time when the Owner took possession.

5.4 Transmit completed commissioning and close-out manuals to the Owner.

5.5 Complete final cleaning and touch-up.

5.6 Submit final payment request.

5.7 Submit evidence of final and continuing insurance coverage complying with applicable insurance requirements.

6. Operating and Maintenance Manuals (see UGC 6.2.3 & 6.2.4)

6.1 Contractor shall organize operating and maintenance manual information into suitable sets of manageable size, and bind into individual binders properly tabbed and indexed. Four complete copies of each bound operating and maintenance manual shall be provided to the Owner, one complete copy for the A/E and one electronic copy of each operating and maintenance manual shall be provided to the Owner.

6.2 The requirements of this section are separate, distinct and in addition to product submittal requirements that may be established by this and other sections of the specifications.

6.3. Material and equipment data required by this section is intended to include all data necessary for the proper installation, removal, normal operation, emergency operation, startup, shutdown, maintenance, cleaning, adjustment, calibration, lubrication, assembly, disassembly, repair, inspection, trouble shooting and service of the equipment or materials.

7. Record Product Submittals

During progress of the work, maintain approved copies of each product data submittal and shop drawings, and mark-up significant variations in the actual work in comparison with submitted information. A separate binder with one copy of all MSDS sheets for any and all products incorporated into the project shall be maintained during the course of the project, this binder shall be included in the record submittal documents.

8. Record Sample Submittals

Immediately prior to the date(s) of Substantial Completion, arrange for A/E and Owner to meet with Contractor at the project site to determine which (if any) of the submitted samples or mock-ups maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes.

9. Commissioning and Close-out Manual

The Contractor shall incorporate all commissioning and closeout documentation and/or verification not included in the operating and maintenance manuals, into a manual for transmittal to the Owner

Section 019100 General Commissioning Requirements

1. Scope of Work Included

1.1 It is of primary concern that all operable systems installed in the project perform in accordance with the Construction Documents and the specified Owner's operational needs. This is particularly critical for systems affecting life safety, building controls, plumbing, HVAC, lighting and power delivery systems. The process of assuring such performance is achieved is commonly referred to as "Commissioning".

1.2 This section establishes minimum general and administrative requirements pertaining to start-up and commissioning of equipment, devices, and building systems. Additional technical and operational requirements for particular systems and components are established in the various technical sections of the specifications. The Contractor is solely responsible for the Commissioning process.

2. Commissioning Plan

2.1 The Contractor shall prepare a detailed commissioning plan to identify the following:

2.1.1 Project commissioning team members;

2.1.2 Commissioning activities;

- Pre-functional tests;
- Start-up tests;
- Functional tests;
- System integration testing.

2.1.3 The Contractor shall properly document the results of each phase of the commissioning plan and notify Architect/Engineer (A/E) and Owner of any failures to achieve the specified performance levels.

2.2 The Contractor shall incorporate the commissioning plan into the project baseline schedule to reflect dates and durations of all commissioning activities.

3. Equipment Documentation Requirements

The Contractor shall develop a complete equipment matrix/list of all equipment, devices and systems which will be presented to the project commissioning team at the Pre-commissioning conference. The following information should be included on the matrix/list:

- Brief equipment identification text;
- Equipment or device i.d. number;
- Start-up inspection required;
- Associated building system;
- Governing specification section;
- Appropriate submittal reference number(s);

- Installation location (room number or column coordinates).

4. Test Equipment

4.1 The Contractor and subcontractors shall provide all specialized tools, test equipment and instruments required to execute start-up, checkout and functional performance testing of equipment under their contracts.

4.2 Test equipment shall be of sufficient quality and accuracy to test and/or measure system performance within tolerances specified. A testing laboratory shall have calibrated the test equipment within the previous twelve months. Calibration shall be NIST traceable and in accordance with the manufacturer's recommendations.

5. Pre-commissioning Meeting

5.1 The Contractor shall conduct the Pre-commissioning meeting and review all aspects of the commissioning plan. All documentation will be discussed and test procedures will be reviewed for approval by the Owner.

5.2 The Contractor shall establish target dates for each of the commissioning activities and these will be discussed at all future project progress meetings.

6. Pre-installation Meeting - The Contractor shall schedule a pre-installation meeting for the work of each major building system. This meeting shall be scheduled following approval of system submittals and prior to commencement of system installation work.

7. Contractor's Verification of Installation

The Contractor shall perform a review of all tests to confirm completion and compliance with the specified performance specifications. The Contractor shall verify:

- Each component device has been properly installed;
- All shop drawings and product data submittals have been approved;
- All valve charts, wiring diagrams, control schematics, electrical panel directories, etc. have been submitted, approved and properly installed;
- All tabulated data has been submitted for each system and/or device as required by the specifications;
- All test reports and/or certifications required have been submitted and accepted;
- Any and all deficiencies have been corrected and re-tested to conformance with the specifications.

8. Contractor's Operational Testing

8.1 The Contractor shall operate, or cause to be operated each system, device or equipment item, both intermittently and continuously, for the appropriate duration as set forth in the specifications and/or in accordance with the manufacturer's recommendations. These operations will be documented as a functional test.

8.2 Each component device and each building system shall be exercised to the full extent of its capability, from minimum to maximum, and under automatic control, where it is applicable, as well as checking manual operation.

9. Integrated System Demonstration

9.1 After successful completion and subsequent documentation of all system operations, the Contractor shall schedule a meeting with the project commissioning team to review the demonstration of all integrated systems within the facility.

9.2 The demonstration(s) shall included not only normal operating conditions over the entire operating range, but also failure modes such as major component failure and loss of power.

10. Owner Training

10.1 Training shall consist of classroom type sessions followed by on-site demonstrations of system operations.

10.2 The Contractor shall provide a minimum of eight hours of DVD recording of the training, with audio. The Owner will designate which portions of the training will be recorded. The DVD shall be produced in a professional manner.

HOT WORK PERMIT

Issue date: 3/1/2013 Permit # HCC 0001

Avoid hot work, or seek an alternative/safer method, if possible!

All temporary operations involving open flames, or producing heat, and or sparks, require a Hot Work Permit. This includes but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

Emergency contact # **713.718.8888** (24x7 HCC Security)

Precautions Checklist: **Permit expires:** _____

- ☐ * Verify that all available sprinklers, hose streams, and extinguishers are in service, and operable.
- ☐ * Verify that hot work equipment is in good working condition.

Requirements within 35' of hot work.

- ☐ Has any flammable liquid, dust, lint and oily deposits been removed?
- ☐ Have the floors been swept clean?
- ☐ Have combustible floors been wet down, or covered with damp sand, or fire resistive sheets?
- ☐ Remove other combustible material where possible, or use protective welding pads, or metal shields.
- ☐ Have all wall and floor openings been covered?
- ☐ Are welding pads, blankets, or curtains installed under and around the work area?
- ☐ If the HVAC system is affected has it been shut down, or protected in someway?

Hot work on walls, ceilings or roofs

- ☐ Is the construction area noncombustible and does not require combustible covering or insulation?
- ☐ Has combustible material on other side of walls, ceilings or roofs been moved away?

Fire Watch / post hot work area monitoring.

- ☐ * Fire watch will be provided during and for a minimum of (1) hour after hot work, including any break activity.
- ☐ * Fire Watch is supplied with a minimum of a 10 lb fire extinguisher, with current inspection tag.
- ☐ * Fire watch is trained in use of equipment and, in sounding the fire alarm.
- ☐ Fire watch is required in adjoining areas, above, and below area of hot work.
- ☐ Monitor hot work area for an additional (3) hours after the (1) hour fire watch.

What type of hot work is being performed.

_____

Where is the work being performed. _____

Fire watch sign off. _____

Name of person performing hot work. _____

Contact phone number. _____

Document 00821

WAGE SCALE AND PAYROLL REQUIREMENTS FOR BUILDING CONSTRUCTION

Wage Scale Requirements

1.01 Contractor and its Subcontractors must pay the general prevailing wage rates for building construction for each craft or type of worker or mechanic employed in the execution of any building construction or repair under the Contract in accordance with Chapter 2258 of the Texas Government Code and City of Houston, Texas Ordinance Nos. 85-2070, 2000-1114, 2001-152, 2006-91 and 2006-168, and 2009-247 all as amended from time to time. City Council has determined the prevailing wage rate in the locality in which the work is being performed, which is set forth in Exhibit "A".

1.02 This prevailing wage rate does not prohibit the payment of more than the rates stated.

1.03 In bidding, Contractor warrants and represents that it has carefully examined the classifications for each craft or type of worker needed to execute the Contract and determined that such classifications in Exhibit "A" include all necessary categories to perform the work under the Contract.

1.04 The wage scale for building construction is to be applied to work on a building including an area within 5 feet of the exterior wall.

1.05 If Contractor believes that an additional classification for a particular craft or type of worker is necessary to perform work under the Contract, it must submit with its bid a request to the Contract Compliance Division of the Mayor's Office of Business Opportunity ("OBO") to use an additional labor classification not listed in Exhibit "A" and specify the proposed new classification. OBO shall determine whether a proposed classification is already covered in Exhibit "A", and, if it is, specify which classification is appropriate. OBO’s decision is conclusive. If OBO decides that a new classification is necessary, it will determine the appropriate prevailing wage rate for any resurveyed, amended, new, or additional craft or type of worker not covered by Exhibit "A". Such determination must be decided in accordance with procedures established by OBO, and in compliance with Chapter 2258 of the Texas Government Code and City of Houston, Texas Ordinance Nos. 85-2070, 2000-1114, 2001-152, 2006-91, 2006-168, and 2009-247 subject to City Council approval.

1.06 Contractor must not use any labor classification not covered by Exhibit "A" until such classification is established and approved for use by OBO.

1.07 A Contractor or Subcontractor who violates Chapter 2258 of the Texas Government Code must pay to the City, $60 per each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates set forth in Exhibit "A".

1.08 The City may withhold money required to be withheld under Chapter 2258 of the Texas Government Code from the final payment to Contractor or earlier payments if City Council makes a determination that there is good cause to believe that Contractor has not complied with these provisions and Chapter 2258 of the Government Code, in which case the City may withhold the money at any time subsequent to the finding by City Council.

1.09 Contractor and Subcontractors must keep records specifying:

(1) the name and classification of each worker employed under the Contract; and

(2) the actual per diem wages paid to each worker, and the applicable hourly rate.

The records must be open at all reasonable hours for inspection by the officers and agents of the City.

1.10 The hourly cost of salary for non-exempt workers for labor in excess of 40 hours per worker per week, shall be calculated at 1.5 times the worker's base pay, plus 1.0 times fringe benefits, for the applicable craft and level.

Certified Payroll Requirements

2.01 Employees are paid weekly and payrolls are submitted weekly using the City of Houston's electronic payroll submission module, unless the prime Contractor has been instructed to do otherwise by the Office of Business Opportunity. When no work is done after a Contractor has started work, the Contractor is required to submit weekly compliance statement with no work performed. The payrolls must reflect the exact work and classification of the workers, the exact amount that they were paid. Workers must be paid the contracted amount (prevailing wage rates.) The Contractor will be penalized $60.00 a day for each employee who is underpaid per Texas Government Code 2258-023 for all contracts except Federally Funded Contract.

2.02 Payrolls submitted manually must be signed by an authorized person. Only ORIGINAL signatures are acceptable - no copied signatures. Payrolls must clearly indicate whether the worker worked inside or outside the building area.

2.03 Payrolls must be numbered and clearly marked: the first payroll as No. 1; etc. Payroll for the final week worked on the job should be marked "FINAL".

2.04 Payrolls must have "Week Ending" dates.

2.05 Payrolls must have employees' names, addresses, last four digits of the social security numbers, and job classifications. The job classifications must be the same as the classifications on the prevailing wage rate schedule.

2.06 A payroll deduction authorization form must be submitted for each employee for any deductions other than Federal and FICA taxes and court ordered child support.

2.07 Employees must be paid overtime (time and a half) for all hours worked over 40 hours a week on both federally and City-funded contracts.

2.08 The Contractor has the responsibility to comply with all Internal Revenue Service rules and regulations. Contractors who submit certified payrolls with owner operators (truckers) must submit a signed tax liability statement from each worker acknowledging the worker's responsibility for payment of Federal Income Tax and FICA.

2.09 Companies that have computerized payroll systems must copy the back of the certified payroll, Form WH347, and submit it with the authorized official's original signature.

2.10 If the Contractor wants to use the apprentice wage rates for an employee, the apprenticeship certificates must be submitted to the Office of Business Opportunity in advance of the employee working on the project and appearing on the payroll.

2.11 A poster of the Prevailing Wage Rate Schedule should be clearly displayed on each job site, or in case of annual service agreements, in the Contractor's office.

2.12 The Contractor shall submit the “Certificate from Contractor Appointing Officer or Employee to Supervise Payment of Employees” (Exhibit “B”) to the Monitoring Authority listed in Document 00495 prior to final execution of the contract.

2.13 During the course of the work, Subcontractors shall submit the “Certificate from Subcontractor Appointing Officer or Employee to Supervise Payment of Employees” (Exhibit “C”) to the Monitoring Authority listed in Document 00495.

2.14 Upon completion of the Project, as part of the contract-awarding department's total clearance process, the Office of Business Opportunity’s Contract Compliance Section must review whether the Wage Rate and Payroll Requirements were met and report the results to the department.

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EXHIBIT "A"

CITY OF HOUSTON, TEXAS
LABOR CLASSIFICATIONS AND PREVAILING WAGE RATES
FOR
BUILDING CONSTRUCTION
2013

Worker Classification	Ratio	Base Rate	Fringe Benefit	Wage Total
Asbestos Worker/Insulator *	Ratio 1/1 - Apprentice	$20.27	$8.92	$29.19
Asbestos Abatement Worker (ceilings, walls ,floors only)	Ratio 1/1 - Apprentice	$14.00	$0.00	$14.00
Boilermaker *	Ratio 5/1 - Apprentice	$23.06	$20.28	$43.34
Brick Layer * (see Mason Tender Brick)	Ratio 1/3 - Apprentice	$18.00	$0.00	$18.00
Carpenter * (including acoustical ceiling work)	Ratio 2/1 - Apprentice	$21.00	$6.43	$27.43
Cement Mason/Concrete Finisher *	Ratio 1/3 - Apprentice	$12.83	$0.00	$12.83
Drywall Finisher/Taper *	Ratio 1/3 - Helper $8.54	$12.13	$1.01	$13.14
Drywall Hanger, * incl. metal studs installation	Ratio 1/3 - Helper $9.46	$12.96	$1.59	$14.55
Electrician *	Ratio 3/2 - Apprentice	$27.65	$7.70	$35.35
Elevator Mechanic *	Ratio 1/1 - Apprentice	$37.35	$23.53	$60.88
Formbuilder/Formsetter *	Ratio 1/3 - Helper $7.67	$11.82	$0.00	$11.82
Glazier *	Ratio 1/3 - Helper $11.51	$14.92	$2.78	$17.70
Insulator * (Batt and Foam)	Ratio 1/3 - Helper $6.50	$10.00	$0.00	$10.00
Ironworker *(Reinforcing)	Ratio 1/3 - Helper $7.83	$12.06	$0.00	$12.06
Ironworker *(Structural)	Ratio 1/3 - Helper $10.19	$15.68	$0.00	$15.68
Lather *	Ratio 1/3 - Helper $13.38	$16.90	$3.61	$20.51
Painter * (Brush, Roller, and Spray)	Ratio 1/3 - Helper $7.42	$11.17	$0.00	$11.17
Pipe Fitter *(HVAC Pipe only)	Ratio 1/1 - Apprentice	$29.63	$10.16	$39.79
Pipe Fitter *(Excluding HVAC)	Ratio 1/3 – Apprentice $12.40	$19.20	$8.23	$27.43
Plasterer *	Ratio 1/3 - Apprentice	$19.42	$1.00	$20.42
Plumber *	Ratio 3/2 - Apprentice	$30.29	$9.50	$39.79
Roofer *	Ratio 1/3 - Helper $7.85	$11.51	$0.57	$12.08
Sheet Metal Worker *(incl. HVAC duct and system install.)	Ratio 2/1 - Apprentice	$25.37	$7.99	$33.36
Sprinkler Fitter * (Fire sprinklers)	Ratio 1/1 – Apprentice	$25.84	$16.47	$42.31
Tile Finisher *	Ratio 1/3 - Helper $8.08	$12.00	$0.43	$12.43
Tile Setter *	Ratio 1/3 - Helper $10.91	$15.70	$1.09	$16.79
Truck Driver		$10.78	$1.57	$12.35
Laborers:				
Common Laborer		$9.29	$0.00	$9.29
Mason Tender (Brick)		$10.13	$0.00	$10.13
Mason Tender (Cement)		$9.86	$0.00	$9.86
Pipe Layer		$12.35	$0.00	$12.35
Plaster Tender (Plasterer's helper)		$12.90	$2.51	$15.41
Power Equipment Operator:				
Asphalt Paver		$13.50	$0.25	$13.75

Backhoe – Power Equipment Operator		$12.54	$0.00	$12.54
Crane – Power Equipment Operator		$17.95	$3.56	$21.51
Forklift – Power Equipment Operator		$15.46	$5.15	$20.61
Slab and Wall Saw – Power Equipment Operator		$15.54	$3.83	$19.37
Welders - Receive rate prescribed for craft performing operation in which welding is incidental				
*** When Apprentices are shown, Helpers cannot be utilized**				

Building Construction Prevailing Wages
Classification Definitions

Asbestos Worker/Insulator * - Ratio 1/1 Apprentice
(Including application of all insulating materials, protective coverings, coatings and finishing to all type of mechanical systems). Applies insulating material to exposed surfaces of structures, such as air ducts, hot and cold pipes, storage tanks, and cold storage rooms: Reads blueprints and selects required insulation material (in sheet, tubular, or roll form), such as fiberglass, foam rubber, styrofoam, cork, or urethane, based on material's heat retaining or excluding characteristics. Brushes adhesives on or attaches metal adhesive-backed pins to flat surfaces as necessary to facilitate application of insulation material. Measures and cuts insulation material to specified size and shape for covering flat or round surfaces, using tape measure, knife, or scissors. Fits, wraps, or attaches required insulation material around or to structure, following blueprint specifications. Covers or seals insulation with preformed plastic covers, canvas strips, sealant, or tape to secure insulation to structure, according to type of insulation used and structure covered, using staple gun, trowel, paintbrush, or caulking gun.

Asbestos Abatement Worker * (Ceilings, Floors, & Walls only)
Ratio 1/3 Apprentice
Removes asbestos from ceilings, walls, beams, boilers, and other structures, following hazardous waste handling guidelines: Assembles scaffolding and seals off work area, using plastic sheeting and duct tape. Positions mobile decontamination unit or portable showers at entrance of work area. Builds connecting walkway between mobile unit or portable showers and work area, using hand tools, lumber, nails, plastic sheeting, and duct tape. Positions portable air evacuation and filtration system inside work area. Sprays chemical solution over asbestos covered surfaces, using tank with attached hose and nozzle, to soften asbestos. Cuts and scrapes asbestos from surfaces, using knife and scraper. Shovels asbestos into plastic disposal bags and seals bags, using duct tape. Cleans work area of loose asbestos, using vacuum, broom, and dustpan. Places asbestos in disposal bags and seals bags, using duct tape. Dismantles scaffolding and temporary walkway, using hand tools, and places plastic sheeting and disposal bags into transport bags. Seals bags, using duct tape, and loads bags into truck.

Boilermaker * - Ratio 5/1 Apprentice
Assembles, analyzes defects in, and repairs boilers, pressure vessels, tanks, and vats in field, following blueprints and using hand tools and portable power tools and equipment: Locates and marks reference points for columns or plates on foundation, using master straightedge, squares, transit, and measuring tape, and applying knowledge of geometry. Attaches rigging or signals crane operator to lift parts to specified position. Aligns structures or plate sections to assemble boiler frame, tanks, or vats, using plumb bobs, levels, wedges, dogs, or turnbuckles. Hammers, flame cuts, files, or grinds irregular edges of sections or structural parts to facilitate fitting edges together. Bolts or arc-welds structures and sections together. Positions drums and headers into supports and bolts or welds supports to frame. Aligns water tubes and connects and expands ends to drums and headers, using tube expander. Bells, beads with power hammer, or welds tube ends to ensure leak proof joints. Bolts or welds casing sections, uptakes, stacks, baffles, and such fabricated parts as chutes, air heaters, fan stands, feeding tube, catwalks, ladders, coal hoppers, and safety hatch to frame, using wrench. Installs manholes, hand holes, valves, gauges, and feed water connection in

drums to complete assembly of water tube boilers. Assists in testing assembled vessels by pumping water or gas under specified pressure into vessel and observing instruments for evidence of leakage. Repairs boilers or tanks in field by unbolting or flame cutting defective sections or tubes, straightening plates, using torch or jacks, installing new tubes, fitting and welding new sections and replacing worn lugs on bolts. May rivet and caulk sections of vessels, using pneumatic riveting and caulking hammers.

Bricklayer * (See Mason Tender) - Ratio 1/3 Apprentice
Lays building materials, such as brick, structural tile, and concrete cinder, glass, gypsum, and terra cotta block (except stone) to construct or repair walls, partitions, arches, sewers, and other structures: Measures distance from reference points and marks guidelines on working surface to lay out work. Spreads soft bed (layer) of mortar that serves as base and binder for block, using trowel. Applies mortar to end of block and positions block in mortar bed. Taps block with trowel to level, align, and embed in mortar, allowing specified thickness of joint. Removes excess mortar from face of block, using trowel. Finishes mortar between brick with pointing tool or trowel. Breaks bricks to fit spaces too small for whole brick, using edge of trowel or brick hammer. Determines vertical and horizontal alignment of courses, using plumb bob, gauge line (tightly stretched cord), and level. Fastens brick or terra cotta veneer to face of structures, with tie wires embedded in mortar between bricks, or in anchor holes in veneer brick. May weld metal parts to steel structural members. May apply plaster to walls and ceiling, using trowel, to complete repair work.

Carpenter * (Including Acoustical Ceiling Work) - Ratio 2/1 Apprentice
Constructs, erects, installs, and repairs structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools, and conforming to local building codes: Studies blueprints, sketches, or building plans for information pertaining to type of material required, such as lumber or fiberboard, and dimensions of structure or fixture to be fabricated. Selects specified type of lumber or other materials. Prepares layout, using rule, framing square, and calipers. Marks cutting and assembly lines on materials, using pencil, chalk, and marking gauge. Shapes materials to prescribed measurements, using saws, chisels, and planes. Assembles cut and shaped materials and fastens them together with nails, dowel pins, or glue. Verifies trueness of structure with plumb bob and carpenter's level. Erects framework for structures and lays subflooring. Builds stairs and lays out and installs partitions and cabinetwork. Covers sub floor with building paper to keep out moisture and lays hardwood, parquet, and wood-strip-block floors by nailing floors to sub floor or cementing them to mastic or asphalt base. Applies shock-absorbing, sound-deadening, and decorative paneling to ceilings and walls. Fits and installs prefabricated window frames, doors, doorframes, weather stripping, interior and exterior trim, and finish hardware, such as locks, letter drops, and kick plates. Constructs forms and chutes for pouring concrete. Erects scaffolding and ladders for assembling structures above ground level. May weld metal parts to steel structural members.

Cement Mason/Concrete Finisher *(See Concrete Mason/Concrete Finisher) - Ratio 1/3 Apprentice
Finisher; concrete floater Smoothes and finishes surfaces of poured concrete floors, walls, sidewalks, or curbs to specified textures, using hand tools or power tools, including floats, trowels, and screeds: Signals concrete deliverer to position truck to facilitate pouring concrete. Moves discharge chute of truck to direct concrete into forms. Spreads concrete into inaccessible sections of forms, using rake or shovel. Levels concrete to specified depth and workable consistency, using hand held screed and floats to bring water to surface and produce soft topping. Smoothes, and shapes surfaces of freshly poured concrete, using straightedge and float or power screed. Finishes concrete surfaces, using power trowel, or wets and rubs concrete with abrasive stone to impart finish. Removes rough or defective spots from concrete surfaces, using power grinder or chisel and hammer, and patches holes with fresh concrete or epoxy compound. Molds expansion joints and edges, using edging tools, jointers, and straightedge. May sprinkle colored stone chips, powdered steel, or coloring powder on concrete to produce prescribed finish. May produce rough concrete surface, using broom. May mix cement, using hoe or concrete-mixing machine. May direct sub grade work, mixing of concrete, and setting of forms.

Drywall Finisher/Taper - Ratio 1/3 Helpers
Wallboard and plasterboard; sheetrock taper; taper and bedder; taper and floater Seals joints between plasterboard or other wallboards to prepare wall surface for painting or papering; Mixes sealing compound by hand or with portable electric mixer, and spreads compound over joints between boards, using trowel, broad knife, or spatula. Presses paper tape over joint to embed tape into compound and seal joint, or tapes joint, using mechanical applicator that spreads compound and embeds tape in one operation. Spreads and smoothes cementing material over tape, using trowel or floating machine to blend joint with wall surface. Sands rough spots after cement has dried. Fills cracks and holes in walls and ceiling with sealing compound. Installs metal molding at corners in lieu of sealant and tape. Usually works as member of crew. May apply texturing compound and primer to walls and ceiling preparatory to final finishing, using brushes, roller, or spray gun. May countersink nails or screws below surface of wall prior to applying sealing compound, using hammer or screwdriver.

Drywall Hanger (Includes Installing Metal Studs) - Ratio 1/3 Helpers
Dry-wall installer; gypsum dry-wall systems installer Plans gypsum drywall installations, erects metal framing and furring channels for fastening drywall, and installs drywall to cover walls, ceilings, soffits, shafts, and movable partitions in residential, commercial, and industrial buildings: Reads blueprints and other specifications to determine method of installation, work procedures, and material, tool, and work aid requirements. Lays out reference lines and points for use in computing location and position of metal framing and furring channels and marks position for erecting metalwork, using chalk line. Measures, marks, and cuts metal runners, studs, and furring channels to specified size, using tape measure, straightedge and hand and portable power cutting tools. Secures metal framing to walls and furring channels to ceilings, using hand and portable power tools. Measures and marks cutting lines on drywall, using square, tape measure, and marking devices. Scribes cutting lines on drywall, using straightedge and utility knife and breaks board along cut lines. Fits and fastens board into specified position on wall, using screws, hand tools, portable power tools, or adhesive. Cuts openings into board for electrical outlets, vents, or fixtures, using keyhole saw or other cutting tools. Measures, cuts, assembles, and installs metal framing and decorative trim for windows, doorways, and vents. Fits, aligns, and hangs doors and installs hardware, such as locks and kick plates

Electrician * (Including Pulling Wire and Low Voltage Wiring and Installation of Fire Alarms, Security Systems, Telephones, and Computers.) - Ratio 3/2 Apprentice
Plans layout, installs, and repairs wiring, electrical fixtures, apparatus, and control equipment: Plans new or modified installations to minimize waste of materials, provide access for future maintenance, and avoid unsightly, hazardous, and unreliable wiring, consistent with specifications and local electrical codes. Prepares sketches showing location of wiring and equipment, or follows diagrams or blueprints, ensuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit, using tools, such as hacksaw, pipe threader, and conduit bender. Pulls wiring through conduit. Splices wires by stripping insulation from terminal leads, using knife or pliers, twisting or soldering wires together, and applying tape or terminal caps. Connects wiring to lighting fixtures and power equipment, using hand tools. Installs control and distribution apparatus, such as switches, relays, and circuit-breaker panels, fastening in place with screws or bolts, using hand tools and power tools. Connects power cables to equipment, such as electric range or motor, and installs grounding leads. Tests continuity of circuit to ensure electrical compatibility and safety of components, using testing instruments, such as ohmmeter, battery and buzzer, and oscilloscope. Observes functioning of installed equipment or system to detect hazards and need for adjustments, relocation, or replacement.

Elevator Mechanic * - Ratio 1/1 Apprentice
FOOTNOTES: a. - Employer contributes 8% of basic hourly rate for over 5 years' service and 6% of basic hourly rate for 6 months to 5 years' service as Vacation Pay Credit. Paid Holidays: New Year's Day; Memorial Day; Independence Day Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day

Erector; elevator installer; elevator mechanic Assembles and installs electric and hydraulic freight and passenger elevators, escalators, and dumbwaiters, determining layout and electrical connections from blueprints: Studies blueprints and lays out location of framework, counterbalance rails, motor pump, cylinder, and plunger foundations. Drills holes in concrete or structural steel members with portable electric drill. Secures anchor bolts or welds brackets to support rails and framework, and verifies alignment with plumb bob and level. Cuts prefabricated sections of framework, rails, and other elevator components to specified dimensions, using acetylene torch, power saw, and disk grinder. Installs cables, counterweights, pumps, motor foundations, escalator drives, guide rails, elevator cars, and control panels, using hand tools. Connects electrical wiring to control panels and electric motors. Installs safety and control devices. Positions electric motor and equipment on top of elevator shaft, using hoists and cable slings.

Formbuilder/Formsetter - Ratio 1/3 Helpers
Constructs built-in-place or prefabricated wooden forms, according to specifications, for molding concrete structures: Studies blueprints and diagrams to determine type and dimension of forms to be constructed. Saws lumber to blueprint dimensions, using handsaw or power saw, and nails lumber together to make form panels. Erects built-in-place forms or assembles and installs prefabricated forms on construction site according to blueprint specifications, using hand tools, plumb rule, and level. Inserts spreaders and tie rods between opposite faces of form to maintain specified dimensions. Anchors and braces forms to fixed objects, using nails, bolts, anchor rods, steel cables, planks, and timbers.

Glazier - Ratio 1/3 Helpers
Installs glass in windows, skylights, store fronts, and display cases, or on surfaces, such as building fronts, interior walls, ceilings, and tabletops: Marks outline or pattern on glass, and cuts glass, using glasscutter. Breaks off excess glass by hand or with notched tool. Fastens glass panes into wood sash with glaziers points, and spreads and smoothes putty around edge of panes with knife to seal joints. Installs mirrors or structural glass on building fronts, walls, ceilings, or tables, using mastic, screws, or decorative molding. Bolts metal hinges, handles, locks, and other hardware to prefabricated glass doors. Sets glass doors into frame and fits hinges. May install metal window and doorframes into which glass panels are to be fitted. May press plastic adhesive film to glass or spray glass with tinting solution to prevent light glare. May install stained glass windows.

Insulator (Batt and Foam) - Ratio 1/3 Helpers
Applies batt and form insulation to walls, ceilings and other surfaces according to manufacturers specifications and blue print instructions. May use sealants such as cement plaster or asphalt compound to seal insulation; may spread concrete over floor slabs to form wearing floor: brushes adhesives, cuts insulating materials to specified shape to cover surfaces; uses tape or other sealants to adhere insulation to surfaces. May use staple gun, towel, paintbrushes and caulking guns.

Ironworker (Reinforcing) - Ratio 1/3 Helpers
Positions and secures steel bars in concrete forms to reinforce concrete; places rods in forms, spacing and fastening together with wire and pliers. Cuts bars using hacksaw, bar cutters or acetylene torch. Bends steel rods with hand tools or rod bending machine; reinforces concrete with wire mesh; welds reinforcing bars together.

Ironworker (Structural) - Ratio 1/3 Helpers
Erector; ironworker; steel erector; structural-iron erector; structural-iron worker; structural steel erector Performs any combination of following duties to raise, place, and unite girders, columns, and other structural-steel members to form completed structures or structure frameworks, working as member of crew: Sets up hoisting equipment for raising and placing structural-steel members. Fastens steel members to cable of hoist, using chain, cable, or rope. Signals worker operating hoisting equipment to lift and place steel member. Guides member, using tab line (rope) or rides on member in order to guide it into position. Pulls, pushes, or pries steel members into approximate position while member is supported by hoisting device. Forces members into final position, using turnbuckles, crowbars, jacks, and hand tools. Aligns rivet holes in member with corresponding holes in previously placed member by driving drift pins or handle of wrench through holes. Verifies vertical and horizontal alignment of members, using plumb bob and level.

Lather - Ratio 1/3 Helpers
Fastens wooden, metal, or rockboard lath to walls, ceilings, and partitions of buildings to provide supporting base for plaster, fireproofing, or acoustical material, using hand tools and portable power tools: Erects horizontal metal framework to which laths are fastened, using nails, bolts, and studgun. Drills holes in floor and ceiling, using portable electric tool, and drives ends of wooden or metal studs into holes to provide anchor for furring or rockboard lath. Wires horizontal strips to furring to stiffen framework. Cuts lath to fit openings and projections, using hand tools or portable power tools. Wires, nails, clips, or staples lath to framework, ceiling joists, and flat concrete surfaces. Bends metal lath to fit corners, or attaches preformed corner reinforcements. Wires plasterer's channels to overhead structural framework to provide support for plaster or acoustical ceiling tile.

Painter (Brush, Roller, and Spray) - Ratio 1/3 Helpers
Applies coats of paint, varnish, stain, enamel, or lacquer to decorate and protect interior or exterior surfaces, trimmings, and fixtures of buildings and other structures: Reads work order or receives instructions from supervisor or homeowner regarding painting. Smoothes surfaces, using sandpaper, brushes, or steel wool, and removes old paint from surfaces, using paint remover, scraper, wire brush, or blowtorch to prepare surfaces for painting. Fills nail holes, cracks, and joints with caulk, putty, plaster, or other filler, using caulking gun and putty knife. Selects premixed paints, or mixes required portions of pigment, oil, and thinning and drying substances to prepare paint that matches specified colors. Removes fixtures, such as pictures and electric switchcovers, from walls prior to painting, using screwdriver. Spreads dropcloths over floors and room furnishings, and covers surfaces, such as baseboards, doorframes, and windows with masking tape and paper to protect surfaces during painting. Paints surfaces, using brushes, spray gun, or paint rollers. Simulates wood grain, marble, brick, or tile effects. Applies paint with cloth, brush, sponge, or fingers to create special effects. Erects scaffolding or sets up ladders to perform tasks above ground level.

Pipe fitter * (HVAC Pipe Only) - Ratio 1/3 Apprentice
Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following

specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks. May weld pipe supports to structural steel members. May observe production machines in assigned area of manufacturing facility to detect machinery malfunctions. May operate machinery to verify repair. May modify programs of automated machinery, such as robots and conveyors, to change motion and speed of machine, using teach pendant, control panel, or keyboard and display screen of robot controller and programmable controller. May be designated Steam Fitter (construction) when installing piping systems that must withstand high pressure.

Pipe Fitter * (Excluding HVAC) – Ratio 1/1 See Journeyman / Apprentice schedule
Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe-threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks.

Plasterer * See Plaster Tender - Ratio 1/3 Apprentice
Applies coats of plaster to interior walls, ceilings, and partitions of buildings, to produce finished surface, according to blueprints, architect's drawings, or oral instructions, using hand tools and portable power tools: Directs workers to mix plaster to desired consistency and to erect scaffolds. Spreads plaster over lath or masonry base, using trowel, and smoothes plaster with darby and float to attain uniform thickness. Applies scratch, brown, or finish coats of plaster to wood, metal, or board lath successively. Roughens undercoat with scratcher (wire or metal scraper) to provide bond for succeeding coats of plaster.

Plumber * (Excluding HVAC Pipe) - Ratio 3/2 Apprentice
Assembles, installs, and repairs pipes, fittings, and fixtures of heating, water, and drainage systems, according to specifications and plumbing codes: Studies building plans and working drawings to determine work aids required and sequence of installations. Inspects structure to ascertain obstructions to be avoided to prevent weakening of structure resulting from installation of pipe. Locates and marks position of pipe and pipe connections and passage holes for pipes in walls and floors, using ruler, spirit level, and plumb bob. Cuts openings in walls and floors to accommodate pipe and pipe fittings, using hand tools and power tools. Cuts and threads pipe, using pipe cutters, cutting torch, and pipe-threading machine. Bends pipe to required angle by use of pipe-bending machine or by placing pipe over block and bending it by hand. Assembles and installs valves, pipe fittings, and pipes composed of metals, such as iron, steel, brass, and lead, and nonmetals, such as glass, vitrified clay, and plastic, using hand tools and power tools. Joins pipes by use of screws, bolts, fittings, solder, plastic solvent, and caulks joints. Fills pipe system with water or air and reads pressure gauges to determine whether system is leaking. Installs and repairs plumbing fixtures, such as sinks, commodes, bathtubs, water heaters, hot water tanks, garbage disposal units, dishwashers,

and water softeners. Repairs and maintains plumbing by replacing washers in leaky faucets, mending burst pipes, and opening clogged drains.

Roofer - Ratio 1/3 Helpers
Covers roofs with roofing materials other than sheet metal, such as composition shingles or sheets, wood shingles, or asphalt and gravel, to waterproof roofs: Cuts roofing paper to size, using knife, and nails or staples it to roof in overlapping strips to form base for roofing materials. Installs gutters and downs spouts. Aligns roofing material with edge of roof, and overlaps successive layers, gauging distance of overlap with chalkline, gauge on shingling hatchet, or by lines on shingles. Fastens composition shingles or sheets to roof with asphalt, cement, or nails. Punches holes in slate, tile, terra cotta, or wooden shingles, using punch and hammer. Cuts strips of flashing and fits them into angles formed by walls, vents, and intersecting roof surfaces. When applying asphalt or tar and gravel to roof, mops or pours hot asphalt or tar onto roof base. Applies alternate layers of hot asphalt or tar and roofing paper until roof covering is as specified. Applies gravel or pebbles over top layer, using rake or stiff bristled broom.

Sheet metal worker * Ratio 2/1 Apprentice (Including Setting HVAC System)(Excluding HVAC Duct) Ratio 3/1 Apprentice
Fabricates, assembles, installs and repairs sheet metal products, including sheet metal roof (also see Roofer). Operates soldering and welding equipment to join together sheet metal parts. Seals seams and joints with sealant. Installs roof sheets, trims, flashing, gutters down spouts and other related items. Performs other related duties.

Sprinkler Fitter (Fire) * - Ratio 1/1 Apprentice
Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe-threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks. May weld pipe supports to structural steel members. May observe production machines in assigned area of manufacturing facility to detect machinery malfunctions. May operate machinery to verify repair. May modify programs of automated machinery, such as robots and conveyors, to change motion and speed of machine, using teach pendant, control panel, or keyboard and display screen of robot controller and programmable controller.

Tile Finisher - Ratio 1/3 Helpers
Supplies and mixes construction materials for TILE SETTER (construction) 861.381-054, applies grout, and cleans installed tile: Moves tiles, tile setting tools, and work devices from storage area to installation site manually or using wheelbarrow. Mixes mortar and grout according to standard formulas and request from TILE SETTER (construction), using bucket, water hose, spatula, and portable mixer. Supplies TILE SETTER (construction) with mortar, using wheelbarrow and shovel. Applies grout between joints of installed tile, using grouting trowel. Removes excess grout from tile

joints with wet sponge and scrapes corners and crevices with trowel. Wipes surface of tile after grout has set to remove grout residue and polish tile, using nonabrasive materials. Cleans installation site, mixing and storage areas, and installation machines, tools, and equipment, using water and various cleaning tools. Stores tile setting materials, machines, tools, and equipment. May apply caulk, sealers, acid, steam, or related agents to caulk, seal, or clean installed tile, using various application devices and equipment. May modify mixing, grouting, grinding, and cleaning procedures according to type of installation or material used. May assist TILE SETTER (construction) to position and secure metal lath, wire mesh, or felt paper prior to installation of tile. May cut marked tiles to size, using power saw or tile cutter.

Tile Setter - Ratio 1/3 Helpers
Applies tile to walls, floors, ceilings, and promenade roof decks, following design specifications: Examines blueprints, measures and marks surfaces to be covered, and lays out work. Measures and cuts metal lath to size for walls and ceilings with tin snips. Tacks lath to wall and ceiling surfaces with staple gun or hammer. Spreads plaster base over lath with trowel and levels plaster to specified thickness, using screed. Spreads concrete on sub floor, with trowel and levels it with screed. Spreads mastic or other adhesive base on roof deck, using serrated spreader to form base for promenade tile. Cuts and shapes tile with tile cutters and biters. Positions tile and taps it with trowel handle to affix tile to plaster or adhesive base.

Truck Driver
Drives truck with capacity of more than 3 tons, to transport materials to and from specified destinations: Drives truck to destination, applying knowledge of commercial driving regulations and area roads. Prepares receipts for load picked up. Collects payment for goods delivered and for delivery charges. May maintain truck log, according to state and federal regulations. May maintain telephone or radio contact with supervisor to receive delivery instructions. May load and unload truck. May inspect truck equipment and supplies, such as tires, lights, brakes, gas, oil, and water. May perform emergency roadside repairs, such as changing tires, installing light bulbs, tire chains, and spark plugs. May position blocks and tie rope around items to secure cargo during transit.

Laborers

Common Laborer
Performs any combination of the following tasks in erecting, repairing and wrecking buildings; dig, spread and level dirt and gravel; lift carry and hold building materials, tools and supplies; clean tools, equipment, materials and work areas; mix, pour and spread concrete, asphalt, gravel and other materials; join, wrap and seal sections of pipe; routine non-machine tasks such as removing forms from set concrete, filling expansion joints with asphalt, and placing culverts in trench. May also signal construction equipment operators; measure distances from grade stakes, drive stakes and stretch lines; bolt, nail align and block up under forms; mix and finish poured concrete, erect scaffolding; spread paint or coating to seal surfaces; caulking compounds to seal surfaces; remove projections from concrete, and mount pipe hangers.

Mason Tender Brick (Bricklayer's Helper)

Mason Tender Cement (Concrete Mason's / Concrete Finisher's Helper)

Pipe layer
Lay pipe for storm or sanitation sewers, drains, and water mains. Perform any combination of the following tasks: grade trenches or culverts, position pipe, or seal joints.

Plaster Tender (Plaster's Helper)
Tends machine that pumps plaster or stucco through spraygun for application to ceilings, walls, and partitions of buildings: Starts and stops machine on signals from PLASTERER (construction). Fills

hopper of machine with plaster. Turns valves to regulate pump and compressor. Assists in erecting scaffolds.

Power Equipment Operator:

Asphalt Paver (operator)
Operator; bituminous-paving-machine operator; blacktop-paver operator; blacktop spreader; mechanical-spreader operator; paving-machine operator, asphalt or bituminous Operates machine that spreads and levels hot-mix bituminous paving material on sub grade of highways and streets: Bolts extensions to screed to adjust width, using wrenches. Lights burners to heat screed. Starts engine and controls paving machine to push dump truck and maintain constant flow of asphalt into hopper. Observes distribution of paving material along screed and controls direction of screed to eliminate voids at curbs and joints. Turns valves to regulate temperature of asphalt flowing from hopper when asphalt begins to harden on screed.

Backhoe (operator)
Operates power-driven machine, equipped with movable shovel, to excavate or move coal, dirt, rock, sand, and other materials: Receives written or oral instructions from supervisor regarding material to move or excavate. Pushes levers and depresses pedals to move machine, to lower and push shovel into stockpiled material, to lower and dig shovel into surface of ground, and to lift, swing, and dump contents of shovel into truck, car, or onto conveyor, hopper, or stockpile. Observes markings on ground, hand signals, or grade stakes to remove material, when operating machine at excavation site.

Crane (operator)
Operates electric-, diesel-, gasoline-, or steam-powered guy-derrick or stiff-leg derrick (mast supported by fixed legs or tripod), to move products, equipment, or materials to and from quarries, storage areas, and processes, or to load and unload trucks or railroad cars: Pushes and pulls levers and depresses pedals to raise, lower, and rotate boom and to raise and lower load line in response to signals.

Forklift (operator)
Drives gasoline-, liquefied gas-, or electric-powered industrial truck equipped with lifting devices, such as forklift, boom, scoop, lift beam and swivel-hook, fork-grapple, clamps, elevating platform, or trailer hitch, to push, pull, lift, stack, tier, or move products, equipment, or materials in warehouse, storage yard, or factory: Moves levers and presses pedals to drive truck and control movement of lifting apparatus. Positions forks, lifting platform, or other lifting device under, over, or around loaded pallets, skids, boxes, products, or materials or hooks tow trucks to trailer hitch, and transports load to designated area. Unloads and stacks material by raising and lowering lifting device.

Slab & Wall Saw (operator)

Apprentices
Apprentices may be used in any of the crafts listed above where noted, if they are currently certified in a program recognized by the Bureau of Apprenticeship and Training, U.S. Department of Labor, providing the proper ratio between journeyman and apprentice is observed. Apprentice certification certificates must be supplied with the first weekly payroll upon which the apprentice's name appears.

Helper (65% of the journeyman classification)
(Must not exceed 3 helpers to 1 journeyman)
A Helper is a semi-skilled worker (rather than a skilled journeyman) who works under the direction of and assists a journeyman. Under the journeyman's direction and supervision, the helper performs a variety of duties to assist the journeyman such as preparing, carrying, and furnishing equipment,

supplies and maintaining them in order; cleaning and preparing work areas; lifting, positioning, and holding materials or tools; and other related semi-skilled tasks as directed by the journeyman. A helper may use the tools of the trade at and under the direction of the journeyman. The particular duties performed by a helper vary according to area practice. The journeyman must work in close proximity to the location of the helpers work area. The helpers wage rate shall be calculated at no less than 65% of the prevailing wage for that journeyman's classification.

Helper who assists more than one journeyman craft should be listed with the notation indicating each journeyman craft classification they assist.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Pipe fitters * Apprentice Schedule (Excluding HVAC Pipe)

Journeyman	Indentured Apprentice	Apprentice Applicant	Total
1	1	0	1 to 1
3	2	1	3 to 3
5	3	2	5 to 5
8	4	3	8 to 7
12	5	4	12 to 9
16	6	5	16 to 11
20	7	6	20 to 13
25	8	7	25 to 15
30	9	8	30 to 17
40	10	9	40 to 19
50	11	10	50 to 21

NOTE: Continue after 50 Journeyman — ONE (1) Indentured Apprentice and one (1) Apprentice Applicant for every ten (10) Journeyman

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*** When Apprentices are shown, Helpers cannot be utilized**

If there are questions as to the classification of a worker, contact the Contract Compliance Officer in writing with a description of the work the worker will be performing. After review the Contract Compliance Officer will respond in writing with the classification and wage rate to be paid the worker in question.

EXHIBIT "B"

CERTIFICATE FROM CONTRACTOR APPOINTING OFFICER OR EMPLOYEE TO SUPERVISE PAYMENT OF EMPLOYEES

Project Name _____

_____

Project WBS#: _____ Date _____

(I) (We) hereby certify that (I am) (we are) the prime Contractor for _____

_____
(specify type of job)

in connection with construction of the above-mentioned Project, and that (I) (we) have appointed _____, whose signature appears below, to supervise the payment of (my) (our) employees beginning _____, 20___; that he/she is in a position to have full knowledge of the facts set forth in the payroll documents and in the statement of compliance required by the Copeland Act and the City of Houston, which he/she is to execute with (my) (our) full authority and approval until such time as (I) (we) submit to the City of Houston a new certificate appointing some other person for the purposes hereinabove stated.

_____ Phone: _____
(Identifying Signature of Appointee)

Attest: _____
(Name of Firm or Corporation)

By: _____ By: _____
(Signature) (Signature)

_____ _____
(Title) (Title)

NOTE: This certificate must be executed by an authorized officer of a corporation or by a member of a partnership, and shall be executed prior to and be submitted with the first payroll. Should the appointee be changed, a new certificate must accompany the first payroll for which the new appointee executes a statement of compliance required by the Copeland Act and the City of Houston.

EXHIBIT "C"

CERTIFICATE FROM SUBCONTRACTOR APPOINTING OFFICER OR EMPLOYEE TO SUPERVISE PAYMENT OF EMPLOYEES

Project Name _____

_____

Project WBS#: _____ Date _____

(I) (We) hereby certify that (I am) (we are) the prime Contractor for _____

_____
(specify type of job)

in connection with construction of the above-mentioned Project, and that (I) (we) have appointed _____, whose signature appears below, to supervise the payment of (my) (our) employees beginning _____, 20___; that he/she is in a position to have full knowledge of the facts set forth in the payroll documents and in the statement of compliance required by the Copeland Act and the City of Houston, which he/she is to execute with (my) (our) full authority and approval until such time as (I) (we) submit to the City of Houston a new certificate appointing some other person for the purposes hereinabove stated.

_____ Phone: _____
(Identifying Signature of Appointee)

Attest: _____
(Name of Firm or Corporation)

By: _____ By: _____
(Signature) (Signature)

_____ _____
(Title) (Title)

NOTE: This certificate must be executed by an authorized officer of a corporation or by a member of a partnership, and shall be executed prior to and be submitted with the first payroll. Should the appointee be changed, a new certificate must accompany the first payroll for which the new appointee executes a statement of compliance required by the Copeland Act and the City of Houston.

END OF DOCUMENT

NOTES:

1. TBM "A" ELEV. 41.95' TOP (2) 60 NAIL IN WEST SIDE POWER POLE S.W. CORNER N. DRENNAN AND ENGLEKE

2. TBM "B" ELEV. 41.21' BOX CUT ON BACK OF CURB INLET NE CORNER OF N. MILBY AND LOVEJOY

3. ELEVATIONS BASED ON THE FOLLOWING FLOODPLAIN REFERENCE MARK:

   –NO. 210025– EL: 40.68'
   LOCATED ON BRIDGE AT HIRSCH ROAD AND BUFFALO BAYOU ON CONC. BEAM ON NORTHWEST UPSTREAM CORNER OF BRIDGE.

   –NO. 210015– EL: 40.49'
   LOCATED ON NW CORNER OF BRIDGE ON DOWNSTREAM CONC. WALK AT LOCKWOOD DRIVE AND BUFFALO BAYOU.

   –NO. 210030– EL: 42.43'
   LOCATED ON BRIDGE AT JENSON DRIVE AND BUFFALO BAYOU LOCATED ON DOWNSTREAM CONC. WALK ON EAST SIDE OF BRIDGE.

4. SUBJECT TRACT IS LOCATED IN ZONE X, PER FIRM MAP NO. 48201C0690K DATED APRIL 20, 2000 AND PER PRELIMNARY MAP NO. 48201C0690L DATED SEPTEMBER 30, 2004

5. UNDERGROUND PRIVATE UTILITIES SUCH AS GAS, ELECTRICAL OR TELEPHONE COULD NOT BE VISUALLY LOCATED OR VERIFIED

N

SCALE 1" = 40'

LEGEND

- POWER POLE W/LIGHT
- POWER POLE
- ELECTRIC JUNCTION BOX
- TRAFFIC SIGN
- MANHOLE
- B OR BB INLET
- GRATE INLET
- POST
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- GAS VALVE
- BUILDING
- a/c AIR CONDITIONING UNIT
- WOOD FENCE
- CHAIN LINK FENCE
- TEMPORARY BECHMARK
- PARKING LOT LIGHT
- CLEAN OUT
- MAILBOX
- GAS METER
- GAS LINE MARKER
- FOUND IRON ROD
- FOUND IRON PIPE
- TERAN GROUP CONTROL POINT
- TXDOT MONUMENT
- UNDERGROUND CABLE MARKER
- XX.XX EXISTING ELEVATION
- (R) RECORD DRAWING
- SET 5/8 " IRON ROD WITH CAP

STATE OF TEXAS
REGISTERED
ORLANDO J. TERAN II
4865
PROFESSIONAL
SURVEYOR

1/5/05

TERAN GROUP
888 W. SAM HOUSTON PKWY. S., STE. 250
HOUSTON, TEXAS 77042
PH: 713-244-9795
FAX: 713-244-9794

TOPOGRAPHICAL SURVEY OF 10.6904 ACRE TRACT OF LAND S.M. WILLIAMS SURVEY, A-87 HARRIS COUNTY, TEXAS

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Encasement for piping.
3. Specialty valves.
4. Flexible connectors.
5. Water meters furnished by utility company for installation by Contractor.
6. Water meters.
7. Escutcheons.
8. Sleeves and sleeve seals.
9. Wall penetration systems.

1.3 SUBMITTALS

A. Product Data: For the following products:

1. Specialty valves.
2. Transition fittings.
3. Dielectric fittings.
4. Flexible connectors.
5. Water meters.
6. Backflow preventers and vacuum breakers.
7. Escutcheons.
8. Sleeves and sleeve seals.
9. Water penetration systems.

B. Coordination Drawings: For piping in equipment rooms and other congested areas, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Fire-suppression-water piping.
2. Domestic water piping.
3. HVAC hydronic piping.
4. Natural Gas piping.
5. Lab Gas Piping

C. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.

C. Comply with NSF 61 for potable domestic water piping and components.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Architect and Construction Manager no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Architect's and Construction Manager's written permission.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 WATER SUPPLY SYSTEM:

A. A complete system of hot and cold water supply to all plumbing fixtures and mechanical equipment shall be supplied and installed as shown on the Drawings. The water supply system shall be installed using the materials and methods as specified in the following paragraphs.

B. UNDERGROUND WATER PIPING SYSTEMS:

1. Pipe: All pipe used for underground water piping mains shall be Class 52 centrifugally cast, close grained cast iron pipe or Class 50 DUCTILE iron pipe arranged with bell and spigot mechanical joints.
2. Valve Boxes:

a. For each underground valve installed by the Contractor, the Contractor shall provide and install a two-piece, screw adjustable type valve box. These valve boxes shall be designed for heavy roadway service and they shall have a deep socket type of cover which prevents their being accidentally knocked out of position.
b. The word "WATER" shall appear on each cover. The installation of these members shall be such that by the use of the adjustable screw type bodies the tops are just flush with the finished grade. These valve boxes shall be Tyler Pipe Industries #6850, or approved equal.

3. Lead: It is forbidden that lead in any form be used in any water system other than waste. If lead is used in the fabrication or installation of any water system other than waste, then ALL of the installed equipment and material, which may have come in contact with the lead, shall be marked with bright red or orange spray paint, and shall be removed from the project site. The system(s) shall then be restored and reinstalled using ALL NEW MATERIALS.

C. FIRE HYDRANTS:

1. Furnish and install U.L. approved fire hydrants at locations indicated on the Drawings.
2. Fire hydrants shall be equal to Kennedy Valve Manufacturing Company with two (2) 2-1/2" and one (1) 4-1/2" threaded nozzles. Threads are to be per local Fire Department requirements. Each fire hydrant supply connection shall be preceded with a six-inch (6") gate valve and valve box as specified for underground water systems.
3. Fire hydrants shall be firmly supported underground all around the standpipe. Lower part of standpipe shall be surrounded with coarse gravel for drainage.

D. IRRIGATION PROVISIONS:

1. Furnish and install capped and/or valved water lines under paving, through retaining walls in paved plaza areas and as indicated on Drawings for connections and extensions under work of Section Irrigation (Sprinkler) System.

E. BUILDING ENTRANCE:

1. A metallic sleeve shall be inserted in the forms of the building wall through which the water service enters the building. The interior diameter of such sleeve shall be four inches (4") greater than the exterior diameter of the water service.
2. The water service pipe from within the building shall be extended to a point five feet outside the building wall through this sleeve. The position of the water service in this sleeve shall be concentric and the intervening space shall be packed in a flexible manner to avert the flow of water from outside of the building into the basement.
3. The interior pipe extended outside the building shall be provided with a protective wrapping of "Tape Coat" SP warmed with hand torch. This protective tape shall be applied with "half lap" coverage in strict accordance with the manufacturer's published instructions. The cast iron pipe connected to the pipe extending from the building wall shall contain two caulked joints within four feet of the union of the cast iron pipe and the interior pipe from the building.

2.2 REQUIREMENTS OF INTERIOR WATER PIPING SYSTEMS:

1. All piping shall have reducing fittings used for reducing or increasing where any change in the pipe sizes occurs. No bushing of any nature shall be allowed in piping.
2. All exposed chrome plated, polished or enameled connections from fixtures shall be put up with special care, showing no tool marks or threads at fittings, and supported by neat racks or hangers with round head screws of same material and finish.
3. Wade Shock stop, or approved equal, sealed air chambers shall be provided in all water branches to fixtures, sized in accordance with manufacturer's recommendations, concealed, accessible, and located so as to protect each group of plumbing fixtures.
4. The fabrication of copper pipe and fittings shall in every detail conform to the recommendations and instructions of the fitting manufacturer. The tools used shall be the tools adapted to that specific purpose.

2.3 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper shall be used for all domestic cold and hot water piping up to and including 4" for above grade applications.

1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
5. Copper Pressure-Seal-Joint Fittings:
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Elkhart Products Corporation; Industrial Division.
        2) NIBCO INC.
    b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
    c. NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.

B. Interior domestic water piping of 6” and larger shall be schedule 40 galvanized steel to ASTM A53.

2.4 DUCTILE-IRON PIPE AND FITTINGS (for underground use)

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Standard-Pattern, Mechanical-Joint Fittings: AWWA C110, ductile or gray iron.
2. Compact-Pattern, Mechanical-Joint Fittings: AWWA C153, ductile iron.
    a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Standard-Pattern, Push-on-Joint Fittings: AWWA C110, ductile or gray iron.
    a. Gaskets: AWWA C111, rubber.
2. Compact-Pattern, Push-on-Joint Fittings: AWWA C153, ductile iron.
    a. Gaskets: AWWA C111, rubber.

C. Plain-End, Ductile-Iron Pipe: AWWA C151.

1. Grooved-Joint, Ductile-Iron-Pipe Appurtenances:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Anvil International.
2) Shurjoint Piping Products.
3) Star Pipe Products.
4) Victaulic Company.

b. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.

c. Grooved-End, Ductile-Iron-Pipe Couplings: AWWA C606 for ductile-iron-pipe dimensions. Include ferrous housing sections, EPDM-rubber gaskets suitable for hot and cold water, and bolts and nuts.

2.5 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

E. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.

1. Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

G. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.6 SPECIALTY VALVES

A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.

B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

2.7 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Dresser Piping Specialties.
c. Ford Meter Box Company, Inc. (The).
d. JCM Industries.
e. Romac Industries, Inc.
f. Smith-Blair, Inc; a Sensus company.
g. Viking Johnson; c/o Mueller Co.

D. Plastic-to-Metal Transition Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Charlotte Pipe and Foundry Company.
b. Harvel Plastics, Inc.
c. Spears Manufacturing Company.

2. Description: CPVC or PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket or threaded end.

2.8 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Capitol Manufacturing Company.
b. Central Plastics Company.
c. EPCO Sales, Inc.
d. Hart Industries International, Inc.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
f. Zurn Plumbing Products Group; Wilkins Water Control Products.

2. Description:

a. Pressure Rating: 150 psig at 180 deg F.

b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Capitol Manufacturing Company.
b. Central Plastics Company.
c. EPCO Sales, Inc.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Factory-fabricated, bolted, companion-flange assembly.
b. Pressure Rating: 150 psig.
c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.

2. Description:

a. Non-conducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig.
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Calpico, Inc.
b. Lochinvar Corporation.

2. Description:

a. Galvanized-steel coupling.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Female threaded.
d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Perfection Corporation; a subsidiary of American Meter Company.
b. Precision Plumbing Products, Inc.

c. Victaulic Company.

2. Description:

a. Electroplated steel nipple complying with ASTM F 1545.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Male threaded or grooved.
d. Lining: Inert and noncorrosive, propylene.

2.9 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flex-Hose Co., Inc.
2. Flexicraft Industries.
3. Metraflex, Inc.
4. Unaflex, Inc.

B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.10 ESCUTCHEONS

A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.

B. Split Casting, Cast Brass: Polished, chrome-plated or rough-brass finish with concealed hinge and setscrew.

C. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.11 SLEEVES

A. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.

B. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.12 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.

3. Metraflex, Inc.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.13 WALL PENETRATION SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. SIGMA.

B. Description: Wall-sleeve assembly, consisting of housing and gland, gaskets, and pipe sleeve.

1. Carrier-Pipe Deflection: Up to 5 percent without leakage.
2. Housing: Ductile-iron casting with hub, water stop, anchor ring, and locking devices. Include gland, bolts, and nuts.
3. Housing-to-Sleeve Gasket: EPDM rubber.
4. Housing-to-Carrier-Pipe Gasket: AWWA C111, EPDM rubber.
5. Pipe Sleeve: ASTM A 53/A 53M, Schedule 40, zinc-coated steel pipe.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

D. Install underground ductile-iron pipe in PE encasement according to ASTM A 674 or AWWA C105.

E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

F. Install shutoff valve immediately upstream of each dielectric fitting.

G. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.

H. Install domestic water piping level and plumb.

I. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

J. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

K. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

L. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

M. Install piping adjacent to equipment and specialties to allow service and maintenance.

N. Install piping to permit valve servicing.

O. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

P. Install piping free of sags and bends.

Q. Install fittings for changes in direction and branch connections.

R. Install PEX piping with loop at each change of direction of more than 90 degrees.

S. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

T. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages.

U. Install thermostats in hot-water circulation piping. Comply with requirements in Division 22 Section "Domestic Water Pumps" for thermostats.

V. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.

3.2 TESTING AND STERILIZATION

A. All water piping systems shall be properly tested to assure their being absolutely tight. In the case of pipes which are to be insulated, these tests shall be completed and the piping system proven to be absolutely tight before any insulation is applied. Wherever pipes are placed so that they will ultimately be concealed, these tests shall be conducted and the absolute tightness of each piping system shall be demonstrated before the system is concealed.

B. The procedure of these tests shall consist of subjecting a piping system to a hydrostatic pressure per Section 23 00 00. During the test period, all pipe, fittings and accessories in the particular piping system which is being tested shall be carefully inspected. If leaks are detected, such leaks shall be stopped by means designated by the Owner's duly authorized representative and the hydrostatic test

shall again be applied. This procedure shall be repeated until, for an entire twenty-four hour period, no leaks can be found while the system being tested is subjected to the pressure mentioned above.

C. Wherever conditions permit, each piping system shall thereafter be subjected to its normal operating pressure and temperature for a period of no less than five (5) days. During that period, it shall be kept under the most careful observation. The piping systems must demonstrate the propriety of their installation by remaining absolutely tight during this period. Even though the completion of these tests is satisfactory, there is a continuing responsibility for the ultimate, proper, and satisfactory operation of such piping systems and their accessories.

D. After completion of the testing, the entire cold and hot water piping systems, with attached equipment, shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine. The chlorinating materials shall be either liquid chlorine conforming to U. S. Army Specification No. 4-1 or calcium hypochlorite or chlorinated lime conforming to the requirements of Federal Specification O-C-114. The sterilizing solution shall be allowed to remain in the system for a period of eight (8) hours during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.2 parts per million.

E. The sterilization process shall be conducted as required by the Health Department of the “City of Houston”, and the specifications above, and upon completion of the process, the Health Department shall test and certify the cleanliness of the water piping system. The Mechanical Subcontractor shall pay all costs and charges incidental to this test and certification.

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.

G. Ductile-Iron-Piping Grooved Joints: Cut groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join ductile-iron pipe and grooved-end fittings according to AWWA C606 for ductile-iron-pipe, cut-grooved joints.

H. Steel-Piping Grooved Joints: Cut or roll groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

I. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

1. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4 VALVE INSTALLATION

A. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball valves for piping NPS 2 and smaller. Use butterfly for piping NPS 2-1/2 and larger.

B. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

C. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

D. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for calibrated balancing valves.

3.5 FLEXIBLE CONNECTOR INSTALLATION

A. Install flexible connectors in suction and discharge piping connections to each domestic water pump.

B. Install bronze-hose flexible connectors in copper domestic water tubing.

C. Install stainless-steel-hose flexible connectors in steel domestic water piping.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Division 22 Section "Vibration Controls for Plumbing Piping and Equipment" for seismic-restraint devices.

B. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:
    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements for plumbing fixture for connection sizes.
3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
    a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Re-inspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for re-inspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow it to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow it to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Clean non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

C. Prepare and submit reports of purging and disinfecting activities.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use butterfly, ball valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

C. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION

SECTION 22 13 16 – SANITARY WASTE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following for soil, waste, and vent piping inside the building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.
3. Encasement for underground metal piping.

B. Related Sections include the following:

1. Division 22 Section "Chemical Waste-Systems for Laboratory Facilities" for chemical-waste and vent piping systems.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

C. LLDPE: Linear, low-density polyethylene plastic.

D. NBR: Acrylonitrile-butadiene rubber.

E. PE: Polyethylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.
2. Sanitary Sewer, Force-Main Piping: 100 psig.

1.5 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-DWV" for plastic drain,

waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 PVC SOIL PIPE AND FITTINGS (Below ground application)

A. Underground, soil, waste, and vent piping NPS 6 and smaller shall be the following:
1. PVC Pipe: Schedule 40 PVC, conform to ASTM D-1785 Soil and Waste Vent piping. Fittings shall be compatible material with solvent cement type joints.
2. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311 drain, waste, and vent pipe patterns with solvent-cemented joints.

2.4 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS (above ground application)

A. Pipe and Fittings: ASTM A 74, Service class(s).

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.5 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.

a. Manufacturers:

1) ANACO.
2) Fernco, Inc.
3) Mission Rubber Co.
4) Tyler Pipe; Soil Pipe Div.

2.6 SPECIAL PIPE FITTINGS

A. Flexible, Non-pressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:

a. Dallas Specialty & Mfg. Co.
b. Mission Rubber Co.
c. NDS, Inc.
d. Plastic Oddities, Inc.

2. Sleeve Materials:

a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

B. Shielded Non-pressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Mission Rubber Co.

C. Rigid, Unshielded, Non-pressure Pipe Couplings: ASTM C 1461, sleeve-type reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:

a. ANACO.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings and sovent stack fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.

C. Aboveground soil and waste piping NPS 6 and larger shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hub less cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hub less-coupling joints.

D. Aboveground, vent piping NPS 4 and smaller shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
3. Copper DWV tube, copper drainage fittings, and soldered joints.

a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2: Hard copper tube, Type M; copper pressure fittings; and soldered joints.

E. Underground soil and waste piping NPS 6 and smaller shall be the following:

1. Cellular-core, Sewer and Drain Series, schedule 40 PVC pipe; PVC socket fittings; and solvent-cemented joints.

3.3 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is specified in Division 22.

B. Basic piping installation requirements are specified in Division 22.

C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

F. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.

G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written

instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 2 and smaller; 1 percent downward in direction of flow for piping NPS 3 and larger.
2. Horizontal Sanitary Drainage Piping: 1 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

K. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

L. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

M. Install underground PVC soil and waste drainage piping according to ASTM D 2321.

N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hub less cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hub less-coupling joints.

E. PVC Non pressure Piping Joints: Join piping according to ASTM D 2665.

3.5 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Install individual, straight, horizontal piping runs according to the following:
    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer than 100 Feet, if indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and 5: 48 inches with 5/8-inch rod.
4. NPS 6: 48 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 48 inches with 7/8-inch rod.

H. Install supports for vertical PVC piping every 48 inches.

I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.
7. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
8. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
9. Prepare reports for tests and required corrective action.

3.8 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PROTECTION

A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION

SECTION 226213

VACUUM PIPING FOR LABORATORY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Laboratory high-vacuum piping and specialties, designated "laboratory high vacuum" operating at 24 inches mercury 29 inches mercury.

B. Related Sections include the following:

1. Division 11 Section "Laboratory Fume Hoods" for vacuum outlets in laboratory fume hoods.
2. Division 12 Section "Laboratory Casework" for vacuum outlets in casework.
3. Division 22 Section "Vacuum Equipment for Laboratory Facilities" for laboratory vacuum producers.

1.3 DEFINITIONS

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Vacuum pipes tubes and fittings.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Brazing certificates.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For vacuum piping specialties to include in emergency, operation, and maintenance manuals.

1.5 COORDINATION

A. Coordinate medical vacuum service connections with other service connections. Medical compressed-air service connections are specified in Division 22 Section "Compressed-Air Piping for Laboratory and Healthcare Facilities," and medical gas service connections are specified in Division 22 Section "Gas Piping for Laboratory."

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Copper Gas Tube: ASTM B 819, Type L, seamless, drawn temper. Include standard color marking "ACR" in blue for Type L tube.
   1. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, with dimensions for brazed joints.
   2. Copper Unions: ASME B16.22 or MSS SP-123, wrought copper or cast-copper alloy.

B. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

C. Fittings for installation exposed within the laboratory shall also Swagelok fittings at valves connections. Tubing wall thickness shall be suitable for the Swagelok fittings.

2.2 VALVES

A. General Requirements for Valves: Manufacturer cleaned, purged, and bagged according to CGA G-4.1 for oxygen service.

B. Metal Ball, Butterfly, Check, Gate, and Globe Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping."

C. Provide valves for each service above the fume hood upstream of the entry regardless of if it is indicated on the drawings or not. Valves shall be bronze ball valves, compatible to the pipe material. Valves shall be Whitey, or Nupro with Swagelok connections.

D. 3/4" Inch and Smaller: Use lever handle ball valves, Whitey "40" series with factory assembled nylon color handles, stainless steel for stainless tubing and brass for copper tubing.

E. Larger than 3/4" Use Whitey "CO" series ball valves with factory assembled nylon color handles, brass for copper tubing. Use Virgin TFE series 62 through 68 for all services.

F. Ball Valves: MSS SP-110, 3-piece body, brass or bronze.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Healthcare Products, Inc.; Chemetron Div.
b. Allied Healthcare Products, Inc.; Oxequip Health Industries.
c. Amico Corporation.
d. BeaconMedaes.
e. Conbraco Industries, Inc.
f. NIBCO INC.
g. Squire-Cogswell/Aeros Instruments, Inc.
h. Tri-Tech Medical.

2. Pressure Rating: 300 psig minimum.
3. Ball: Full-port, chrome-plated brass.
4. Seats: PTFE or TFE.
5. Handle: Lever type with locking device.
6. Stem: Blowout proof with PTFE or TFE seal.
7. Ends: Manufacturer-installed ASTM B 819, copper-tube extensions.

G. Bronze Check Valves: In-line pattern.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Healthcare Products, Inc.; Chemetron Div.
b. Amico Corporation.
c. BeaconMedaes.
d. Conbraco Industries, Inc.
e. Squire-Cogswell/Aeros Instruments, Inc.
f. Tri-Tech Medical.

2. Pressure Rating: 300 psig minimum.
3. Operation: Spring loaded.
4. Ends: Manufacturer-installed ASTM B 819, copper-tube extensions.

2.3 FLEXIBLE PIPE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Flex-Hose Co., Inc.
2. Mercer Rubber Co.
3. Metraflex, Inc.

4. Proco Products, Inc.
5. Unaflex.

B. Description: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: 200 psig 250 psig minimum.
2. End Connections: Threaded copper pipe or plain-end copper tube.

2.4 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Under deck Clamp: Clamping ring with set screws.

PART 3 - EXECUTION

3.1 PREPARATION

A. Cleaning of Tubing: If manufacturer-cleaned and -capped fittings or tubing are not available or if pre-cleaned fittings or tubing must be re-cleaned because of exposure, have supplier or separate agency acceptable to authorities having jurisdiction perform the following procedures:

1. Clean tube and fittings, valves, gages, and other components of oil, grease, and other readily oxidizable materials as required for oxygen service according to CGA G-4.1, "Cleaning Equipment for Oxygen Service."
2. Wash tubing and components in hot, alkaline-cleaner-water solution of sodium carbonate or tri-sodium phosphate in proportion of 1 lb of chemical to 3 gal. of water.

a. Scrub to ensure complete cleaning.
b. Rinse with clean, hot water to remove cleaning solution.

B. Laboratory Vacuum Piping: Use one of the following piping materials for each size range:

1. NPS 4 and Smaller: Type L, copper water tube; wrought-copper fittings; and brazed joints.
2. NPS 5 to NPS 8: Type L, copper water tube; wrought-copper fittings; and brazed joints.

C. Drain Piping: Use one of the following piping materials:

1. Copper water tube, cast- or wrought-copper fittings, soldered press-type fittings and pressure-sealed joints.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of vacuum piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Comply with ASSE Standard #6010 for installation of vacuum piping.

C. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and coordinate with other services occupying that space.

F. Install piping adjacent to equipment and specialties to allow service and maintenance.

G. Install vacuum and drain piping with 1 percent slope downward in direction of flow.

H. Install nipples, unions, and special fittings, and valves with pressure ratings same as or higher than piping pressure rating used in applications below unless otherwise indicated.

I. Install eccentric reducers, if available, where vacuum piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.

J. Provide drain leg and drain trap at end of each main and branch and at low points.

K. Install thermometer and vacuum gage on inlet piping to each vacuum producer and on each receiver and separator. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping."

L. Install piping to permit valve servicing.

M. Install piping free of sags and bends.

N. Install fittings for changes in direction and for branch connections. Extruded-tee branch outlets in copper tubing may be made where specified.

O. Install medical vacuum piping to medical vacuum service connections specified in this Section and to equipment specified in other Sections requiring medical vacuum service.

P. Install medical vacuum service connections recessed in walls. Attach roughing-in assembly to substrate; attach finishing assembly to roughing-in assembly.

Q. Install medical vacuum bottle bracket adjacent to each wall-mounted medical vacuum service connection suction inlet.

R. Connect vacuum piping to vacuum producers and to equipment requiring vacuum service.

S. Install unions, in copper vacuum tubing adjacent to each valve and at final connection to each piece of equipment, machine, and specialty.

T. Install unions, in PVC vacuum piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment, machine, and specialty.

U. Install flanges, in PVC vacuum piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment, machine, and specialty.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support devices.

B. Vertical Piping: MSS Type 8 or 42 clamps.

C. Individual, Straight, Horizontal Piping Runs:

1. 100 Feet and Less: MSS Type 1, adjustable, steel, clevis hangers.
2. Longer Than 100 Feet: MSS Type 43, adjustable, roller hangers.

D. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for trapeze hangers.

E. Base of Vertical Piping: MSS Type 52, spring hangers.

F. Support horizontal piping within 12 inches of each fitting and coupling.

G. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

H. Install supports for vertical copper tubing every 10 feet.

3.4 LABELING AND IDENTIFICATION

A. Install identifying labels and devices for laboratory vacuum piping, valves, and specialties. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment."

END OF SECTION

SECTION 230923 - DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide a complete DDC Control System and instrumentation necessary to obtain all implied or intended functions and results specified herein A complete system must include, but no limited to, the following listed items: sensors, valves, dampers, valve and damper operators, DDC panels, relays, terminal equipment controllers, mounting brackets, differential pressure wells, thermowells, and the like.

B. The DDC Control System shall consist of DDC and electric devices as specified. All control devices must be products of the same manufacturer. Provide all control devices of the type specified and/or required of each sequence, without exception.

C. Provide all control, interlock, and power wiring, circuit breakers, panelboards, and transformers not shown on the drawings and as necessary to accomplish all functions, sequences, and interlocks specified in this section. Refer to Division 26 – Electrical, for materials and methods.

D. The entire DDC Control System must be provided by the System manufacturer.
   1. All components and elements.
   2. The testing and acceptance procedures.

1.2 RELATED WORK

A. Motor starters, switches, outlet boxes, circuit breakers, panelboards, transformers, and all other material and devices shown on the Electrical drawings are specified in Division 26, Electrical.

B. The system shall be capable of being monitored from a remote location.

1.3 RELATED SECTIONS

A. Section 232113 – Hydronic Pumps.

B. Section 237413 – Packaged Outdoor Central Station Air Handling Units.

C. Section 237313 – Modular Indoor Central Station Air Handling Units.

1.4 SUBMITTALS

A. Include manufacturer’s certified rating data, description literature, catalog cuts, and shop drawings, for proposed:
   1. Control devices and equipment.

2. Control dampers and valves.
3. Control panels.
4. Wiring materials and electrical power equipment.

B. Include control, interlock and power wiring diagrams and descriptions on operation of all control systems and their effect on other equipment and systems.

C. Include an HVAC control schematic layout showing, in detail, the exact quantity of function points, printed circuit cards, the relationship of these elements and a description of how they interrelate operationally. Work shall be not be initiated prior to the return of these documents by A/E with instructions to proceed with the installation; however, such instructions will not relieve Contractor from compliance with Contract Documents.

D. A review of any submittal which results in a requirement for the Contractor to resubmit, is **not** a justified basis for work delay or additional compensation.

E. Arrange a non-disclosure agreement with the system manufacturer to permit the Owner to obtain the use of documentation on the system and/or software.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Quality Assurance
1. System must be installed by a bonded company/contractor, certified and licensed by the system manufacturer to install systems within the [Houston] area, specializing exclusively in the design and installation of building management and control systems, located within a twenty-five mile radius of the project site, with a minimum of five years of documented experience installing DDC Control systems or equal or larger size and degree of difficulty (as determine by the Engineer). The installation, to include, but not limited to, system wiring must be completed by regular full-time employees of or under the direct supervision of the regular full-time employees of the system manufacturer.
2. Perform, in conjunction with the TAB Contractor, complete HVAC System and DDC Control System commissioning, to include verification of proper sequencing and operation of all DDC Control System Components.

B. Acceptable Manufacturers:
1. Andover Controls by Kratos. (Only acceptable provider.)

2.2 MATERIALS

A. This portion of the specifications sets a minimum standard of quality for all equipment and devices used in the control system and at the various control panels. Any reference to an equipment item, control system components, or panel is to apply equally to all similar items, system or panels as determined by the A/E. Provide all Afirst quality@ grade hardware within this system. Select equipment on the basis of durability, serviceability and function.

B. The equipment furnished under this section of the specifications must be supplied as a complete system, installed under the direct supervision and responsibility of the system manufacturer, and utilizing all of the various components specified to meet the functions and accuracies described within this section of the specifications.

2.3 SYSTEM ARCHITECTURE

A. This specification requires that he topology of the system support a LAN (Ethernet) based network within a single building or complex buildings in close physical proximity. It also requires a dial-up (via modem) mechanism to access remote sites. The Ethernet network must implement the BACnet/IP protocol. **The controls will tie into the existing Continuum I2 System**. However, any data read from or written to these devices must use the standard BACnet read/Write Services. Due to the heterogeneous nature of the system, all system components must be designed to interoperate in an event based 'report by exception' implementation.

B. BACnet Implementation – Supply quality products that conform to BACnet standards as set forth in the ASHRA 135-1995, ASHRAE 135 Annex J and ASHRAE 135 Addendum B documents. Furthermore these products must conform to the Conformance Class and Functional Groups (BIBBs) and Testing Specifications currently being drafted by the BACnet Committee as set forth in the following paragraphs:

1. For each product used that resides on the BACnet/IP bus, provide a complete PICS statement. This statement must be further embellished to specify all properties of all BACnet objects that are supported be they required, optional or manufacturer specific. For each property supported this statement must specify whether the property is read-only or writable.
2. All products must implement the BACnet/ IP datalink on Ethernet as described in the BACnet Annex J document and provide , as needed, the BBMDs for each IP segment.
3. All products must support BACnet Services that increase throughout. These services include, but are not limited to, the Read Property Multiple, Write Property Multiple, Change of Value (COV), Confirmed Event Notification service.
4. The products must subscribe to the new Conformance Call and Functional Group (BIBBs) as being drafted by the BACnet Committee. It is understood that this requirement is new and may not be fully implemented by all manufacturer=s products. However, the manufacturer must designate for each of the products used which class of device is being used (e.g. OWS, BC, AAC, ASC, SS, SA) and state current compliance to the BIBBs. In al cases, conformance to the Date Sharing, Event Management and Dynamic Object Binding BIBBs are mandatory.
5. Show testing rigor by providing proof that the BACnet Testing Specification was executed for each product. Provide a list of all known other BACnet manufacturers that currently integrate with their products and provide references to these manufacturers upon request.
6. Provide a complete BMCS that consists of an information sharing network of stand-alone Control Units (SCU's) to monitor and control equipment per the Sequence of Operation included herein.
7. "Information sharing" is defined as: the function of each SCU to exchange data on the network trunk with other CU's without the need of additional devices such as network managers, gateways or central computers.
8. "Stand-alone" is defined as: the function of each SCU to independently monitor and control connected equipment through its own microcomputer.

C. BMCS Computer/ Workstation Architecture – Provide internal characteristic of the workstation architecture that describe how the workstation components operate and how these components can be embellished independently. The following characteristics are required of the workstation.
   1. The workstation must support standard BACnet messaging that allows data transfer to all system components and equipment, as well as other BACnet compliant products not supplied.
   2. The workstation must comply with the BIBBs as defined under the OWS designation. It is only expected, at this time, for compliance with the Data Sharing, Even Management and Dynamic Object Binding BIBBs.
   3. The workstation is to support a client/ server architecture. This architecture must separate the communication software form the application software, providing a more flexible/ maintainable product. The architecture must allow the cline and server to reside in a single workstation. Alternately, at the discretion of the customer, the server must also be able to operate in a separate computer. In this configuration, the server must support many client workstations simultaneously.
   4. The communication serves must support the addition of other servers not developed by the manufacturer. The requirement allows the workstation to interoperate with equipment that does not support the BACnet protocol. An example of this architecture may be the OPC architecture.
   5. If the OPC architecture is employed, the OPC clients supplied by the manufacturer must support the OPC Data Access Server (DAS) and OPC Alarm and Event Server (A/E). Supply current list of OPC server providers that currently operate with the OPC clients provided.
   6. The workstation must be designed so that it is not an integral part of control system. This allows the workstation to be disconnected and reconnected to the system at the discretion of the Owner without affection the control system.
   7. The workstation must support a data caching mechanism that retains current object information for those object either currently being referenced or recently referenced. The workstation must be designed to operate in a ‘report by exception’ mode. The workstation must never need to continuously poll for controller data.
   8. The workstation must employ a ‘browsing’ feature that allows the operator to reference all connected objects by name for all objects provided by the manufacturer as well as for objects in controllers not supplied.
   9. The data available at the workstation must in some fashion be ‘exportable’ to other applications. This requirement can be accomplished in various manners (e.g. Microsoft Access, ODBC). However, this exporting must be automatic (i.e. no manual intervention required) once setup by the Owner.
   10. The workstation must have a mechanism that allows other software applications (clients) to be written to ace the real-time, event and trend data of the controllers. This mechanism must follow some standard protocol such as Active X, ODBC, HTML, XML. The cline must be able to be written in interpreted scripting language or Visual Basic.

D. Central Hardware – The installing manufacturer must provide a BMCS that is accessible and totally addressable from other BMCS throughout the HCC Community College. The term “totally addressable” is understood to mean a complete two-way direct communication interface and information sharing network for the control of all balding BMCS functions (no Exceptions), without the need for or use of gateways or any other interfacing hardware or software.

E. All control system shall be compatible to and to be tied into the existing BAS at 3100 Main.

F. Locate DDC Control System Computer in the Main Building Security Office near the front of the building.

2.4 COMMUNICATIONS PROCESSING

A. The BMCS must operate as a true toke-pass-peer-to-peer communication network. Provide resident processor sin each SCU for full exchange of system date between other SCU's on the network trunk. Systems that limit data exchange to a defined number of system points are not acceptable.

B. Systems that operate via polled response or other type of protocols that rely on a central processor or similar device to mange SCU to SCU communication may be considered only if a similar device is provided as stand-by. Upon a failure of malfunction of the primary device. The stand-by must automatically, without any operator intervention, assume all DDC CONTROL network management activities.

C. The failure of any SCU on the network must not affect the operation of other SCU's. An SCU failure must be annunciated at the specified alarm printer or terminals.

2.5 SCU HARDWARE

A. Each SCU must consist of a 16-bit microprocessor and controller, power supply, input/output boards and communication board. All program and point data bases must be stored in batter-packed RAM. Provide a minimum of 128K RAM in each SCU to allow for point expansion and trend data storage.

B. Incorporate in each SCU a real-time clock.

C. Provide each SCU with an RS232 communications port. Connecting an operator terminal, whether portable or stationery, is to allow the user to communicate with the entire network.

D. Provide each SCU with input/ output connections to field equipment. The following point types must be supported.
   1. Analog inputs – for measuring sensed variables. Provide inputs capable of accepting voltage, resistance, current or pressure signals.
   2. Analog outputs – for controlling end devices. Provide outputs capable of producing voltage, resistance, current or pressure signals.
   3. Digital inputs – for monitoring dry contacts such as relays, switches, pulses, etc.
   4. Digital outputs – to control two position devices such as starters, actuators, relays, etc.

E. Provide each SCU listed under UL 916 (Energy Management Systems), UL 864-UDTZ (Signal Systems Unit) and tested to comply with sub-part J of Part 15FCC rules for Class A computing equipment.

2.6 PROGRAMMING FUNCTIONS

A. Provide resident software in each SCU for custom programming of control strategies, point database, operator interface, network communications, facilities and energy management functions.

B. Accomplish programming of control and energy management strategies via a high level computer language as BASIC. Provide standard math processor as part of the programming language. Provide all analog loops capable of proportional, integral and derivative control.

C. Incorporate in each SCU an operator interface program (OIP) that provides an English language user interface. The OIP is to allow the user to program, interrogate, command and edit the BMCS via a self prompting method. Provide operator terminals, whether textual or graphical, able to access the entire network form any SCU. Accomplish access in a transparent fashion; that is; the operator must not be required to address specific SCU's in order to display or command system points.

2.7 FACILITY MANAGEMENT SOFTWARE

A. Provide BMCS with standard and custom report generation functions that include.
   1. Alarm summaries.
   2. Motor status summaries.
   3. Point displays by type, system, status, overrides, failures, location, equipment and enabled/disabled.
   4. Program listings.

B. Display all reports by:
   1. Operator request.
   2. Time of day.
   3. Event conditions (such as in response to an alarm, interlock, etc.)

C. Time and date stamp all reports.

D. Provide an alarm processing program to annunciate those points designated as alarmable. Alarm points must, upon alarm occurrence, be displayed or printed at designated terminals.

E. Historical trend data must be recollected and stored at each SCU for later retrieval. Retrieval is to manual or automatic. Any point, physical or calculated, is to be designated for tending. The system must allow for two methods of trend collection: either by a pre-defined time interval sample or upon a pre-defined change of value. Trend data must be presented in a columnar format. Each sample must be time stamped. Trend reports are to be a single point or are to be a group of point up to a maximum of 8 point tin any single group. Any point, regardless of physical location in the system is to become part of a multiple point group.

F. Provide each BMCS network with a point-monitoring function that can display single or multiple points in a continuous updated fashion for dynamic displays of point values.

G. Provide a database and configuration report program that allows the user to interrogate BMCS status. As a minimum the user is to be able to: verify available RAM at each SCU, verify SCU status (on-line, of-line, failed) and set the system clock.

H. Any invalid operator entry is to result in an error message.

I. SCU's must contain a password access routine that will assign an operator to one of the three levels of access. Level 1 is to permit display function only, Level 2 is to additionally permit commanding of system points and Level 3 shall additionally permit full program and database editing.

J. SCU's must provide for the accumulation of totalized values for the purposes of run-time or energy tantalization. Totalized values are to be displayed or printed automatically by operator request.

2.8 ENERGY MANAGEMENT SOFTWARE

A. Provide the BMCS with an adjustable width sliding window electric demand limiting (EDL) program and to be user programmable to reduce the peak electric demand as user definable target values are approached.
   1. The EDL program is to be capable of automatically shedding non-critical deferrable loads on the network, such as electric heating coils, lights, batter charges, HVAC systems, motors, etc., as outline in the schedule, during high electrical usage periods. This sequence is to automatically restore the load after a critical demand period has passed. The operator is to have the ability to select either the following (first off, first on) or the sequential (last off, last on) load shed tables for load assignment.
   2. The EDL program is to be capable of providing proportional voltage outputs which will change set point of HVAC control systems, and/or rest hot water or chilled water control loops.
   3. Target demand limits are to be user definable via operator terminals on the network or assigned by the EDL program.
   4. The EDL program is to be capable of up to 7 unique KWH target set points. These targets will allow the target tot be changed in accordance with the utility time-of-day metering schedule, such that during off hours EDL will allow a higher KWH demand, if required, without being panelized for additional demand charges. The time of start and finish for each of the time-of-day target values are to be user definable through the operator terminal.
   5. A trend log is to be programmed to store, for future recall, the peak demand value, the day of the month occurrence, the time of day of occurrence and the total KWH consumption. THE DDC Control System is to display or pint a bar graph of demand in 15 minute intervals for the preceding 24 hour period. The EDL program is to be capable of control from multiple meters (min) in the main switchboard. Coordinate requirements with Division 16.

B. A duty cycle control (DDC) program is to provide user definable variable "on" and "off" times throughout the day once the mechanical or electric equipment is started by Time Program Commands, Optimum Start, or Manual Command.
   1. The time of the overall cycle, as well as the length of time for each load during its cycle, is to be user selectable. Off times or different load can be staggered within the cycle

period and temperature compensation is to be programmed to reduce the off position of the cycle as required.

2. Each piece of equipment being duty cycled must have its own unique temperature sensor as input to the SCU which is to be programmed to override the duty cycle off time based on the environmental conditions of the space being served by the equipment. Alternatively, a common analog sensor such as outdoor air is to be used to automatically shorten the off cycle time of all duty cycled equipment, base upon the difference of outside temperature from design conditions.
3. The operator is to be able to read program data or to reprogram the system. Any of the program parameters, such as cycle time, off time, adding or deleting loads, auto adjust sensor assignments input for compensation, etc., is to be monitored or altered by a qualified operator through a connected operator terminal.

C. Provide BMCS with an optimal start program such that the building is divided into zones for optimum start. Warm-up and cool-down is to occur in sequence with succeeding zones starting only after the preceding zone has completed its warm-up or cool-down.
   1. The optimum start-up time of assigned equipment is to be determined based on a software calculation, which takes into consideration outdoor air conditions, space conditions, and building R factor.
   2. The optimum start program is to control start-up of the cooling and heating equipment to achieve the target occupancy space temperature at the precise time of building occupancy. A built-in “learning” technique is to cause the BMCS to automatically adjust itself to the most effective time to start equipment based on historical data.

D. Provide the BMCS with an operator interactive time of day (TOD) program. TOD programming and modifying is to be accomplish in a calendar-like format that prompts the user in English language to specify month, year, day and time and associated point commands. It is to be possible to assign single points or groups of points to any on or off time. Appropriate time delays are to be provide to “stagger” on times.
   1. TOD is to incorporate a holiday and special day schedule capability which will automatically bring up a pre-defined holiday or special day schedule of operation. Holidays or special days are to be scheduled up to one year in advance.
   2. In addition to the time dependent two state control, provide TOD time dependent set point control. This control must provide the capabilities to output assignable, proportional set point values in accordance with the time of day and day of week. This program is to be used to accomplish night setback, morning warm-up and normal daily operating set points of al control system loop controlled by the BMCS. As with the two stare control, time dependent set point is to be subject to the holiday schedule. The set points desired are to be user definable at any operator terminal.
   3. The operator is to be capable of reading and /or altering all sorted data pertaining to time of day, day of week, on/off times, set point values, and holiday designation.
   4. The TOD program, is to also provide and override function that allows the user to conveniently change a start or stop time for any point up to one week in advance. The override command is to be temporary. Once executed the TOD program is to revert to its original schedule.
   5. The TOD program is to interface with the optimal start program (OSP) such that stop times may be

E. In addition to the previously specified management functions, provide the BMCS complete with the following programs:
   1. Enthalpy optimization.
   2. Supply air reset.
   3. Hot water reset.
   4. Chilled water reset.
   5. Volumetric control.
   6. Dead band control.

F. All specified energy management programs, whether or not applicable to this project are to be provided such that the Owner may enable the programs at a future date without the need to purchase or modify additional software.

2.9 POINT EXPANSION MODULES

A. Provide each SCU capable of extending its input/ output capabilities via special purpose modules. Said modules may be mounted remote form the SCU and are to communicate with the SCU over a pair of twisted cables.

2.10 TERMINAL EQUIPMENT CONTROLLERS

A. Provide Terminal Equipment Controllers for each piece of equipment as specified. The BMCS is to support specific controllers for the following types of equipment as a minimum:
   1. Air Handling Units.
   2. Fan Coil Units.
   3. Fan Powered Air Terminal Units.

B. Controllers are to include all point inputs and outputs necessary to perform the specified control sequences. As a minimum, 50% of the point outputs are to be of the Universal type; that is, the outputs may be utilized either as modulating or two-state, allowing for additional system flexibility. In lieu of Universal outputs, provide a minimum of 50% spare outputs of each type via additional point termination boards or controllers. Analog outputs are to be industry standard signals such as 24V floating control, allowing for interface to a variety of modulation actuators. Terminal Equipment Controllers utilizing proprietary control signals and actuators are no acceptable. As an alternative, provide SCU's or other ASC's with industry standard outputs for control of all terminal equipment.

C. Provide each controller performing space temperature control with a matching room temperature sensor. All sensors must have stainless steel cover plate with vandal-proof screws and steel back plate. The sensor may be either RTD or thermistor type providing the following minimum performance requirements are met:
   1. Accuracy +/- .05 degrees F (+/-0.3 degrees C)
   2. Operating Range: 35 degrees to 115 degrees F.
      (2 degrees to 46 degrees C)
   3. Set Point Adjustment Range: 55 degrees to 95 degrees F
      (2 degrees to 30 degrees C)
   4. Set Point Modes: Independent Heating, Cooling, Night
   5. Setback-Heating, Night Setback Cooling

6. Calibration Adjustments: None required.
7. Installation: Up to 100 feet from controller
8. Each room temperature sensor is to include a terminal jack integral to the sensor assembly. The terminal jack will be used to connect a portable laptop or similar operator's terminal to control and monitor all hardware and software points as associated with the controllers. In lieu of an internal jack, provide a separate terminal jack mounted on a stainless steel wall plate adjacent to the sensor to facilitate direct access to the controller via the terminal.
9. All Terminal Equipment Controller for the Fan Powered Air Terminal Units are to be furnished to the unit manufacturer for installation, wiring and testing at their factory prior to shipment to the jobsite.

D. Each controller is to perform its primary control function independent of other SCU network communication, or if network communication is interrupted. Reversion to a fail-sage model of operation during network interruption is not acceptable. Should the controller reside on a SCU network, the controller is to receive its real-time data from the SCU clock to insure network continuity. Each controller is to include algorithms incorporating proportional, integral and derivative (PID) gains for all applications. All PID gains and biases are to be filed-adjustable by the user via terminals as specified herein. The functionality shall allow for tighter control of space conditions and will facilitate optimal occupant comfort and energy savings. Controllers that incorporate proportional and integral (PI) control algorithms only are not acceptable.

E. Provide each terminal equipment controller with sufficient memory to accommodate point databases, operating programs, local alarming and local trending. All databases and programs are to be stored in non-volatile EEPROM, EPROM and PROM, or minimum of 100-hour battery backup is to be provided. The controllers are to be able to return to full normal operation without user intervention after a power failure of unlimited duration. Provide interruptible power supplies (UPS's) of sufficient capacities for all terminal controllers that do not meet this power protection requirement. Operating programs are to be field selectable for specific applications. In addition, specific applications may be modified to meet the user's exact control strategy requirements, allowing for additional system flexibility. Controllers that require factory change of all applications are not acceptable.

F. Each controller is to have connection provisions for a portable laptop or similar operator's terminal. The connection to be possible at both the controller at the matching room temperature sensor as previously specified. The terminal will be used for readout of system variables, override control, adjustment of control parameters, air balancing, servicing and troubleshooting. The terminal will provide the user with the following functionally as a minimum:
1. Display system status (heating, cooling, etc…)
2. Display all point values and set points
3. Set and change all set points
4. Set and change heating/cooling dead bands
5. Set and change PID loop gains
6. Set and change system mode (occupied/ unoccupied)
7. Set and change system mode times
8. Override all set points
9. Override all digital and analog outputs
10. Command all digital and analog outputs
11. Select application mode

12. Assign controller address

G. All communication and display via the portable terminal are to be in full English language with accompanying English and SI (International System of Units) engineering units for all displayed data. Selection between English and SI units is to be accomplished via a single keystroke on the portable terminal .

H. In addition to local interface capabilities al functionality as specified above are to be performed both from a central operator's workstation and from any SCU on the communications network via the same portable terminal. Form a terminal connected to any SCU it is to be possible to issue global commands to groups of controllers. Provide the following global commanding capabilities for all controllers as a minimum:
1. Start/ Stop of all fans.
2. Start/ Stop pf all air handling units.
3. Heating/ Cooling set points changes.
4. Start/ Stop of fan coil units and fan powered terminal units.
5. Modulate Open/ Closed all values in percent open notation.
6. Modulate Open/ Closed all dampers in percent open notation.
7. Minimum/ Maximum CFM set point changes (terminal box controllers).

I. Provide additional terminals at each SCU and workstation, if required, to perform the specified functionally. It is not necessary to disconnect the communications bus from any communication between the terminal(s) and the controllers; nor is it necessary to identify the specific network bus, SCU or terminal equipment controller prior to initiating any communication.

2.11 VALVES

A. All automatic valves are to be sized by the System Manufacturer. Equip valves with plugs t produce an equal percentage or modified equal percentage characteristics on water service. Provide a valve actuator/ operator of sufficient size to give tight shutoff at the differential pressure that will be encountered. Submit valve data shutoff versus differential head.

B. Provide globe valves 2 inches and smaller with bronze or cast brass screwed bodies rated at 150 psig minimum; provide globe valves 2-1/2 and 3 inches with iron flanged bodies rated at 125. Provide valves with stainless steel trim and seat rings. Valves must be designed for 25 psi water differential pressure as a minimum, but greater as required in paragraph 2.12A above. Provide Honeywell Model #V-5011, or "approved equal" only.

C. Size valves to pass required capacity at a pressure drop not to exceed 5 psig.

D. Butterfly valves (sizes 4" and larger only) shall be flanged or full-log body type rated for 250 psi W.O.G. to 200 deg. F, must meet ANSI Class 125/150 flange standards and MSS SP-67 standard.
1. Valve body must be ductile iron with EPDM molded seat.
2. Seat – The dovetail seat is to ensure drop tight, bi-directional shutoff and shall be replaceable. The seat is to fully isolate the valve body, steam and journal areas form the flowing media.
3. Disc/Stem – The valve must have a one-piece disc/stem assembly or thru-disc design for a minimum obstruction to flow. The disc edges and hubs must be hand polished to a 32

AARH or better finish. Use of pins or bolts exposed in the waterway to attach dist to stem are specifically **not** allowed. Material for disc and stem must b e316 stainless steel.

4. Actuation – Valve body must have an integral cast to plate for direct flush-mounting of manual actuators without use of brackets or adapters. Actuators shall be Belimo and Schneider or equal and approved.
5. Inboard Bearings/ Upper Steam Busing/ Stem Packing – the valve must have upper and lower inboard stem bearings isolate from the line media, and a heavy duty upper stem busing. Provide bi-directional stem packing to insure dry stem design.

2.12 ELECTRICAL ACUATORS

Provide 120 or 24 volt electric actuators with cast aluminum body (plastic or other similar materials are not acceptable) and spring return. Each actuator is to be full proportioning type to operate the damper/ valve under normal operating conditions and guarantee tight close-off against pressures encountered. Actuator must position damper/ valve normally open or normally encountered. Actuator must position damper/ valve normally open or normally closed (N.O. OR N.C.) as indicated in Sequence of Operation or on the Mechanical Drawings. Provide motor with all required mounting bases and linkage to properly mount and connect the damper/ valve. Provide electrical requirements to the Contractor prior to fabrication or installation. Provide damper actuators for all air handling unit return and outside air dampers.

2.13 PRESSURE SENSORS

Provide differential pressure sensors with cast aluminum NEMA 1 housing with a 4-20 ma output proportional signal; provide provisions for field checking. Provide sensors capable withstanding up to 150% of rated pressure, without damaging the device. Accuracy is to be within 2% of full scale. Sensors are to be manufactured by Leeds & Northrup, Satra, Robertshaw, Dwyer Instruments, or be an “approved equal”.

2.14 AUTOMATIC CONTROL DAMPERS

Provide parallel blade dampers for 2-position control; opposed blade dampers for 3-position or modulating control. Construct frames of 13-gauge galvanized sheet metal with provisions for duct mounting. Provide damper blades not exceeding 8 inches in width, of corrugated-type construction, fabricated from two sheets of 22-gauge galvanized sheet metal spot welded together or single 16-guge sheet. Make bearings of nylon or oil-impregnated, sinthered bronze. Make shafts of 2 inch zinc-plated steel. Provide blades suitable for high velocity performance. Construct damper so that leakage does not exceed 2 percent based on 2000 f[, and 4-inch static pressure. Provide replaceable resilient seals along top, bottom and sides of frame and along blade edge. Submit leakage and flow characteristic data with shop drawings.

2.15 CONTROL PANELS/ CABINETS

Provide unitized, fully enclosed NEMA 1 steel cabinets to contain all necessary switches, relays, and other devices required to perform specified sequences. Provide a cabinet with continuously hinged door with locking latch, inside drawing rack and tow coats of paint All

locks are to sue a common key. Devices on the panel face must be identified with engraved nameplates.The BMCS manufacturer/ installer shall be advised that some control panels/cabinets or controllers where it is required by the Authority Having Jurisdiction or identified within the scope of this project (No Exceptions).

2.16 WATER FLOW MEASURING

Provide insertion type tubing or paddle wheel flow sensing device. Unit to generate not more than 10 pulses per second at 10 FPS flow rate for input directly to the SCU. Calibrate device flow rate based on the pipe size. Overall accuracy shall be 3% of the absolute flow. Install with an isolation valve for the removal of sensor for servicing. Data industrial sensor or approved equal. Furnish signal conditioner compatible with SCU.

2.17 TEMPERATURE AND HUMIDITY SENSORS

A. Use platinum resistance type (RTD) temperature sensors or electronic semi-conductor thermistor probe temperature sensors as required to meet the accuracy requirements.

B. Where differential temperature measurements are made, or where the sensed temperature is used in calculations, use sensor that are tested and matched.

C. Humidity sensor must have the sensing element of inorganic resistance media.

D. Termistor construction.
   1. Bead coated with glass.
   2. Covered with a metal sheath.
   3. Encapsulated with moisture

E. Sensors of the same category shall be of the same manufacturer:
   1. Interchangeability of plus or minus 0.1% at the reference temperature.

F. Sensor sheath material shall be compatible with the environment to which it will be exposed. All sensors must have stainless steel cover plate with vandal-proof screws and steel back plate.

G. All external trim material shall be corrosion resistant with all parts assembled into water tight, vibration-proof, heat resistant assembly.

H. Sensors elements for use outdoors; in refrigerated spaces; or sensing piped liquids:
   1. Minimum of 8 foot long leads.
   2. Encapsulated into Type 304 stainless steel tubes with low conductivity moisture proofing material.

I. Provide appropriate terminations for the wiring conditions.

J. Time constant response to temperature change time shall be less than three second/degrees change.

K. Field calibrations not approved. All sensors shall be precise and accurate so they will not require adjustments or calibrations.

L. Discharge and mixed air sensors shall be averaging type to sense temperature across full duct width; minimum 5" long.

M. Sensor to CPU accuracy must meet the following end to end overall system, accuracy, including errors associated with the sensor, leadwire, A to D converter and DDC.

1.	Hot water temperature	+/- 1.0 degrees F
2.	Chilled water temperatures	+/- 0.5 degrees F
3.	Space temperatures	+/- 1.5 degrees F
4.	Duct air temperatures	+/- 1.0 degrees F
5.	Humidity	+/- 5.0% of Full Scale

N. Where differential temperature measurements are made, or the sensed temperature is used in calculations, the temperature error shall not exceed +/-0.5 degrees F, net (0.25 degrees F per point)

O. Sensor Operating Range

1.	Chilled water	30 degrees F to 80 degrees F
2.	Hot water	50 degrees F to 200 degrees F
3.	Discharge Air	30 degrees F to 150 degrees F
4.	Space	30 degrees F to 100 degrees F
5.	Outside Air	0 degrees F to 120 degrees F
6.	Humidity	20% to 80%

2.18 DIFFEERNTIAL PRESSURE SWITCHES

A. All binary points are to alarm on open or closed contacts. Use of Current Sensing Relays will not be allowed for pumps or belt drive motors.

B. Air flow for each fan is to be indicated by means of differential pressure sensing device which opens a contact as the differential pressure fails below an adjustable pressure range setting.
1. Use this point as start/ stop feedback.

C. Water flow for each pump is to be indicated by means of a differential pressure water flow switch, which opens a contact as the differential pressure fails below an adjustable pressure range setting.
1. Use this point as start/ stop feedback.

2.19 LABORATORY AIRFLOW CONTROL SYSTEM

A. Each individual laboratory shall have a dedicated laboratory airflow control system. Each dedicated laboratory airflow control system shall support a minimum of twenty (20) network controlled airflow devices.

B. All labs fume hoods shall operate between normal occupied (100%) and unoccupied (50%) flow rates programmed within the overall building control system and connected to campus wide network control.

C. The laboratory airflow control system shall employ individual average face velocity controllers that directly measure the area of the fume hood sash opening and proportionally control the hood's exhaust airflow to maintain a constant face velocity over a minimum range of 20% to 100% of sash travel. The corresponding minimum hood exhaust flow turndown ratio shall be 5 to 1.

D. The hood exhaust airflow control device shall respond to the fume hood sash opening by achieving 90% of its commanded value within one second of the sash reaching 90% of its final position (with no more than 5% overshoot / undershoot) of required airflow. Rate of sash movement shall be between 1.0 to 1.5 feet per second.

E. The hood exhaust airflow control device shall be automatically switched between in-use and standby (minimum) levels based on BAS schedule. The airflow control device shall achieve the required in-use commanded value in less than one second from BAS with no more than a 5% overshoot or undershoot.

F. The laboratory airflow control system shall maintain specific airflow (±5% of signal within one second of a change in duct static pressure) regardless of the magnitude of the pressure change airflow change or quantity of airflow control devices on the manifold (within 0.6" to 3.0" WC) for Medium Pressure Applications or (within 0.3" to 3.0"WC) for Low Pressure Applications.

G. The laboratory airflow control system shall use volumetric offset control to maintain room pressurization. The system shall maintain proper room pressurization polarity (negative) regardless of any change in room/system conditions such as the raising and lowering of any or all fume hood sashes or rapid changes in duct static pressure. Systems using differential pressure measurement or velocity measurement to control room pressurization are unacceptable.

H. The laboratory airflow control system shall maintain specific airflow (±5% of signal) with a minimum 16 to 1 turndown to insure accurate pressurization at low airflow and guarantee the maximum system diversity and energy efficiency without exceeding 2000 FPM velocity through any airflow device and have no deviation or loss of accuracy through the entire range of the flow device.

2.20 Exhaust and Supply Airflow Device Controller

A. The airflow control device shall be a microprocessor-based design and, shall use closed loop control to linearly regulate airflow based on a digital control signal. The device shall generate a digital feedback signal that represents its airflow.

B. The airflow control device shall store its control algorithms in non-volatile, re-writable memory. The device shall be able to stand-alone or to be networked with other room level digital airflow control devices using an industry standard protocol.

C. Room-level control functions shall be embedded in and carried out by the airflow device controller using distributed control architecture. Critical control functions shall be implemented locally; no room-level controller shall be required.

D. The airflow control device shall use industry standard 24 V AC power.

E. The airflow control device shall have provisions to connect a notebook PC commissioning tool and every node on the network shall be accessible from any point in the system.

F. The airflow control device shall have built-integral Input / Output connections address fume hood control, temperature control, humidity control occupancy control, emergency control and non-network sensors switches and control devices. At a minimum the airflow controller shall have:
1. Three (3) Universal Inputs, capable of accepting 0 to 10Vdc, 4 to 20mA, 0 to 65k ohms, or Type 2 or Type 3 10k ohm @ 25 degree C thermistor temperature sensors.
2. One (1) Digital Input capable of accepting a dry contact or logic level signal input.
3. Two (2) Analog Outputs capable of developing either a 0 to 10Vdc, or 4 to 20mA linear control signal.
4. One (1) Form C (SPDT) relay output capable of driving up to 1A @ 24Vac/Vdc.

G. The airflow control device shall meet FCC Part 15 Subpart J Class A, and be UL916 listed.

H. The airflow control device shall maintain a temperature set point by controlling the airflow and the reheat valve in response to a room temperature sensor. An additional output shall be provided for supplementary cooling or heating. If the airflow supply device is not required for make-up airflow control for fume hoods, then the 1-second speed of response, and fail-safe conditions required of the laboratory airflow control system shall not apply.

2.21 LABORATORY CONTROL FUNCTIONS

A. The airflow control devices shall utilize a peer-to-peer, distributed control architecture to perform room-level control functions. Master/Slave control schemes shall not be acceptable. Control functions shall at a minimum include, pressurization, temperature, humidity control and respond to occupancy and emergency control commands.

B. The laboratory Pressurization Control system shall control supply and auxiliary exhaust airflow devices in order to maintain a volumetric offset (either positive or negative). Offset shall be maintained regardless of any change in flow or static pressure. This offset shall be field adjustable and represents the volume of air, which will enter (or exit) the room from the corridor or adjacent spaces.

C. The pressurization control algorithm shall sum the flow values of all Supply and Exhaust airflow devices and command appropriate controlled devices to new set points to maintain the desired offset. The offset shall be adjustable.

D. The pressurization control algorithm shall consider both networked devices, as well as:
1. Up to three (3) non-networked devices providing a linear analog flow signal.
2. Any number of Variable Volume devices where the total of supply devices and the total of exhaust devices may be factored into the pressurization control algorithm.

E. Volumetric offset shall be the only acceptable means of controlling room pressurization. Systems that rely on differential pressure as a means of control shall provide documentation to demonstrate that space pressurization can be maintained if fume hood sashes are changed at the same time a door to the space is opened.

F. The Pressurization control algorithm shall support the ability to regulate the distribution of total supply flow across multiple supply airflow control devices in order to optimize air distribution in the space.

G. Supply and install Differential Room Pressure monitor / control between the lab and the corridor for each lab unit locations each monitored by an Active Pressure Monitor (Phoenix Model #APM-100). The APM will have field selectable outputs of 4-20ma with 12mA out at 0 in.wc. and 0-10 Vdc with 5 Vdc at 0 in.wc. mid range. The required differential pressure range selections as follows;
   1. Between +/- .05″ WC to +/- 0.1 ″ WC.

H. The differential room pressure will be LED displayed on the monitor to a 0.0001 WC scale. The differential room pressure monitor will provide and LED indication of Normal or Alarm state and provide and contact closure for remote alarm notification if desired. There will also be a local Audible Alarm and Mute button feature. The alarm will have a built in adjustable delay to prevent nuisance alarms. The differential room pressure monitor shall have on option for remote switching from positive to negative room monitoring and providing a switchable positive and negative alarm setting.

I. Local Display Unit (LDU)
   1. Each lab shall be provided with Local Display Unit (LDU).The laboratory control system shall be capable of providing a standard product offering of a multi-function LCD display, Local Display Unit (LDU), equipped with a 3150 Neuron processor, Real-time clock, and can display and interface up to 250 network variables. The LDU will reside on the local communication using standard open LONTALK protocol using open snvt structure communicating at 78 Kbps without a supervising station requirement and interoperability for peer to peer communication.
   2. The LDU shall be configurable with the supplied LNS plug-in, which will allow for grouping of up to 5 points per group, with a maximum of 50 groups. The group and variable names shall be customizable with up to 13 and 16 characters respectively. The LDU shall incorporate a backlit 128 X 128 pixel screen, changeable logo, 6 button interface for navigation and data entry, battery backup with 15 year lifespan and can be surface or flush mounted on a standard electrical J-box. The LDU shall have password functionality to allow full access or view only as well as an Auto Log-off feature. Scheduling shall be accomplished via the campus scheduling system with Occupied/Unoccupied commands issued to the LDU. Provide local over-ride control for emergency conditions.

J. Temperature Control
   1. The laboratory control system shall regulate the space temperature through a combination of volumetric thermal override and control of reheat coils. The laboratory control system shall support the temperature zones for each pressurization zone. Each zone shall have provisions for monitoring up to five (5) temperature inputs and calculating a straight-line average to be used for control purposes. Separate cooling and heating set points shall be writable from the BMS, with the option of a local offset adjustment.

2. Temperature control shall be implemented through the use of independent primary cooling and heating control functions, as well as an auxiliary temperature control function, which may be used for either supplemental cooling or heating. Cooling shall be provided as a function of thermal override of conditioned air with both supply and exhaust airflow devices responding simultaneously so as to maintain the desired offset. Heating shall be provided through modulating control of reheat coil.
3. The auxiliary temperature control function shall offer the option of either heating or cooling mode and to operate as either a stand-alone temperature control loop, or staged to supplement the corresponding primary temperature control loop.

K. Humidity Control
1. The Laboratory control system shall have an embedded humidity control function, which allows the monitoring and control of the relative humidity level in the pressurized zone. Using peer-to-peer control, the airflow devices shall have the ability to monitor the relative humidity level of the space and, based on a BMS writable set point, develop a control signal to drive one or the other humidification or dehumidification control circuits.
2. The humidity control loop(s) shall share a common set point, with a configurable dead band adjustment to prevent the humidification and dehumidification control functions to operate at the same time.

L. Emergency Mode Control
1. The laboratory control system shall provide a means of overriding temperature and pressurization control in response to a command indicating an emergency condition exists and airflow control devices are to be driven to a specific flow set point. The system shall support up to four (4) emergency control modes. The emergency control modes may be initiated either by a local contact input, or BMS command.
2. Once an Emergency mode is invoked, pressurization and temperature control are overridden for the period that the mode is active. Emergency modes shall have a priority scheme allowing a more critical mode to override a previously set condition.

M. Local Alarm Control
1. The laboratory control system shall provide the means of summing selective alarm activity at the room-level network and generating a local alarm signal. The local alarm signal may be directed to any available output, as well as to the BMS. The alarm mask may be configured differently for each room-level system.

N. Diversity Alarm
1. The laboratory control system shall have the ability of monitoring the airflow values for the pressurized space, and generating an alarm signal in the event the Total Supply flow exceeds a predetermined threshold. The Diversity Alarm is intended to allow the user to take diversity in the design and generate an alarm condition in the event the diversity threshold is compromised. This function must be available in either an integrated or stand-alone system.

O. Fume Hood Control
1. Airflow devices intended to control the face velocity of a fume hood, shall have the ability to interface directly with the Fume Hood Monitoring device. The fume hood velocity monitor shall be X 30 series. The airflow control device shall:
    a. Accept command inputs to regulate the flow accordingly and make this command value available to the BMS.

b. Accept a Sash Position signal and make this value available to the BMS.
c. Accept a Usage Based Control signal to indicate user presence and make this signal available to the BMS.

2. Provide a flow feedback signal to the Fume Hood Monitor, which may be used for calculating face velocity, or to confirm the airflow device has achieved the proper flow rate and make this value available to the BMS.
3. Provide alarm signals to the Fume Hood Monitor in the event the airflow device is unable to achieve the proper flow rate, or there is a loss of static pressure indicating improper fan operation, or that there is a loss of power to the airflow control device, in order to provide a local alarm indication.

The fume hood airflow control device shall respond to changes in sash position and user presence within 1 second, in order to provide a constant 100 feet per minute face velocity when the fume hood is in use.

P. The laboratory control system shall be segregated into individual sub nets to isolate network communications to insure room-level control functions and BMS communications may be carried out reliably. Each laboratory space or pressurization zone shall be its own sub net. Commercially available routers shall be used to provide this isolation.

Q. The laboratory airflow control system shall support at least 20-networked devices in each pressurized zone.

R. All points shall be available through the interface to the building management system (BMS) for trending, archiving, graphics, alarm notification, and status reports. Laboratory airflow control system performance (speed, stability, and accuracy) shall be unaffected by the quantity of points being monitored, processed, or controlled.

S. Refer to the building control specification for the required input/output summary for the necessary points to be monitored and/or controlled.

2.22 INTERFACE TO BUILDING MANAGEMENT SYSTEMS

A. The laboratory airflow control system network shall have the capability of digitally interfacing with the BMS using fully open BACNet IP, LON IP or Modbus TCP/IP. The required software interface drivers shall be developed and housed in a Gateway, a dedicated interface device furnished by the laboratory airflow control system supplier.

B. Any or all room-level points shall be available to the BMS for monitoring or trending. The Gateway shall maintain a cache of all points to be monitored by the BMS. The room-level airflow control devices shall update this cache continually.

C. The building-level network shall be a high-speed LonTalk (1.25 mbps) communications protocol. The building-level network shall support up to one hundred (100) sub nets, or pressurization zones, or six thousand (6,000) data points.

D. A commercially available interface card shall be provided with the Accel-Way in order to connect to the building-level network.

E. A commercially available network interface card shall be provided with the Accel-Way to interface with the BMS. The following points will be available for monitoring;
   1. Makeup/Supply Air Flow - AI
   2. Makeup/ Supply Air Command – AO
   3. Makeup/Supply Air Flow Alarm - DI
   4. General Exhaust Air Flow – AI
   5. General Exhaust Air Command - AO
   6. General Exhaust Air Alarm - DI
   7. Laboratory Offset – AI
   8. Room Differential Pressure – AI
   9. Room Temperature – AI
   10. Room Humidity – AI (if applicable)

2.23 CO2 SENSOR/ TRANSMITTERS

A. Use silicone based sensor with integral tunable solid state interference filter and an IR detector as required to meet the accuracy requirements.

B. Use 4-20 ma output signal.

C. All sensors must have stainless steel coverplate with vandal-proof screws and steel back plate.

D. Sensor shall meet the following end-to-end overall system accuracy, including errors associated with he sensor, transmitter, and BMCS.

1.	Measurement Range	0 – 2,000 ppm
2.	Accuracy	<+/- 20ppm + 1.5% of Reading
3.	Repeatedly	<+/- 20ppm
4.	Temperature Dependence of Output	<+/- 3ppm/ □F.
5.	Long-Tem Stability	<+/- 100ppm/Syears
6.	Response Time (10-90% Response)	<60 seconds

PART 3 - EXECUTION

3.1 INSTALLATION

A. Work must be performed by a bonded company/ contractor, certified and licensed by the system manufacturer to install systems within the [Houston] area, specializing exclusively in the design and installation of building management and control system, located within a twenty-five mile radius of the project site, with a minimum of five years of documented experience installing BMCS of equal or larger size and degree of difficulty (as determined by the Engineer). Installation (to include system wiring) and final adjustments must be competed by regular full-time employees of or under the direct supervision of regular full-time employees of the installation company/ contractor.

B. In addition to other services of factory trained representative, provide at a time of owners approval service of a factory trained representative for a period of one week, based on a 40-hour

week, to instruct the Owner's operating personnel in the operations and service of the units. Provide certification in wiring that this work has been accomplish.

3.2 CALIBRATION & TESTING

A. After completion of the control installation, calibrate and test thermostats, control valves, motors, controllers and other items furnished, subject tot approval. Perform, in conjunction with the TAB Contractor, complete BMCS commissioning (as described in ASHRAE Applications Manual, 1999 edition, Chapter 41 – Building Commissioning and as required by ASHRAE Guideline 1-1996 – Building Commissioning), to include verification of proper sequencing and operation of all MBCS components.

END OF SECTION

SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1. 1 RELATED DOCUMENTS

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

1. 2 SUMMARY

A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:

1. Chilled-water piping.
2. Heating water piping.
3. Makeup-water piping.
4. Condensate-drain piping.
5. Air-vent piping.
6. Safety-valve-inlet and -outlet piping.

B. Related Sections include the following:

1. Division 23 Section "Hydronic Pumps" for pumps, motors, and accessories for hydronic piping.

1. 3 DEFINITIONS

A. PTFE: Polytetrafluoroethylene.

B. RTRF: Reinforced thermosetting resin (fiberglass) fittings.

C. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1. 4 PERFORMANCE REQUIREMENTS

A. Hydraulic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:

1. Chilled-Water Piping: 150 psig at 200 deg F.
2. Makeup-Water Piping: 80 psig 150 deg F
3. Condensate-Drain Piping: 150 deg F.
4. Blow down-Drain Piping: 200 deg F.
5. Air-Vent Piping: 200 deg F.
6. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

1. 5 SUBMITTALS

A. Product Data: For each type of the following:

1. Plastic pipe and fittings with solvent cement.
2. RTRP and RTRF with adhesive.
3. Pressure-seal fittings.

4. Valves. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
5. Air control devices.
6. Chemical treatment.
7. Hydronic specialties.

B. Shop Drawings: Detail, at 1/4 scale, the piping layout, fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

C. Welding certificates.

D. Qualification Data: For Installer.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For air control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.

G. Water Analysis: Submit a copy of the water analysis to illustrate water quality available at Project site.

1. 6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers of Pressure-Sealed Joints: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01.

1. 7 EXTRA MATERIALS

A. Water-Treatment Chemicals: Furnish enough chemicals for initial system startup and for preventive maintenance for one year from date of Substantial Completion.

B. Differential Pressure Meter: For each type of balancing valve and automatic flow control valve, include flow meter, probes, hoses, flow charts, and carrying case.

PART 2 - PRODUCTS

2. 1 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.

B. Annealed-Temper Copper Tubing: ASTM B 88, Type K (ASTM B 88M, Type A).

C. DWV Copper Tubing: ASTM B 306, Type DWV.

D. Wrought-Copper Fittings: ASME B16.22.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International, Inc.
b. S. P. Fittings; a division of Star Pipe Products.
c. Victaulic Company of America.

2. Grooved-End Copper Fittings: ASTM B 75, copper tube or ASTM B 584, bronze casting.
3. Grooved-End-Tube Couplings: Rigid pattern, unless otherwise indicated; gasketed fitting. Ductile-iron housing with keys matching pipe and fitting grooves, EPDM gasket rated for minimum 230 deg F for use with housing, and steel bolts and nuts.

2. 2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 "Piping Applications" Article.

B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125 and 250 as indicated in Part 3 "Piping Applications" Article.

C. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300 as indicated in Part 3 "Piping Applications" Article.

D. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in Part 3 "Piping Applications" Article.

E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 25, 125, and 250; raised ground face, and bolt holes spot faced as indicated in Part 3 "Piping Applications" Article.

F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

1. Material Group: 1.1.
2. End Connections: Butt welding.
3. Facings: Raised face.

H. Grooved Mechanical-Joint Fittings and Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Anvil International, Inc.
    b. Central Sprinkler Company; a division of Tyco Fire & Building Products.
    c. National Fittings, Inc.
    d. S. P. Fittings; a division of Star Pipe Products.
    e. Victaulic Company of America.
2. Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47/A 47M, Grade 32510 malleable iron; ASTM A 53/A 53M, Type F, E, or S, Grade B fabricated steel; or ASTM A 106, Grade B steel fittings with grooves or shoulders constructed to accept grooved-end couplings; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.
3. Couplings: Ductile- or malleable-iron housing and synthetic rubber gasket of central cavity pressure-responsive design; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fitting.

2. 3 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

4. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.

F. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Gasket Material: Thickness, material, and type suitable for fluid to be handled and working temperatures and pressures.

2. 4 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper-alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Capitol Manufacturing Company.
   b. Central Plastics Company.
   c. Hart Industries International, Inc.
   d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   e. Zurn Plumbing Products Group; AquaSpec Commercial Products Division.

2. Factory-fabricated union assembly, for 250 psig minimum working pressure at 180 deg F.

D. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Capitol Manufacturing Company.
   b. Central Plastics Company.
   c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

E. Dielectric-Flange Kits:

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

   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. Central Plastics Company.
   d. Pipeline Seal and Insulator, Inc.

3. Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
4. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Calpico, Inc.
   b. Lochinvar Corporation.

2. Galvanized-steel coupling with inert and noncorrosive thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

G. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Perfection Corporation; a subsidiary of American Meter Company.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Company, Inc.
d. Victaulic Company of America.

2. Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300 psig minimum working pressure at 225 deg F.

2. 5 VALVES

A. Gate, Globe, Check, Ball, and Butterfly Valves: Comply with requirements specified in Division 23 Section "General-Duty Valves for HVAC Piping."

B. Automatic Temperature-Control Valves, Actuators, and Sensors: Comply with requirements specified in Division 23 Section "Instrumentation and Control for HVAC."

C. Bronze, Calibrated-Orifice, Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong Pumps, Inc.
b. Bell & Gossett Domestic Pump; a division of ITT Industries.
c. Flow Design Inc.
d. Gerand Engineering Co.
e. Griswold Controls.
f. Taco.

2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig.
10. Maximum Operating Temperature: 250 deg F.

D. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong Pumps, Inc.
b. Bell & Gossett Domestic Pump; a division of ITT Industries.
c. Flow Design Inc.
d. Gerand Engineering Co.
e. Griswold Controls.
f. Taco.
g. Tour & Andersson; available through Victaulic Company of America.

2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.
6. Seat: PTFE.
7. End Connections: Flanged or grooved.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.
10. CWP Rating: Minimum 125 psig.
11. Maximum Operating Temperature: 250 deg F.

E. Diaphragm-Operated, Pressure-Reducing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amtrol, Inc.
b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump; a division of ITT Industries.
d. Conbraco Industries, Inc.
e. Spence Engineering Company, Inc.
f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Low inlet-pressure check valve.
8. Inlet Strainer, removable without system shutdown.
9. Valve Seat and Stem: Non-corrosive.
10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

F. Diaphragm-Operated Safety Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amtrol, Inc.
b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump; a division of ITT Industries.
d. Conbraco Industries, Inc.
e. Spence Engineering Company, Inc.
f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

G. Automatic Flow-Control Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Flow Design Inc.
b. Griswold Controls.

2. Body: Brass or ferrous metal.
3. Piston and Spring Assembly: Stainless steel, tamper proof, self cleaning, and removable.
4. Combination Assemblies: Include bonze or brass-alloy ball valve.
5. Identification Tag: Marked with zone identification, valve number, and flow rate.
6. Size: Same as pipe in which installed.
7. Performance: Maintain constant flow, plus or minus 5 percent over system pressure fluctuations.
8. Minimum CWP Rating: 175 psig or 300 psig.
9. Maximum Operating Temperature: 200 deg F or 250 deg F.

2. 6 AIR CONTROL DEVICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amtrol, Inc.
2. Armstrong Pumps, Inc.
3. Bell & Gossett Domestic Pump; a division of ITT Industries.
4. Taco.

B. Manual Air Vents:

1. Body: Bronze.
2. Internal Parts: Nonferrous.
3. Operator: Screwdriver or thumbscrew.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/8.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 225 deg F.

C. Automatic Air Vents:

1. Body: Bronze or cast iron.
2. Internal Parts: Nonferrous.
3. Operator: Noncorrosive metal float.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/4.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 240 deg F.

D. Bladder-Type Expansion Tanks:

1. Tank: Welded steel, rated for 125-psig working pressure and 375 deg F maximum operating temperature. Factory test with taps fabricated and supports installed and labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. Bladder: Securely sealed into tank to separate air charge from system water to maintain required expansion capacity.
3. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.

E. Tangential-Type Air Separators:

1. Tank: Welded steel; ASME constructed and labeled for 125-psig minimum working pressure and 375 deg F maximum operating temperature.
2. Air Collector Tube: Perforated stainless steel, constructed to direct released air into expansion tank.
3. Tangential Inlet and Outlet Connections: Threaded for NPS 2 and smaller; flanged connections for NPS 2-1/2 and larger.
4. Blowdown Connection: Threaded.
5. Size: Match system flow capacity.

F. In-Line Air Separators:

1. Tank: One-piece cast iron with an integral weir constructed to decelerate system flow to maximize air separation.
2. Maximum Working Pressure: Up to 175 psig
3. Maximum Operating Temperature: Up to 300 deg F.

G. Air Purgers:

1. Body: Cast iron with internal baffles that slow the water velocity to separate the air from solution and divert it to the vent for quick removal.
2. Maximum Working Pressure: 150 psig.
3. Maximum Operating Temperature: 250 deg.

2. 7 CHEMICAL TREATMENT

A. Bypass Chemical Feeder: Welded steel construction; 125-psig working pressure; 5-gal. capacity; with fill funnel and inlet, outlet, and drain valves.

4. Chemicals: Specially formulated, based on analysis of makeup water, to prevent accumulation of scale and corrosion in piping and connected equipment.

B. Ethylene and Propylene Glycol: Industrial grade with corrosion inhibitors and environmental-stabilizer additives for mixing with water in systems indicated to contain antifreeze or glycol solutions.

2. 8 HYDRONIC PIPING SPECIALTIES

A. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

B. Basket Strainers:

1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig .

C. T-Pattern Strainers:

1. Body: Ductile or malleable iron with removable access coupling and end cap for strainer maintenance.
2. End Connections: Grooved ends.
3. Strainer Screen: [40] [60]-mesh startup strainer, and perforated stainless-steel basket with 57 percent free area.
4. CWP Rating: 750 psig.

D. Stainless-Steel Bellow, Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
2. End Connections: Threaded or flanged to match equipment connected.
3. Performance: Capable of 3/4-inch misalignment.
4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

E. Spherical, Rubber, Flexible Connectors:

1. Body: Fiber-reinforced rubber body.

2. End Connections: Steel flanges drilled to align with Classes 150 and 300 steel flanges.
3. Performance: Capable of misalignment.
4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

F. Expansion fittings are specified in Division 23 Section "Expansion Fittings and Loops for HVAC Piping."

PART 3 - EXECUTION

3. 1 PIPING APPLICATIONS

A. Chilled-water and Hot Water piping, aboveground, NPS 2 and smaller, shall be the following:

1. Type L drawn-temper copper tubing, wrought-copper fittings, and brazed joints. Copper tubing use is conditional to HCC acceptance.
2. Schedule 40 steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

B. Chilled-water and Hot Water piping, aboveground, NPS 2-1/2 and larger, shall be the following:

1. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints for all connections except at the equipment.
2. Schedule 40 steel pipe; grooved, mechanical joint coupling and fittings; and grooved, mechanical joints **only at the equipment connections**.

C. Chilled-water piping installed belowground and within slabs shall be the following:

1. RTRP and RTRF with adhesive or flanged joints.

D. Makeup-water piping installed aboveground shall be the following:

1. Type L drawn-temper copper tubing, wrought-copper fittings, and [brazed] joints.

E. Makeup-Water Piping Installed Belowground and within Slabs: Type K, annealed-temper copper tubing, wrought-copper fittings, and soldered joints. Use the fewest possible joints.

F. Condensate-Drain Piping: Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

G. Air-Vent Piping:

1. Inlet: Same as service where installed with metal-to-plastic transition fittings for plastic piping systems according to the piping manufacturer's written instructions.
2. Outlet: Type K, annealed-temper copper tubing with soldered or flared joints.

H. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is

installed with metal-to-plastic transition fittings for plastic piping systems according to the piping manufacturer's written instructions.

3. 2 VALVE APPLICATIONS

A. Install shutoff-duty valves at each branch connection to supply mains, and at supply connection to each piece of equipment.

B. Install calibrated-orifice, balancing valves at each branch connection to return main.

C. Install calibrated-orifice, balancing valves in the return pipe of each heating or cooling terminal.

D. Install check valves at each pump discharge and elsewhere as required to control flow direction.

E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; and pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.

F. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

3. 3 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

L. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.

P. Install valves according to Division 23 Section "General-Duty Valves for HVAC Piping."

Q. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

R. Install flanges in piping, NPS 2-1/2 and larger, at final connections of equipment and elsewhere as indicated.

S. Install strainers on inlet side of each control valve, pressure-reducing valve, solenoid valve, in-line pump, and elsewhere as indicated. Install NPS 3/4 nipple and ball valve in blow-down connection of strainers NPS 2 and larger. Match size of strainer blow-off connection for strainers smaller than NPS 2.

T. Install expansion loops, expansion joints, anchors, and pipe alignment guides as specified in Division 23 Section "Expansion Fittings and Loops for HVAC Piping."

U. Identify piping as specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3. 4 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Comply with the following requirements for maximum spacing of supports.

B. Seismic restraints are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

C. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
6. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.

D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
4. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
5. NPS 2-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
6. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.

E. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.

3. 5 PIPE JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.

3. 6 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Manual vents at heat-transfer coils and elsewhere as required for air venting.

C. Install piping from boiler air outlet, air separator, or air purger to expansion tank with a 2 percent upward slope toward tank.

D. Install in-line air separators in pump suction. Install drain valve on air separators NPS 2 and larger.

E. Install tangential air separator in pump suction. Install blowdown piping with gate or full-port ball valve; extend full size to nearest floor drain.

F. Install bypass chemical feeders in each hydronic system where indicated, in upright position with top of funnel not more than 48 inches above the floor. Install feeder in minimum NPS 3/4 bypass line, from main with full-size, full-port, ball valve in the main between bypass connections. Install NPS 3/4 pipe from chemical feeder drain, to nearest equipment drain and include a full-size, full-port, ball valve.

G. Install expansion tanks above the air separator. Install tank fitting in tank bottom and charge tank. Use manual vent for initial fill to establish proper water level in tank.

1. Install tank fittings that are shipped loose.
2. Support tank from floor or structure above with sufficient strength to carry weight of tank, piping connections, fittings, plus tank full of water. Do not overload building components and structural members.

H. Install expansion tanks on the floor. Vent and purge air from hydronic system, and ensure tank is properly charged with air to suit system Project requirements.

3. 7 TERMINAL EQUIPMENT CONNECTIONS

A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.

D. Install ports for pressure gages and thermometers at coil inlet and outlet connections according to Division 23 Section "Meters and Gages for HVAC Piping."

3. 8 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, un-insulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.

4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 2 hours, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
7. Verify lubrication of motors and bearings.

END OF SECTION

HOUSTON COMMUNITY COLLEGE
DRENNAN CAMPUS ACADEMIC CENTER
LEVEL 3 RENOVATION

301 NORTH DRENNAN ST. , HOUSTON, TEXAS 77003

APRIL 22, 2013

HOUSTON COMMUNITY COLLEGE SYSTEM

BOARD OF TRUSTEES

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Dr. Irene Porcarello, PRESIDENT- SOUTHEAST COLLEGE

LOCATION MAP

TRUE NORTH / PLAN NORTH

SMITH & COMPANY
ARCHITECTS
1500 McGOWEN SUITE 150. HOUSTON, TEXAS 77004
(713) 524-4202 FAX (713) 524-4071

LEVINSON ALCOSER ASSOCIATES, L.P.
LABORATORY CONSULTANTS
1177 WEST LOOP SOUTH, SUITE 900, HOUSTON, TEXAS 77027
(713) 787-0000 FAX (713) 850-8250

INFRASTRUCTURE ASSOCIATES
MECHANICAL, ELECTRICAL PLUMBING ENGINEERS
6117 RICHMOND AVE. SUITE 200 HOUSTON, TEXAS 77057
(713) 417-1400 FAX (713) 622-0557

REGISTERED ARCHITECT — LAWRENCE G. SMITH — 18438 — STATE OF TEXAS

4/22/2013

LIST OF DRAWINGS

CODE ANALYSIS

BUILDING CODE Check/Analysis

DESCRIPTION:
3-story, 69,100 GSF fully sprinklered, Jr. College Academic Building

1) CODE:
- 2003 International Building Code, with City of Houston Amendments

2) OTHER APPLICABLE CODES:
- Texas Accessibility Standards (TAS)
- International Fire Code (2000)
- Uniform Mechanical Code (2000)
- Uniform Plumbing Code (2000)
- National Electrical Code (2005)
- International Energy Conservation Code (2000)

3) OCCUPANCY GROUP:
Business Group B (Section 304)
Educational occupancy above 12th grade

4) OCCUPANCY SEPARATION – none required
a. Incidental use areas (table 302.1.1)
a.a. Storage rooms > 100 sf = 1 hour separation
a.b. Boiler rooms > 15 psi = 1 hour separation
b. Accessory Use Area – NO SEPARATION REQUIRED
b.a. 1400 sf assembly < 2300 sf 10% of floor area (section 302.2)
b.b. 1400 sf assembly < 9500 sf area for use (table 503)

5) MAXIMUM FLOOR AREA (Table 503):
a. ALLOWABLE AREA OF 23,000 sf for Occupancy Group B by Construction Type II B
b. ALLOWABLE INCREASES: Open Space, three sides >30 feet = 50% increase
c. ALLOWABLE INCREASES: 200% Automatic sprinkler system increase (Section 506.3)
d. TOTAL ALLOWABLE AREA (per story)
= 23,000 + (23,000 x 50%) + (23,000 x 200%)
= 80,500 sf
e. ACTUAL AREA PER FLOOR

FIRST FLOOR	= 22,605 SF
COVERED ENTRY	= 495 SF
SECOND FLOOR	= 23,100 SF
THIRD FLOOR	= 23,100 SF
TOTAL	= 69,300 SF

6) MAXIMUM BUILDING HEIGHT (Table 503) –
a. Occupancy Group B by Construction Type –II B: 4 stories, 55' ht.

7) CONSTRUCTION AND FIRE RATINGS:

a. STRUCTURAL FRAME (including columns, girders, and trusses):
0–hr (Table 601)

b. EXTERIOR BEARING WALLS:
0–hr (Table 601)

c. INTERIOR BEARING WALLS:
0–hr (Table 601)

d. EXTERIOR NON–BEARING WALLS & PARTITIONS: (Table 601)
– Less than 5 ft: 1 hour
– Greater than or equal to 5 ft: 0–hr

e. EXTERIOR OPENINGS: (Table 704.8)
– Unprotected: Greater than 30 – No Limit
– Protected: Greater than 20 – No Limit
– Buildings whose exterior bearing wall, exterior nonbearing wall and exterior structural frame are not required to be fire–resistance rated by Table 601 or Table 602 shall be permitted to have unlimited unprotected openings.

f. FLOORS / CEILING:
0–hour (Table 601)

g. ROOF / CEILING:
Roof 0–hour (Table 601)

h. INTERIOR NON–BEARING WALLS & PARTITIONS:
0–hour (Table 601)

i. STAIRWAY CONSTRUCTION:
1–hour where connecting less than 4 stories (Sec 707.4)

j. VERTICAL EXIT ENCLOSURES
Not required at open stair connecting only two floors per section 707.2 – Exception 12 and Section 1019.1–Exception 8

k. MEMBRANE PENETRATIONS
Openings for outlet boxes in fire rated enclosures shall not exceed 16 in^2 each and an aggregate of 100 in2 per 100 SF of wall, and be separated on opposite sides of wall by 24–inches minimum.

The annular space created by the penetration of a fire sprinkler provided it is covered by a metal escutcheon plate. (Section 712.3.2)

l. SHAFT ENCLOSURES:
– not required for floor openings created by unenclosed stairs or ramps in accordance with section 1019.1, exception 8

1–hour where connecting less than 4 stories (Section 707.4)

m. EXIT ENCLOSURE
1–hour fire rated (Section 1019.1)

n. DOOR ASSEMBLY RATING
20 minutes in 1–hr Corridor walls (Table 715.3)
45 minutes in other 1–hr fire partitions

o. EXIT CORRIDOR WALLS
Rating not required when building is equipped with an automatic sprinkler system (Table 1016.1 note C)

8) FIRE RESISTIVE ASSEMBLIES (Chapter 7)
a. FIRE DOOR
Panic and fire exit hardware (1008.1.9)
The positioning of the actuating portion of the panic hardware or fire exit hardware shall be permitted to remain in the range of 760 mm to 1220 mm (30 in. to 48 in.) above the floor. (NFPA Section 5.2.1.7.1(1))

b. GLAZING IN FIRE DOOR (Section 715.3.4.1)

c. SMOKE DAMPERS (Section 716.3.2, 716.5)

d. FIRE DAMPERS (Section 716.5, 716.3.1.1, Table 716.3.1)

e. INTERIOR FINISHES: (Chapter 8)
1. MAXIMUM FLAME SPREAD: (Table & Section 803.5)
2. EXIT ENCLOSURES AND EXIT PASSAGEWAYS: Sprinklered, Class B = 26–75 Flame Spread Index, 0–450 smoke
3. CORRIDORS: Sprinklered, Class C for Group B, and Class B for Group A–3
4. ROOMS AND ENCLOSED SPACES: Class C = Sprinklered, 76–200 Flame Spread Index, 0–450 smoke

9) FIRE PROTECTION SYSTEMS (Chapter 9)
a. STANDPIPE: Class I Standpipe Required (Section 905.3.1 with Exception 1)

b. Class I standpipes are allowed in buildings equipped with an automatic sprinkler system (IFC Section 905.3.1, Exception 1)

PORTABLE FIRE EXTINGUISHERS:
– Portable fire extinguishers shall be provided in occupancies and locations as required by the International Fire Code. (Section 906.1)
– Classrooms and assembly spaces are considered Light Hazard (1–5.1 NFPA) Size and location for Class A fires required extinguishers type 2A maximum area covered is 11,250 SF (IFC Table 906.3(1))

FIRE ALARM SYSTEM
– Manual fire alarm system required in Group B occupancies with occupant load of 500 or more (907.2.2)

10) EXTERIOR WALLS (Chapter 7)
a. Exterior walls are not required to be fire rated due to separation distances. Parapets are not required.

10) MEANS OF EGRESS (Chapter 10)
a. EGRESS OCCUPANCY LOAD: (Table 1004.1.2) Assume entire area occupied at the same time (1666 total occupancy calculation).

BUSINESS AREAS	100 gross SF/occ
CLASSROOM	20 net SF/occ
MULTI–PURPOSE	15 net SF/occ
WAITING	15 net SF/occ
STORAGE	300 net SF/occ
MECHANICAL	300 net SF/occ

Occupant Load:

FIRST FLOOR	456 OCCUPANTS
SECOND FLOOR	646 OCCUPANTS
THIRD FLOOR	564 OCCUPANTS

b. MINIMUM EXITS REQUIRED per story.
3 (for 1 to 500 occupants) (1018.1)

c. MAXIMUM DISTANCE TO EXITS:
300–ft with automatic sprinkler system (Section 1015.1)

d. DEADENDS – Not more than 50–ft (with automatic sprinkler system) (1016.3, exception 2)

e. MINIMUM EXIT WIDTH with sprinklers:
– 0.2 inches per occupant for stairways
– 0.15 inches per occupant for other egress components
(Section & Table 1005.1)

f. Door encroachment. Doors opening into the path of egress travel shall not reduce the required width to less than one–half during the course of the swing. When fully open, the door shall not project more than 7 inches (178 mm) into the required width. (Section 1005.2)

g. EXIT CORRIDORS: As means of egress system (Section 1016)

h. ILLUMINATION:
– The means of egress, including exit discharge, shall be illuminated at all times the building space served by the means of egress is occupied.
– Illumination shall not be less than 1 foot candle at the floor level
Exception: For auditoriums and similar assembly occupancies, the illumination at the floor level may be reduced during performances to not less than 0.2 foot candle provided that it will be restored upon activation of a fire alarm system

11) OTHER EGRESS COMPONENTS
a. MINIMUM WIDTH: 44–inch (Section 1016.2)
(Section 1005.2) Door encroachment Doors opening into the path of egress travel shall not reduce the required width to less than one–half during the course of the swing. When fully open, the door shall not project more than 7 inches into the required width.

b. MINIMUM HEIGHT: not less than 7 feet 6 inches (Section 1003.2.)

c. FIRE RATING: not required for fully sprinklered building (Table 1016.1)

d. EXITING DOORS: The height of doors shall not be less than 80 inches and 32–inches clear width (Section 1008.1.1)

e. MAXIMUM LEAF – 48 inches (Section 1008.1.1)

f. SWING – Direction of travel with 50 or more occupants (Section 1008.1.1)

g. LANDING – Not less than greater width of stairway or door.
Fully open door shall not reduce required width more than 7–inches. Over 50 occupants shall not reduce required width by half at any time (1008.1.5) 44–inch minimum length in direction of travel (1008.1.5)

h. EXTERIOR EXIT STAIRS:
Permitted as an element of a required means of egress for buildings not exceeding six stories or 75 feet in height. (Section 1022.2).

i. STAIRWAYS
1. 0.3 inches per occupant = egress width (Table 1003.2.3, addendum to the Houston ammendments)

2. MINIMUM WIDTH = 44 inch (Section 1009.1 and 1007.3)

Doors opening onto a landing shall not reduce the landing to less than one–half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing.

3. MINIMUM HEADROOM = 6'–8" (80 inches, Section1009.2)

4. RISER HEIGHTS = 4 to 7 inches (1009.3)

5. MINIMUM TREADS = 11–inch (1009.3)

6. LANDINGS: (Section 1009.4)
MINIMUM 44–inches wide and not less than the stairway width;
Dimension need not exceed 48 inches where stair has straight run

k. HANDRAILS:
Required on both sides of stairs (1009.11)
1. HANDRAIL HEIGHT = 34 to 38–inches (1009.11)

2. EXTENSION = 12 inches beyond top riser and slope for the depth of one tread beyond the bottom riser, each end with return (1009.11.5)

3. HANDGRIP = 1 1/4 inch to 2 inches diameter (1009.11.3)

4. SPACE TO WALL = 1 1/2 inches minimum (1009.11.6)

5. INTERMEDIATES: All portions of the stairway width required for egress capacity to be within 30 inches of a handrail (1009.11.2)

l. CONSTRUCTION: All stairs serving as required means of egress shall be consistent with the type of construction (Section 1009.5)
Exterior openings less than 180 degrees to the stair and within 10–ft of stair opening must be 1–hour fire rated with 3/4 hour opening protectives.

m. VERTICAL EXIT ENCLOSURES
(Section 1019.1) Interior exit stairways and interior exit ramps shall be enclosed with fire barriers constructed in accordance with Section 706. Exit enclosures shall have a fire–resistance rating of not less than 1 hour where connecting less than four stories.

Stairways that are not a required means of egress element are not required to be enclosed where such stairways comply with Section 707.2.

(Section 707.2, Exception 12) A shaft enclosure shall not be required for floor openings created by unenclosed stairs or ramps in accordance with exception 8 or 9 in Section 1019.1.

(Section 1019.1, Exception 8) In other than occupancy Groups H and I, a maximum of 50 percent of egress stairways serving one adjacent floor are not required to be enclosed, provided at least two means of egress are provided from both floors served by the unenclosed stairways. Any two such interconnected floors shall not be open to other floors.

n. EXIT SIGNAGE: (Section 1011.1) Where required, exits and exit access must be marked by an approved exit sign readily visible from any direction of egress travel. Access to exits shall be marked by readily visible exit signs in cases where the exit or the path of egress travel is not immediately visible to the occupants. Exit sign placement shall be such that no point in an exit access corridor is more than 100 feet or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign.

o. RAMPS: All used for exiting (Section 1010.1)
1. MINIMUM WIDTH = 44–inch (1010.5.1), The clear width of a ramp and the clear width between handrails shall be 36–inches

2. HEADROOM = 80 inches min (1010.5.2)

3. HANDRAILS (1010.8) Ramps with a rise greater than 6 inches shall have handrails on both sides complying with Section 1009.11.

4. GUARDRAILS – Per Section 1012

5. SLOPE – Maximum 1:12 with max rises of 30 inches at any run (Section 1010.2 & 1010.4)

6. LANDINGS – Level at bottom and top of each ramp run (Section 1010.6.1–1010.6.5)
a. REQUIRED At least as wide as the width of the ramp (1010.6.2)
b. SIZE – Min. 60 inches in length clear (1010.3)
c. CHANGES IN DIRECTION – Min. landing size shall be 60 x 60 inches (1010.6.4)

p. REDUCTION – Door swings shall not reduce landing less than 42 inches. (1010.5.3)

q. EXIT ACCESS: (Section 101.3)
1. INTERVENING ROOMS – Egress from a room or space shall not pass through adjoining or intervening rooms or areas (Section 1013.2)
2. SEPARATION – Where required by Sections 1014.3, 1014.4, 1014.5

r. VERTICAL EXIT ENCLOSURE: (Section 1019)
1. OPENINGS – In accordance with Section 715
Not usable for any other purpose (1019.1)

2. SMOKEPROOF ENCLOSURES: Not required (Section 1019.1.8)

s. HORIZONTAL EXIT: Not more than half the total number of required exits (Section 1021.1)
1. AREA OF REFUGE = 3 NSF / occupant (Section 1021.4)

2. EXIT DISCHARGE – Exits shall discharge directly to the exterior of the building at grade or with direct access to grade. (Section 1023 with exceptions)

t. EXIT PASSAGEWAY:
1. WIDTH 44–inch minimum and equal to the stair width (Section 1020.2 with exceptions)

2. INTERVENING ROOMS – No penetrations (Section 1020.3)

u. EXIT ACCESS: (Section 1013)
1. TRAVEL DISTANCE – 200 –ft without automatic sprinkler System (Table 1015.1), 300–ft with automatic sprinkler System (Table 1015.1)

v. EXIT IDENTIFICATION – No point more than 100–ft from exit sign (Section 1011.1 with exceptions)
–Not required at obvious main exit, where approved by Building Official
–Not required at areas requiring one exit.
–Graphics (Section 1011.5.1)
–Illumination (Section 1006.1 or 1011.2)
–Power (Section 1011.5.3)

w. GUARDRAILS: Openings with more than 30 inches height difference (Section 1012.1)
1. HEIGHT – Not less than 42–inch (1012.2)

2. OPENINGS – 4–inch diameter sphere cannot pass (1012.3)

3. EXCEPTIONS: At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches cannot pass through any opening. (Section 1012.3, exception 2)

In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies and galleries shall have balusters or ornamental patterns such that a 4–inch diameter sphere cannot pass through any opening up to a height of 26 inches. From a height of 26 inches to 42 inches above the adjacent walking surfaces, a sphere 8 inches in diameter shall not pass. (Section 1012.3,exception 4.)

x. EXIT DISCHARGE
1. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. (Section 1023.1)

2. A maximum of 50 percent of the number and capacity of the exit enclosures is permitted to egress through areas on the level of discharge provided all of the following are met:

1.1. Such exit enclosures egress to a free and unobstructed way to the exterior of the building, which way is readily visible and identifiable from the point of termination of the exit enclosure.

1.2. The entire area of the level of discharge is separated from areas below by construction conforming to the fire–resistance rating for the exit enclosure.

1.3. The egress path from the exit enclosure on the level of discharge is protected throughout by an approved automatic sprinkler system. All portions of the level of discharge with access to the egress path shall either be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of exits.

12) EXTERIOR WALL COVERING:
Weather–protection (Table 1405.2)
Flashing (Section 1405.3)
Veneer (Section 1405.4, 1405.5, 1405.6, 1405.7, 1405.8, 1405.9, 1405.10, and 1405.11)
Plaster (Section 2512)

1. ROOF FIRE CLASSIFICATION Minimum roof class C for Type IIB construction (Table1505.1)
1.1. Penthouse aggregate area is < 1/3 roof area (sec. 1509.2)
1.2. 5'< Penthouse setparations < 20' shall be of minimum 1 hr non combustible construction (sec. 1509.2.1)

2. ROOF DRAINAGE: Roof shall slope minimum ¼:12, or 2% (Section 1507.11.1).
–Drains shall be sized per the International Plumbing Code (Section [P] 1503.4)

13) SAFETY GLAZING: (Section 24)
a. Glazing subject to human impact (Section 2406.1)
b. Hazardous locations (Section 2406.3):
c. Swinging doors except jalousies
d. Fixed or operable panel adjacent to door.
e. Guardrails and railings including structural blasters
e.a. Glass railings shall be fully tempered, laminated temperd, or laminated heat strengthened glass
e.a.a. Guardraills shall support loads specified in section 1607.1 x4 saftey factor
e.a.b. Panels shall not be installed without a guardrail or handrail attached, supported by a minimum of 3 panels or in such a manner that the rail would be supported should one panel fail.

14) TOILET ROOM REQUIREMENTS: Equal male and female occupancy assumed (Section 2902.3)

FIRST FLOOR
TOTAL SQUARE FOOTAGE = 22,605 SF

SECOND FLOOR
TOTAL SQUARE FOOTAGE = 23,100 SF

THIRD FLOOR
TOTAL SQUARE FOOTAGE = 23,100 SF

TOTAL REQUIRED PER FLOOR, BASED ON FULL CALCULATED OCCUPANCY

WATER CLOSETS	12
LAVATORIES	8
DRINKING FOUNTAINS	6
SERVICE SINK	1

15) ELEVATORS: (Chapter 30)
1. 4 cars or less may be in a single hoistway (Section 3002.2)

2. Provide emergency recall system (Section 3003.2)

3. Minimum clear door will be 36–inch wide (TAS p 46 Fig. 22 a)

4. Minimum cab size 68 x 54–inches (TAS p 46 Fig. 22 b)

5. Car control buttons between 35 and 54–inches AFF (TAS p 47 Fig. 23 b)

6. Signage (Section 1007.7)

7. Hall Buttons 42 inch high (TAS p 46 Fig. 20)

8. Hall Lanterns 72 inch high min (TAS p 46 Fig. 20)

9. Jamb Markings 60 inch high (TAS p 46 Fig. 20)

18) AREA OF RESCUE ASSISTANCE

Texas Accessibility Standards:
4.1.3 Accessible Buildings: New Construction
(9)* In buildings or facilities, or portions of buildings or facilities, required to be accessible, accessible means of egress shall be provided in the same number as required for exits by local building/life safety regulations. Where a required exit from an occupiable level is not accessible, an area of rescue assistance shall be provided on each such level (in a number equal to that of inaccessible required exits). Areas of rescue assistance shall comply with 4.3.11.

EXCEPTION: Areas of rescue assistance are not required in buildings or facilities having a supervised automatic sprinkler system.

CODE COMPLIANCE - APPROVED BY THE CITY OF HOUSTON FOR PERMITTING - PERMIT NUMBER 09095547

NO SCALE (2)

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS & WORKMANSHIP IN ACCORDANCE W/ALL APPLICABLE LIFE SAFETY STANDARDS, ORDINANCES & BLDG. COVENANTS & OSHA STANDARDS FOR THIS PROJECT.
2. THE CONTRACTOR SHALL THOROUGHLY EXAMINE THE PREMISES & BASE THE BID ON A THOROUGHLY DOCUMENTED EXISTING CONDITIONS SURVEY IN CONJUNCTION W/ THESE CONTRACT DOCUMENTS.
3. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT, PRIOR TO THE FINAL BID, OF ANY DISCREPANCIES FOUND IN THESE DOCUMENTS OR CONFLICTS FOUND WITH THE BUILDING OR SITE CONDITIONS.
4. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES IN FIELD CONDITIONS OR DIMENSIONS WHICH ARE NOT RESOLVED BY THESE CONTRACT DOCUMENTS PRIOR TO PROCEEDING W/ THE WORK.
5. THE CONTRACTOR SHALL FIRESTOP, AS REQUIRED BY CODE, ALL PENETRATIONS AS MAY BE GENERATED BY THE WORK IN THIS CONTRACT.
6. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING WITHIN THE DETERMINED CRITICAL DIMENSIONS. THE CONTR. SHALL VERIFY THE DIMENSIONS OF OWNER PROVIDED ITEMS & ENSURE THESE ITEMS WILL FIT W/ ADEQUATE INSTALLATION & OPERATION CLEARANCES.
7. "ALIGN" AS USED IN THESE DOCUMENTS SHALL MEAN TO ACCURATELY LOCATE FINISHED FACES IN THE SAME PLANE. NEW CONSTRUCTION REQUIRED TO ALIGN W/EXISTING CONSTRUCTION SHALL BE CONSTRUCTED WITHOUT VISIBLE JOINTS OR SURFACES IRREGULARITIES.
8. "TYP" AS USED IN THESE DOCUMENTS MEANS THAT THE CONDITION OR DIMENSION OR ITEM IS THE SAME OR REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT, UNLESS NOTED OTHERWISE.
9. PROVIDE FIRE RETARDANT TREATED BLOCKING FOR SUPPORT OF WALL COMPONENTS AS REQUIRED.
10. PROVIDE & COORDINATE THE LOCATION, TYPE, QUANTITY & ARRANGEMENT OF FURRING, NAILERS, BLOCKING, GROUNDS, STUDS, STUD REINFORCEMENT & SIMILAR SUPPORTS SO THATHE ATTACHED WORK WILL BE ADEQUATELY SUPPORTED & ROUGH CARPENTRY WILL BE PROPERLY LOCATED.
11. THE CONTRACTOR SHALL REPLACE OR REPAIR TO LIKE-NEW CONDITION ALL ITEMS DAMAGED ON THE PREMISES CAUSED BY THE WORK IN THIS CONTRACT.
12. ALL WORK BY THE CONTRACTOR SHALL CONFORM TO THE OWNER/CONTRACTOR AGREEMENT. THE PROJECT MANUAL CONTAINS THE GENERAL & SUPPLEMENTARY CONDITIONS, SPECIFICATIONS, DRAWINGS, ADDENDA & SUPPLEMENTAL INSTRUCTIONS ISSUED BY THE ARCHITECT.
13. THE CONTRACTOR SHALL NOT PROCEED W/WORK FOR WHICHADDITIONAL COMPENSATION IS EXPECTED BEYOND THE CONTRACT AMOUNT, WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER. FAILURE TO OBTA SUCH AUTHORIZATION SHALL INVALIDATE ANY SUCH CLAIM FOR EXTRA COMPENSATION.
16. THE CONTRACTOR IS ACCOUNTABLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES & COORDINATION OF THE WORK PERFORMED BY HIS SUBCONTRACTORS.
17. ALL WORK NOTED "BY OTHERS" OR "N.I.C." IS TO BE ACCOMPLISHED BY A CONTRACTOR OTHER THAN THE GENERAL CONTRACTOR & IS NOT TO BE A PART OF THE CONSTRUCTION AGREEMENT. THE CONTRACTOR IS TO COORDINATE W/ALL "OTHER" CONTRACTORS AS REQUIRED TO COMPLETE THE WORK.

GENERAL NOTES

NO SCALE (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5–13–2013	ADDENDUM 1

SMITH&COMPANY
ARCHITECTS
1500 MCGOWEN ST. SUITE 150
HOUSTON, TEXAS 77004
PHONE: 713-524-4202
FAX: 713-524-4071
www.sc-arch.com

SEAL:

PROJECT NAME :

DRENNAN CAMPUS
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE : APRIL 22, 2013
PROJECT NO.: N012813
SCALE :
DRAWN BY : JAW
CHECKED BY : TDS

SHEET TITLE :

CODE COMPLIANCE & GENERAL NOTES

SHEET NO. :

A0.02

APPLICABLE CODES AND REGULATIONS

– INTERNATIONAL BUILDING CODE (IBC):	2006 EDITION
– INTERNATIONAL FIRE CODES, NFPA 101:	2006 EDITION
– INTERNATIONAL ENERGY CONVERSATION CODE:	2009 EDITION
– UNIFORM MECHANICAL CODE:	2006 EDITION
– UNIFORM PLUMBING CODE:	2006 EDITION
– NATIONAL ELECTRIC CODE:	2011 EDITION
– TEXAS ACCESSIBILITY STANDARDS:	2012 EDITION
– ASHRAE 90.1–2007	2007 EDITION

BUILDING INFORMATION

LEVEL 3 EXISTING SHELL SPACE = 23,100 SF

CONSTRUCTION TYPE

TYPE – IIB SPRINKLED

OCCUPANCY GROUP:

BUSINESS GROUP B (Educational Occupancy Above 12th Grade)

MAXIMUM OCCUPANCY CALCULATIONS – LEVEL 3 BUILD OUT:

BUSINESS: 23,100 SF / 100 SF per Person =

TOTAL OCCUPANT LOAD = 231

– BUILD OUT WILL BE 100% FULLY SPRINKLED PER IBC 903.2.1.3 (FIRE ALARM TO BE DEFERRED) 1

PLUMBING FACILITIES

	REQUIRED		EXISTING BEFORE NEW WORK	
	MEN	WOMEN	MEN	WOMEN
WATER CLOSETS / URNALS	4	4	6	6
LAVATORIES	3	3	4	4
DRINKING FOUNTAIN	2		2	
SERVICE SINK	1			

* NO ADDITIONAL FIXTURES REQUIRED PER NEW WORK BUILD OUT

GENERAL REQUIREMENTS / BUILD OUT INFORMATION

NO SCALE 19

2HR ——— EXISTING 2 HR RATED INTERIOR WALLS

1HR ——— EXISTING 1 HR RATED INTERIOR WALLS

LEGEND - FIRE RATED WALLS

NO SCALE 14

EXIT SIGN

(F) FIRE EXTINGUISHER – SEMI RECESSED FIRE EXTINGUISHER CABINET

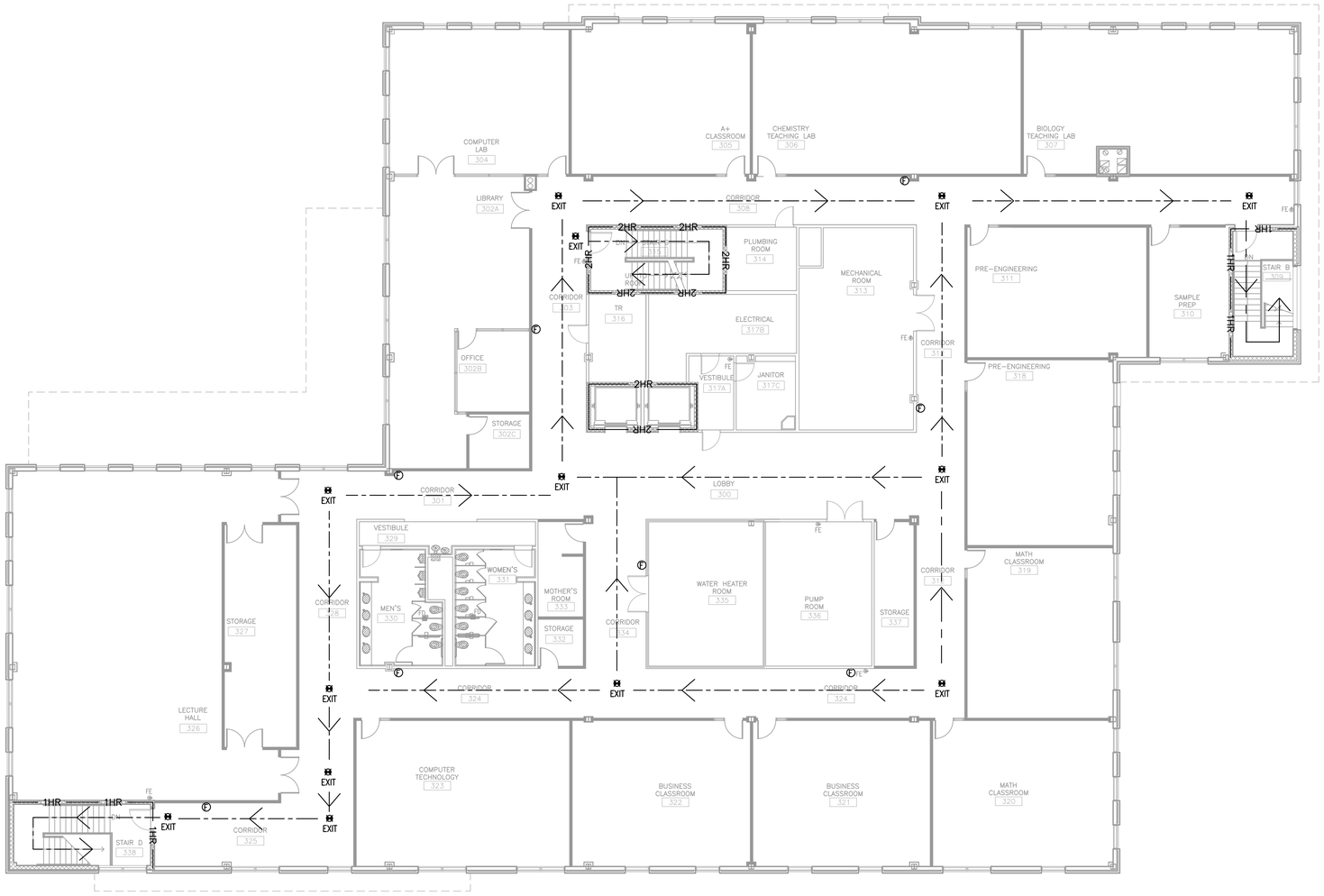
LEGEND

NO SCALE 9

1. REFER TO SHT. A3.02 FOR PARTITION TYPES.
2. REFER TO SHT. A0.02 FOR UL ASSEMBLIES

GENERAL NOTES

NO SCALE 4



LIFE SAFETY / EGRESS PLAN

1/8" = 1'-0" 1

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5–13–2013	ADDENDUM 1

SMITH&COMPANY ARCHITECTS
1500 MCGOWEN ST. SUITE 150
HOUSTON, TEXAS 77004
PHONE: 713-524-4202
FAX: 713-524-4071
www.sc-arch.com

SEAL:

REGISTERED ARCHITECT * LAWRENCE D. SMITH * STATE OF TEXAS 18438

5/13/2013

PROJECT NAME :

DRENNAN CAMPUS
ACADEMIC CENTER
LEVEL 3 RENOVATION

HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER

SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE : APRIL 22, 2013
PROJECT NO.: N012813
SCALE :
DRAWN BY : JAW
CHECKED BY : TDS

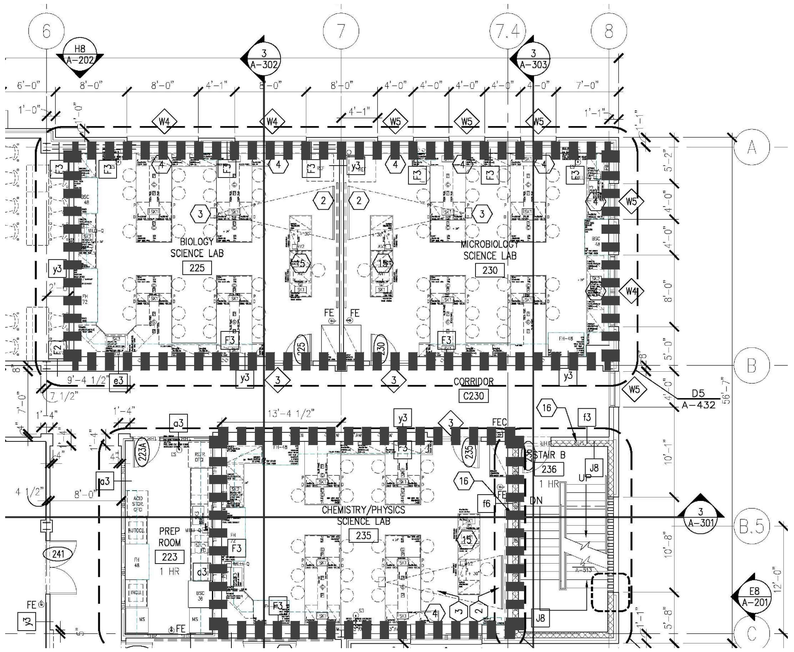
SHEET TITLE :

LEVEL 3
LIFE SAFETY /
EGRESS PLAN

SHEET NO. :

A0.05

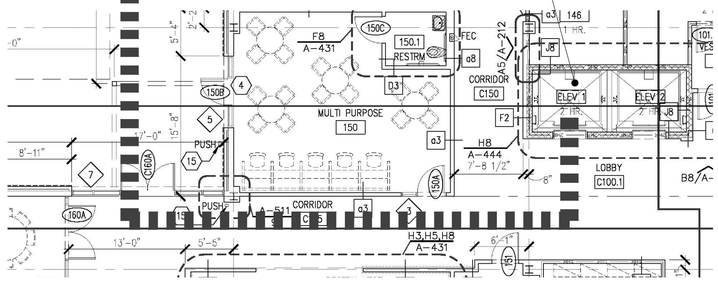
NOTE: ALL NEW WORK TO THE LEVEL 3 BUILD OUT THAT REQUIRES PLUMBING PENETRATION THROUGH THE EXISTING FLOOR SLAB THAT WILL IMPACT THE USE OF CLASSROOM 225, 230 AND 235 MUST BE COMPLETED BY NO LATER THAN AUGUST 10, 2013



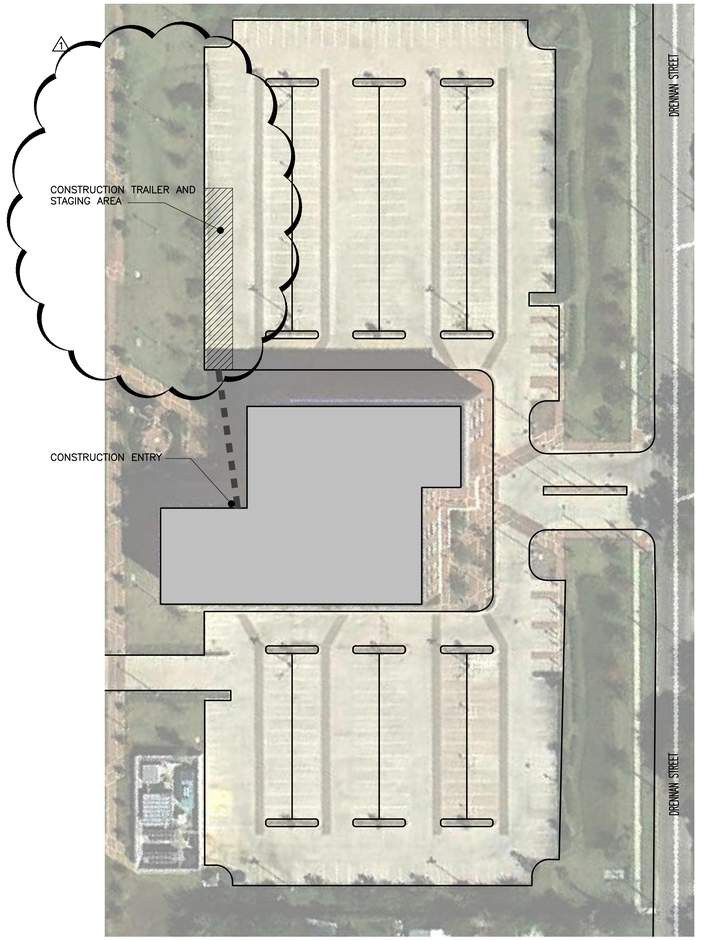
LEVEL 2 EXISTING CLASSROOM CONSTRUCTION COORDINATION — NO SCALE (7)

ROUTE FROM CONSTRUCTION TRAILER AND STAGING AREA INTO BUILDING. – USE EXISTING DOOR C160A

ELEVATOR 1 TO BE USED FOR LEVEL 1 CONSTRUCTION ACCESS



LEVEL 3 ACCESS ROUTE — NO SCALE (6)



SITE STAGING PLAN — NO SCALE (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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SEAL:

REGISTERED ARCHITECT LAWRENCE D. SMITH 18436 STATE OF TEXAS
5/13/2013

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CONSULTANT(S) :

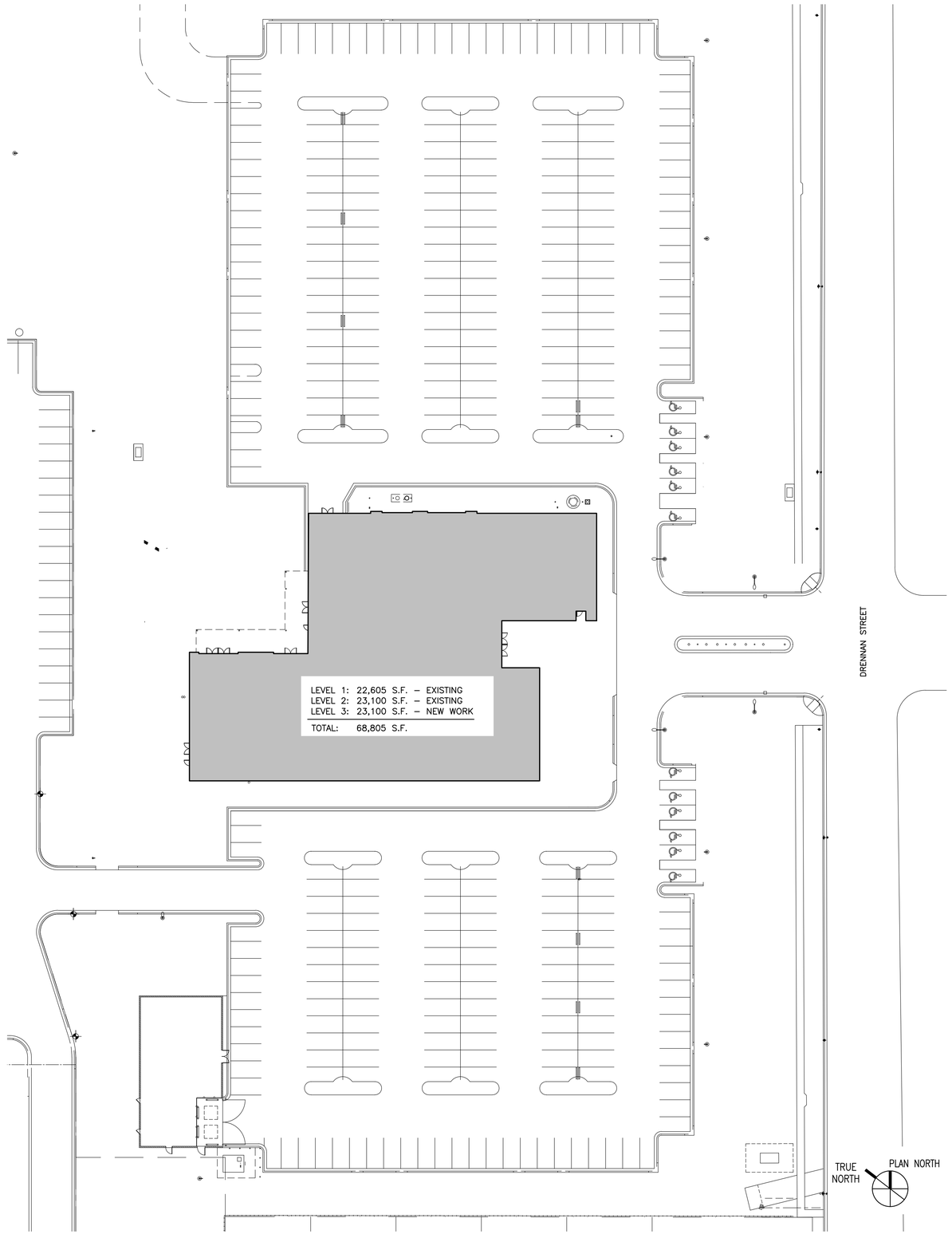
DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

CONSTRUCTION STAGING AND COORDINATION

SHEET NO. :

A0.06



CITY PARKING REQUIREMENTS:

1.0 PARKING SPACE FOR EVERY 3 EMPLOYEES PLUS

1.0 PARKING SPACE FOR EVERY 5 STUDENTS NOT RESIDING ON CAMPUS

NUMBER OF EMPLOYEES:	60	SPACES REQUIRED: 20
NUMBER OF COMMUTER STUDENTS:	1,475	SPACES REQUIRED: 295
		TOTAL REQUIRED: 315

EXISTING PARKING:

PARKING SPACES IN FRONT SURFACE LOT:	318
PARKING SPACES TOTAL PROVIDE:	318

EXISTING SITE PLAN AND PARKING REQUIREMENTS

NO SCALE (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
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CHECKED BY : TDS

SHEET TITLE :

EXISTING SITE PLAN
PARKING REQUIREMENTS

SHEET NO. :

A1.00

KEY NOTES

1. NO WORK SCHEDULED FOR EXISTING STAIRS
2. NO WORK SCHEDULED FOR EXISTING ELEVATOR
3. NO WORK SCHEDULE IN EXISTING ROOM
4. REPLACE ALL DAMAGED CEILING FINISHES AND LIGHT FIXTURES AS WELL AS ANY FLOOR FINISHES ON 2ND LEVEL BELOW THIS ROOM DURING NEW CONSTRUCTION

NO SCALE (15)

LEGEND

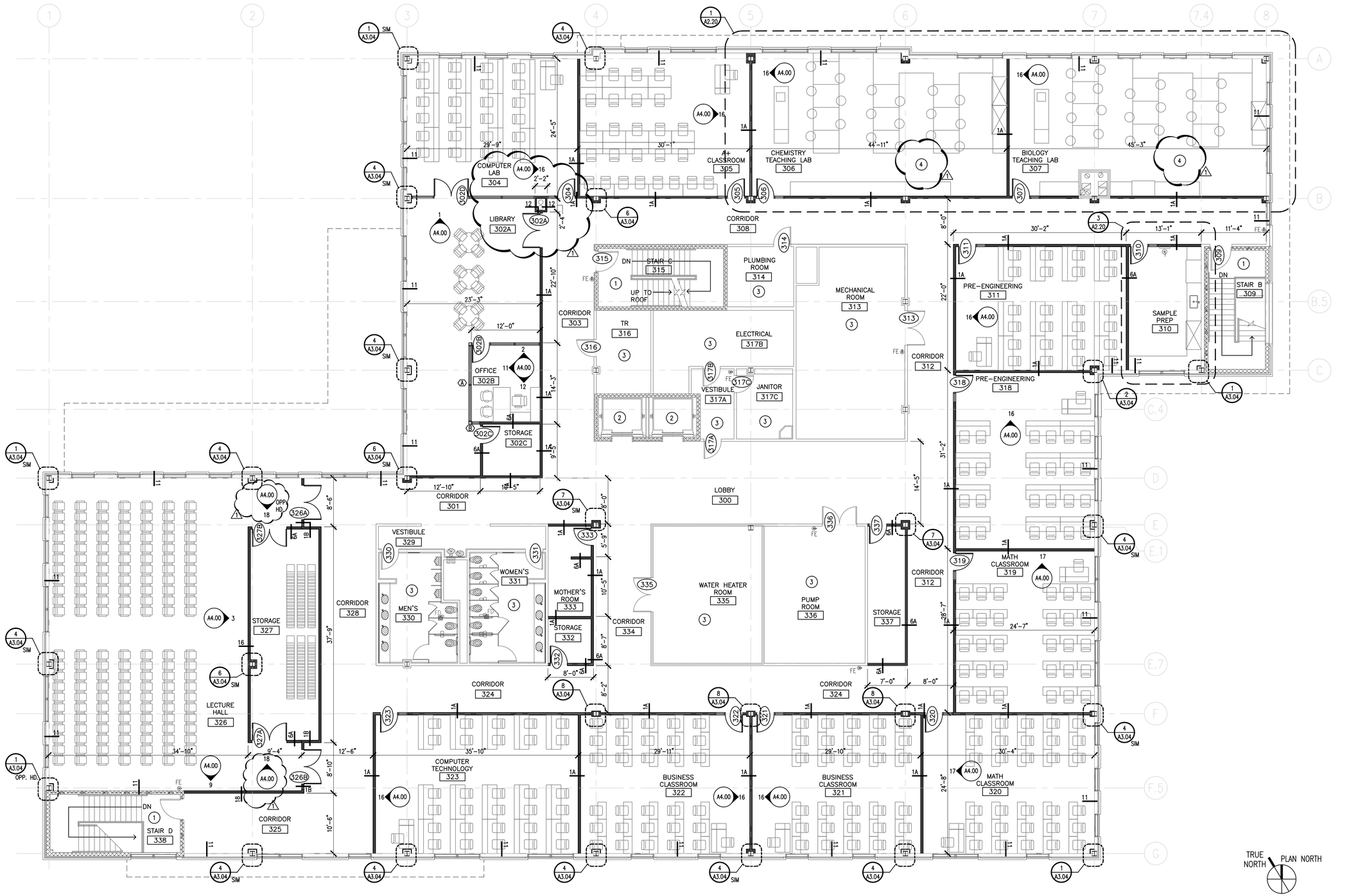
- EXISTING WALL TO REMAIN
- NEW WALL
- EXISTING DOOR TO REMAIN
- NEW DOOR

NO SCALE (10)

GENERAL NOTES

1. REFER TO SHT. A3.02 FOR PARTITION TYPES.
2. REFER TO FINISH SCHEDULE SHEET A3.03 FOR NEW FINISH REQUIREMENTS.
3. REFER TO DOOR SCHEDULE SHT. A3.00 FOR NEW & EXISTING DOOR, FRAME, & HARDWARE REQUIREMENTS.
4. REFER TO PLUMBING DRAWINGS FOR NEW PLUMBING FIXTURES.
5. REFER TO MECHANICAL DRAWINGS FOR NEW MECH. UNITS.
6. ALL ITEMS ARE EXISTING TO REMAIN U.N.O.
7. SEE SHT. A3.00 FOR WINDOW & INTERIOR STOREFRONT
8. SEE SHT. A0.02 FOR GENERAL PROJECT REQUIREMENTS
9. EXISTING COLUMN TO BE PAINTED UNLESS NOTED OTHERWISE

NO SCALE (5)



LEVEL 3 OVERALL FLOOR PLAN

1/8" = 1'-0" (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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REGISTERED ARCHITECT TERRENCE D. SMITH 18438 STATE OF TEXAS

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SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

LEVEL 3
FLOOR PLAN

SHEET NO. :

A2.00

1. LOCATION OF CORNERGAURDS, CG-1
2. REFER TO INTERIOR ELEVATION SHEETS FOR ADDITIONAL DETAILS
3. CONTRACTOR TO INSTALL FIELD TILE, PCT-1 IN MONOLITHIC PATTERN. USE WHOLE TILES AS SHOWING IN THE FINISH PLANS.
4. ALL VCT FLOOR FINISHES SHOWING AT DIAGONAL IN FINISH FLOOR PLAN ARE TO BE CUT PARALLEL TO TO THE DIAGONAL OF THE RAILING @ LOBBY OPEN AREA.
5. USE WHOLE TILES AT ALL TILE TRANSITIONS, LIMIT CUT TILES TO WALLS AND CENTER TILE PATTERNS IN ROOM.
6. ALL GROUT LINES TO BE RECTIFIED $\frac{1}{8}$"
7. ALIGN ALL GROUT LINES WITH WALL EDGES WHERE APPLICABLE.
8. PROVIDE SMOOTH TRANSITION IN FLOORING MATERIALS. INSTALL SCHLUTER ALUMINUM TRIM AS NEEDED.

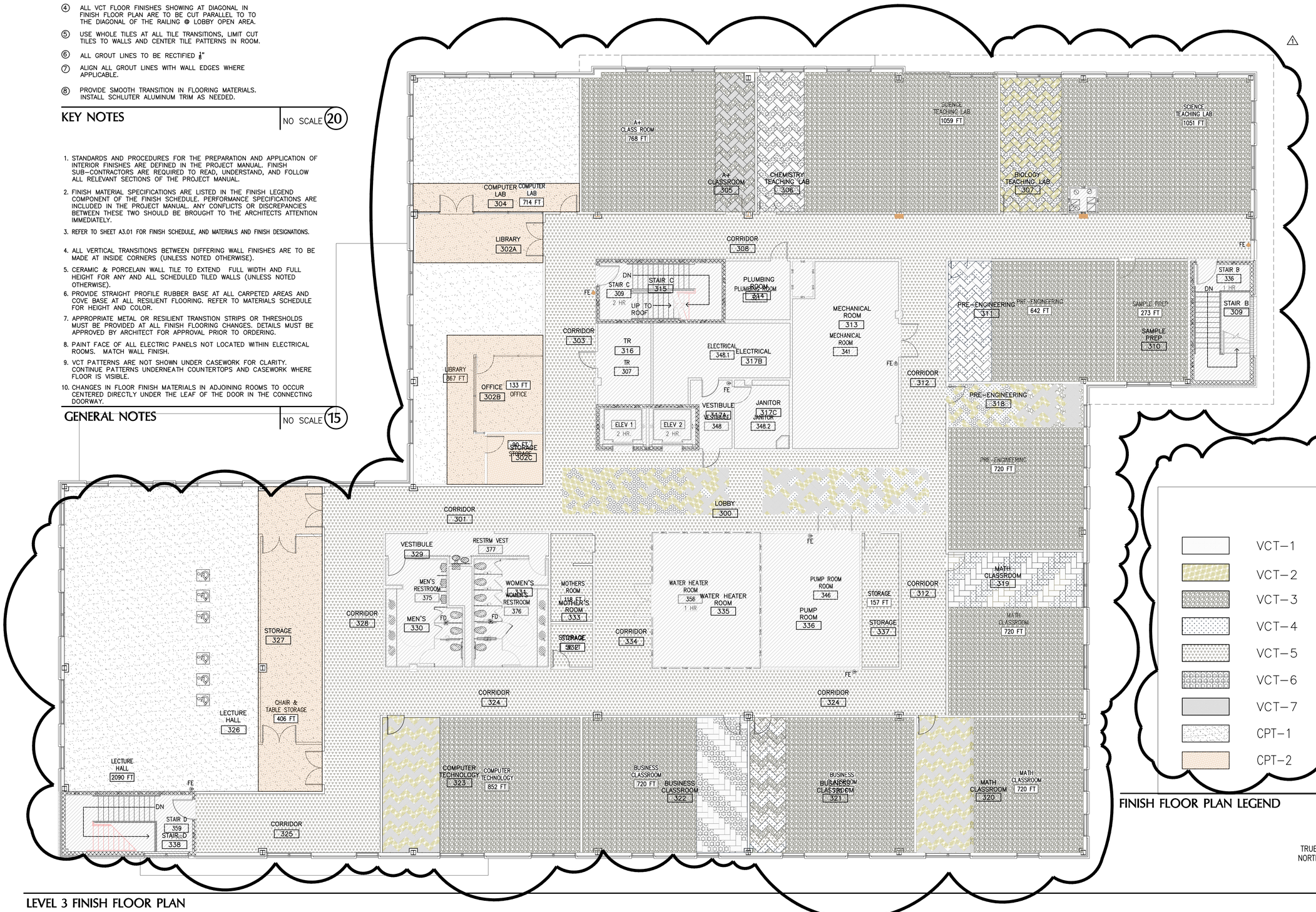
KEY NOTES

NO SCALE (20)

1. STANDARDS AND PROCEDURES FOR THE PREPARATION AND APPLICATION OF INTERIOR FINISHES ARE DEFINED IN THE PROJECT MANUAL. FINISH SUB-CONTRACTORS ARE REQUIRED TO READ, UNDERSTAND, AND FOLLOW ALL RELEVANT SECTIONS OF THE PROJECT MANUAL.
2. FINISH MATERIAL SPECIFICATIONS ARE LISTED IN THE FINISH LEGEND COMPONENT OF THE FINISH SCHEDULE. PERFORMANCE SPECIFICATIONS ARE INCLUDED IN THE PROJECT MANUAL. ANY CONFLICTS OR DISCREPANCIES BETWEEN THESE TWO SHOULD BE BROUGHT TO THE ARCHITECTS ATTENTION IMMEDIATELY.
3. REFER TO SHEET A3.01 FOR FINISH SCHEDULE, AND MATERIALS AND FINISH DESIGNATIONS.
4. ALL VERTICAL TRANSITIONS BETWEEN DIFFERING WALL FINISHES ARE TO BE MADE AT INSIDE CORNERS (UNLESS NOTED OTHERWISE).
5. CERAMIC & PORCELAIN WALL TILE TO EXTEND FULL WIDTH AND FULL HEIGHT FOR ANY AND ALL SCHEDULED TILED WALLS (UNLESS NOTED OTHERWISE).
6. PROVIDE STRAIGHT PROFILE RUBBER BASE AT ALL CARPETED AREAS AND COVE BASE AT ALL RESILIENT FLOORING. REFER TO MATERIALS SCHEDULE FOR HEIGHT AND COLOR.
7. APPROPRIATE METAL OR RESILIENT TRANSTION STRIPS OR THRESHOLDS MUST BE PROVIDED AT ALL FINISH FLOORING CHANGES. DETAILS MUST BE APPROVED BY ARCHITECT FOR APPROVAL PRIOR TO ORDERING.
8. PAINT FACE OF ALL ELECTRIC PANELS NOT LOCATED WITHIN ELECTRICAL ROOMS. MATCH WALL FINISH.
9. VCT PATTERNS ARE NOT SHOWN UNDER CASEWORK FOR CLARITY. CONTINUE PATTERNS UNDERNEATH COUNTERTOPS AND CASEWORK WHERE FLOOR IS VISIBLE.
10. CHANGES IN FLOOR FINISH MATERIALS IN ADJOINING ROOMS TO OCCUR CENTERED DIRECTLY UNDER THE LEAF OF THE DOOR IN THE CONNECTING DOORWAY.

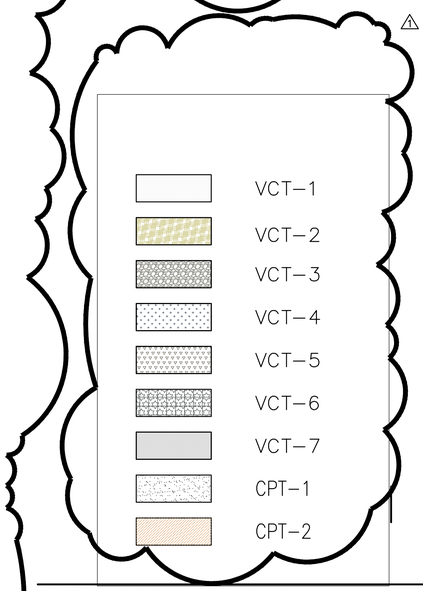
GENERAL NOTES

NO SCALE (15)



LEVEL 3 FINISH FLOOR PLAN

1/8" = 1'-0" (1)



FINISH FLOOR PLAN LEGEND

1/8" = 1'-0" (6)

TRUE NORTH — PLAN NORTH

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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www.sc-arch.com

SEAL:

REGISTERED ARCHITECT — LAWRENCE D. SMITH — 18435 — STATE OF TEXAS

5/13/2013

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

HCC

KEY MAP:

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PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

LEVEL 3 FINISH FLOOR PLAN

SHEET NO. :

A2.01

LEGEND

SYMBOL	DESCRIPTION	LOCATION	NOTES	ROUGH-IN UTILITIES	FH MODEL
88	KEYED NOTE				
SK1	8X12X6 EPOXY RESIN DROP-IN SINK, CENTER DRAIN	STUDENT POSITIONS		SAN	
	DECK MOUNT MIXING FAUCET, SWING GOOSENECK	SK1		DCW, DHW	32L405SG*
SK2	18X15X5 EPOXY RESIN DROP-IN SINK, CORNER DRAIN, ADA	PERIMETER; TEACHING STATION	ADA SINK MOUNT 34" AFF MAX. PROVIDE KNEE SPACE	SAN	
	DECK MOUNT MIXING FAUCET, SWING GOOSENECK, THREE HOLE ON 4" CENTERS, LEVER HANDLES	SK2		DCW, DHW	32L45200*
SK3	25X15X10 EPOXY RESIN DROP-IN SINK, CORNER DRAIN	PERIMETER		SAN	
	DECK MOUNT MIXING FAUCET, SWING GOOSENECK, THREE HOLE ON 4" CENTERS, LEVER HANDLES	SK3		DCW, DHW	32L45200*
	ACCESSORIES	LAB, PREP ROOM	PROVIDE ACCESSORIES REQUIRED TO COMPLETE INSTALLATION		
ES	EYEWASH STATION AND SHOWER	LAB, PREP ROOM	COORDINATE IN-WALL POSITION WITH MEP AND STRUCT.	DCW	32L3770
BSC 36	36" WIDE BIOLOGICAL SAFETY CABINET	LAB, PREP ROOM		VACUUM, AIR, CO2, 110V, 100% EXHAUST (& M/U AIR)	
BSC 42	42" WIDE BIOLOGICAL SAFETY CABINET	LAB		VACUUM, AIR, CO2, 110V, 100% EXHAUST (& M/U AIR)	
FH 48	48" WIDE FUME HOOD	LAB, PREP ROOM		DCW, VACUUM, AIR, GAS, 110V, 100% EXHAUST (& M/U AIR), SAN	
FH 72	72" WIDE FUME HOOD	LAB		DCW, VACUUM, AIR, GAS, 110V, 100% EXHAUST (& M/U AIR), SAN	
SK4	6X15X8 EPOXY RESIN CUP SINK	FUME HOODS		SAN	34L13400
	(FUME HOOD WATER FIXTURE)	FUME HOODS	PROVIDE ACCESSORIES REQUIRED TO COMPLETE INSTALLATION	DCW	
	(FUME HOOD/BSC GAS, AIR, VACUUM, CO2 VALVES, AND ACCESSORIES)	FUME HOODS	PROVIDE ACCESSORIES REQUIRED TO COMPLETE INSTALLATION		
PB	PEG BOARD	(ABOVE) SINKS	PROVIDE DRAIN TROUGH TO SANITARY	SAN	52L82000
P	POWER AT FACE OF CABINET	ON PANEL, AS SHOWN	STAINLESS FACEPLATE	110V	
P	EPOXY TOMBSTONE OUTLET COVER	ON WORK SURFACE, AS SHOWN	STAINLESS FACEPLATE	110V	36L225HO
G	GAS TURRET TWO VALVES	ON WORK SURFACE, AS SHOWN	CONFIGURE # FOR SEATING, MIN. TWO VALVES PER TURRET	GAS	CA30L53800-GO
D	DATA OULET POSITION	BETWEEN STUDENT POSITIONS AT SINK BASE PANEL	FACEPLATE BY IT VENDOR	RE: IT FOR DATA REQUIREMENTS	
AV1	AV EQUIPMENT RACK BY AV VENDOR	TEACHING STATION	PROVIDE DOOR AT FRONT AND REMOVABLE PANEL AT REAR	COORDINATE (2) 2" GROMET HOLES AT EPOXY TOP, RE: AV	
AV2	"CRESTRON" AV OUTLET BY AV VENDOR	TEACHING STATION	PROVIDE FIXED PANEL AT KNEE SPACE & REMOVABLE PANEL AT BACK	COORDINATE 5.5"X6" CUTOUT AT EPOXY TOP, RE: AV	
MS	REFRIGERATED MEDIA STORAGE	PREP ROOM	CFCI	110	THERMO R250
	GAS TURRET FOUR VALVES	ON WORK SURFACE, AS SHOWN	CONFIGURE # FOR SEATING, MIN. FOUR VALVES PER TURRET	.75	CA30L54700-GO

LAB LEGEND 13

EXISTING WALL TO REMAIN

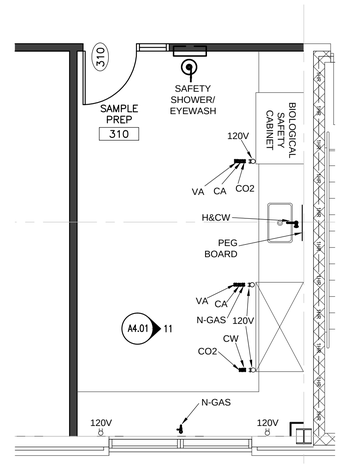
NEW WALL

NEW DOOR

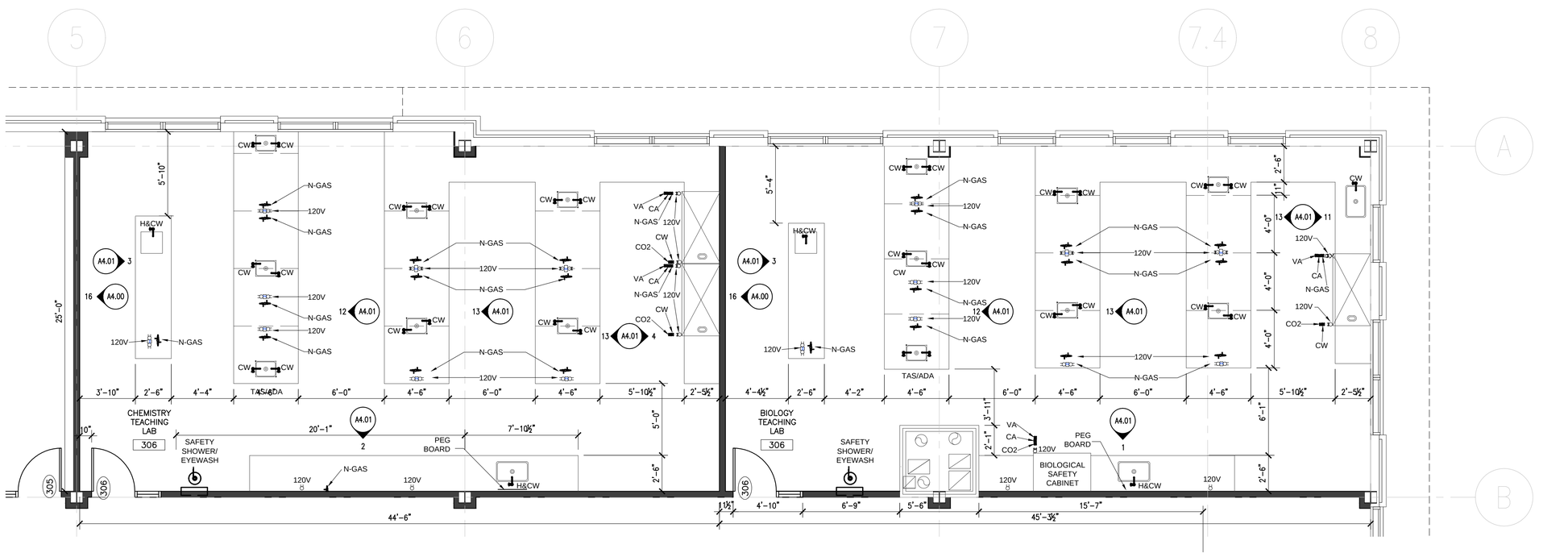
LEGEND NO SCALE 10

1. REFER TO SHT. A3.02 FOR PARTITION TYPES.
2. REFER TO FINISH SCHEDULE SHEET A3.03 FOR NEW FINISH REQUIREMENTS.
3. REFER TO DOOR SCHEDULE SHT. A3.00 FOR NEW & EXISTING DOOR, FRAME, & HARDWARE REQUIREMENTS.
4. REFER TO PLUMBING DRAWINGS FOR NEW PLUMBING FIXTURES.
5. REFER TO MECHANICAL DRAWINGS FOR NEW MECH. UNITS.
6. ALL ITEMS ARE EXISTING TO REMAIN U.N.O.
7. SEE SHT. A3.00 FOR WINDOW & INTERIOR STOREFRONT
8. SEE SHT. A0.02 FOR GENERAL PROJECT REQUIREMENTS
9. REFER 13/A2.31 FOR TYP. FUME HOOD VENT ROOF PENETRATION DETAIL

GENERAL NOTES NO SCALE 5



ENLARGED FLOOR PLAN 1/4" = 1'-0" 3



ENLARGED FLOOR PLAN 1/4" = 1'-0" 1

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SEAL:

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5/13/2013

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SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

ENLARGED PLANS
AND
LAB LEGEND

SHEET NO. :

A2.20

EXISTING WALL TO REMAIN

NEW WALL

NEW DOOR

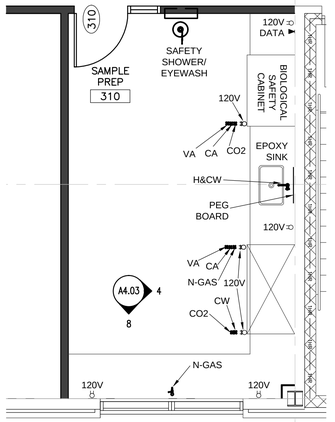
LEGEND

NO SCALE 10

1. REFER TO SHT. A3.02 FOR PARTITION TYPES.
2. REFER TO FINISH SCHEDULE SHEET A3.03 FOR NEW FINISH REQUIREMENTS.
3. REFER TO DOOR SCHEDULE SHT. A3.00 FOR NEW & EXISTING DOOR, FRAME, & HARDWARE REQUIREMENTS.
4. REFER TO PLUMBING DRAWINGS FOR NEW PLUMBING FIXTURES.
5. REFER TO MECHANICAL DRAWINGS FOR NEW MECH. UNITS.
6. ALL ITEMS ARE EXISTING TO REMAIN U.N.O.
7. SEE SHT. A3.00 FOR WINDOW & INTERIOR STOREFRONT
8. SEE SHT. A0.02 FOR GENERAL PROJECT REQUIREMENTS
9. REFER 13/A2.31 FOR TYP. FUME HOOD VENT ROOF PENETRATION DETAIL

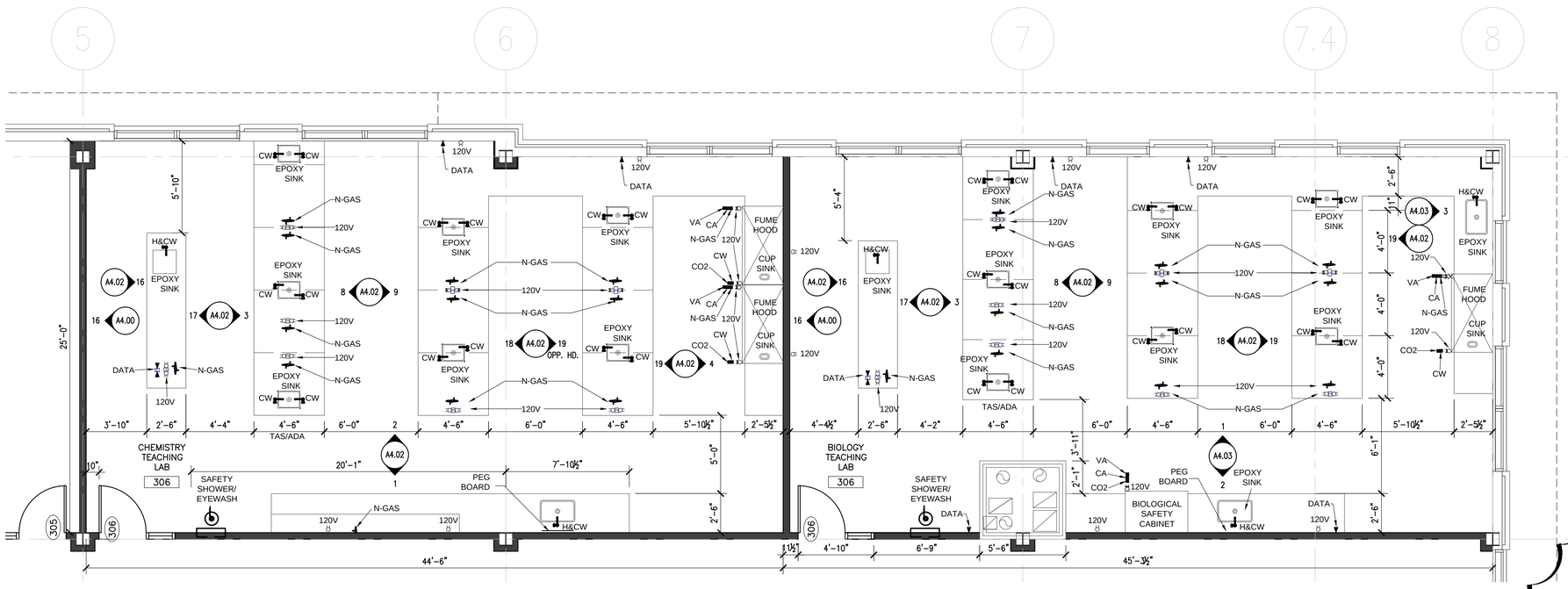
GENERAL NOTES

NO SCALE 5



ENLARGED FLOOR PLAN

1/4" = 1'-0" 3



ENLARGED FLOOR PLAN

1/4" = 1'-0" 1

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ENLARGED PLANS

SHEET NO. :

A2.20

KEY NOTES — NO SCALE (15)

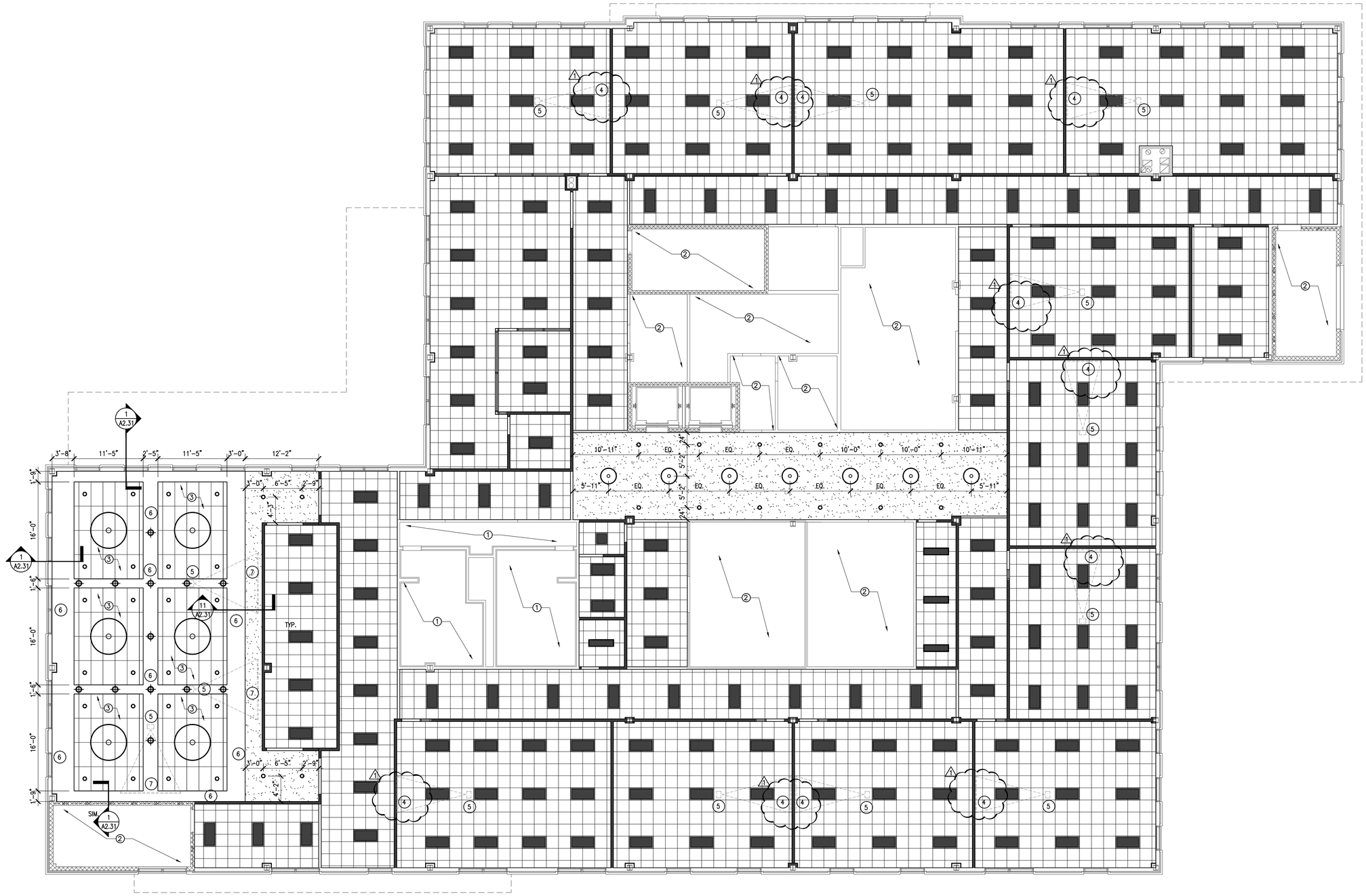
1. EXISTING CEILING TO REMAIN AND PAINTED
2. NO WORK SCHEDULE
3. NEW ARMSTRONG WOODWORKS CONCEALED 2X4 GRID SYSTEM HUNG FROM STRUCTURE
4. DA-LITE NEW CONTOUR ELECTROL (CEILING RECESSED ELECTRIC SCREEN) – PART # 94275LS – PROVIDE SCREEN, POWER, SWITCH AND CONDUIT – REF ELEC.
5. CEILING MOUNTED DATA PROJECTOR PROVIDED & INSTALLED BY OWNER. CONTRACTOR TO INSTALL CONDUIT – REF ELEC.
6. NO CEILING – OPEN TO STRUCTURE ABOVE PAINTED BLACK
7. DA-LITE NEW ADVANTAGE ELECTROL (CEILING RECESSED ELECTRIC SCREEN) – PART # 84328LS

LEGEND — NO SCALE (10)

- NEW DECORATIVE PENDANT HUNG FIXTURE
- NEW DECORATIVE PENDANT HUNG FIXTURE
- NEW 8 INCH RECESSED CAN FIXTURES
- NEW 1x4 SURFACE MOUNTED FLUORESCENT FIXTURES
- NEW 2x4 RECESSED FLUORESCENT FIXTURES
- NEW 2x2 RECESSED FLUORESCENT FIXTURES
- NEW PAINTED GYP. CEILING
- NEW 2X2 CEILING TILE AND 2X2 GRID SYSTEM

GENERAL NOTES — NO SCALE (5)

1. SEE ELECTRICAL DWG'S FOR LIGHT FIXTURE TYPES.
2. MECHANICAL DEVICES NOT SHOWN FOR CLARITY – REF. MECHANICAL
3. ALL CEILING ARE 2x2 CEILING TILE AND GRID U.N.O.
4. REFER TO SHEET A3.03 FOR FINISH SCHEDULE



LEVEL 3 OVERALL FLOOR PLAN — 1/8" = 1'-0" (1)

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KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

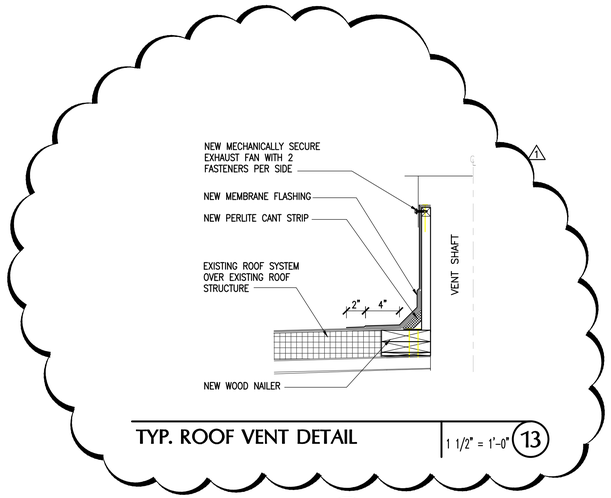
DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

LEVEL 3
REFLECTED
CEILING PLAN

SHEET NO. :

A2.30

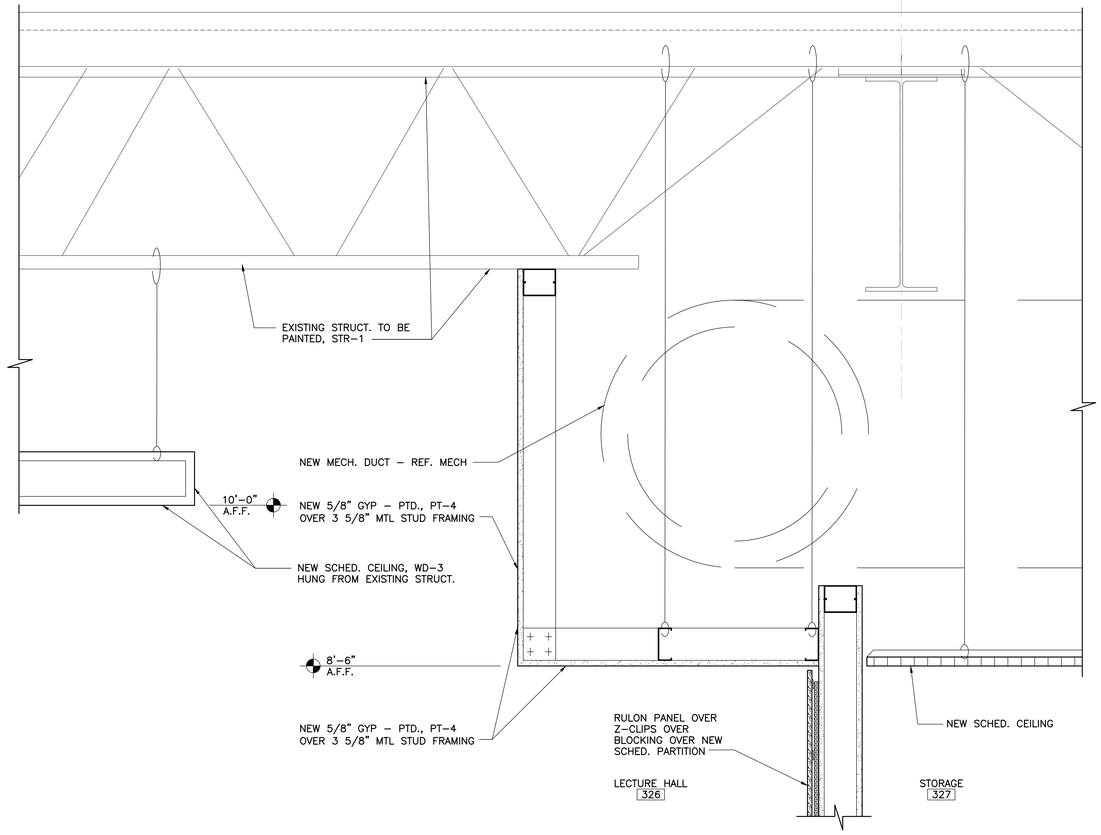


TYP. ROOF VENT DETAIL | 1 1/2" = 1'-0" | 13

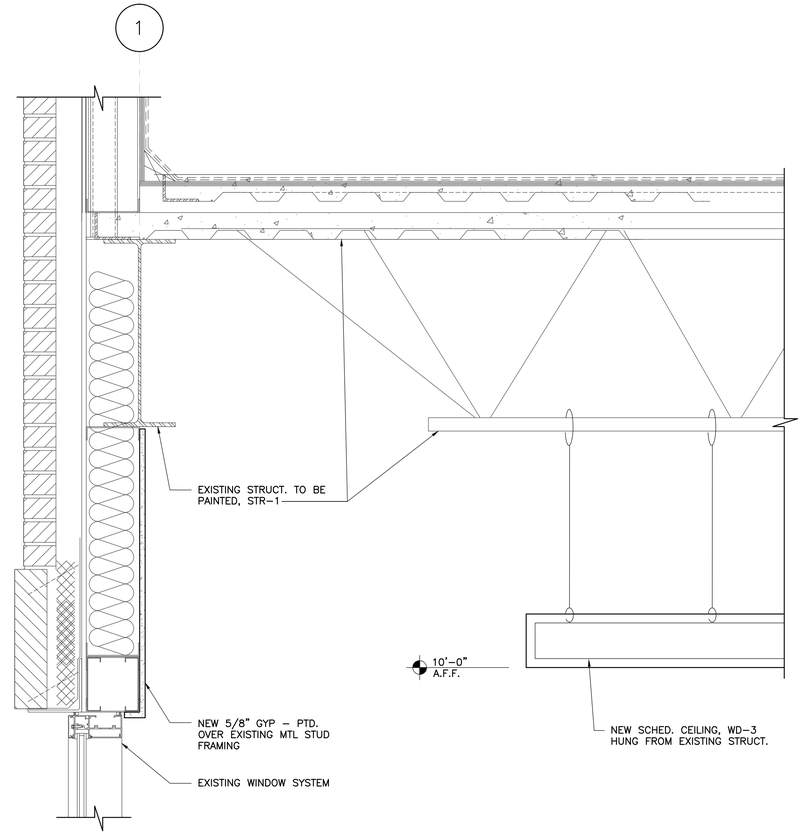
2

1. SEE ELECTRICAL DWG'S FOR LIGHT FIXTURE TYPES.
2. MECHANICAL DEVICES NOT SHOWN FOR CLARITY – REF. MECHANICAL
3. ALL CEILING ARE 2x2 CEILING TILE AND GRID U.N.O.
4. REFER TO SHEET A3.03 FOR FINISH SCHEDULE

GENERAL NOTES | NO SCALE | 3



CEILING DETAIL | 1 1/2" = 1'-0" | 11



CEILING DETAIL | 1 1/2" = 1'-0" | 1

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

SMITH&COMPANY
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SEAL:

PROJECT NAME :

DRENNAN CAMPUS
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

CEILING DETAILS

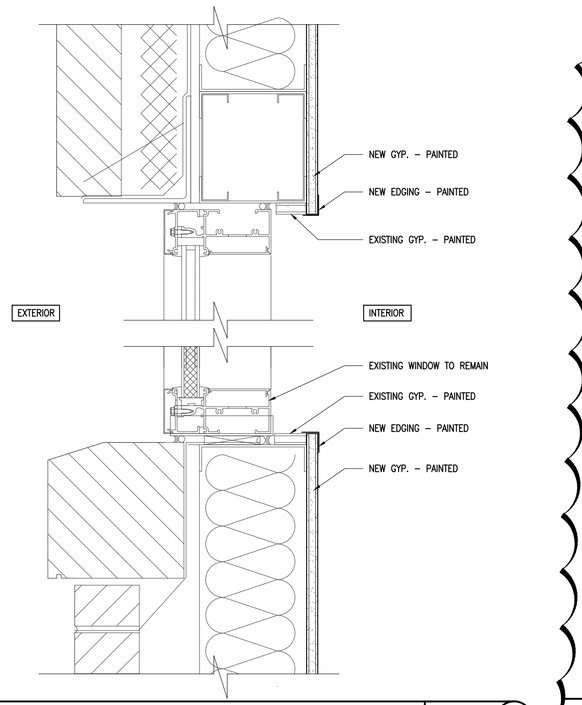
SHEET NO. :

A2.31

1. ALL EXISTING GYP ROUND INTERIOR FACE OF ALL EXISTING EXTERIOR WINDOWS TO BE PAINTED – REF. DETAIL 13/A3.00

GENERAL NOTE

NO SCALE (15)



TYP. EXISTING EXTERIOR WINDOW DETAIL

3"=1'-0" (13)

GLAZING SCHEDULE

GL-1 – 1/2 CLEAR FLOAT GLASS
- ALL INTERIOR GLASS TO BE TEMPERED
- FIRE RATED WHERE USED IN RATED DOOR ASSEMBLY

GL-2 – 3/8 CLEAR FLOAT GLASS
- ALL INTERIOR GLASS TO BE TEMPERED
- FIRE RATED WHERE USED IN RATED DOOR ASSEMBLY

GLAZING SCHEDULE

NO SCALE (10)

WD	WOOD SOLID CORE
ALUM	ALUMINUM
HM	HOLLOW METAL

MATERIAL ABBREVIATIONS

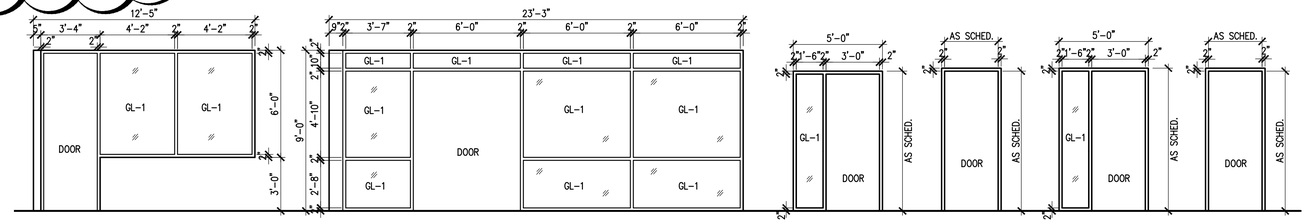
NO SCALE (5)

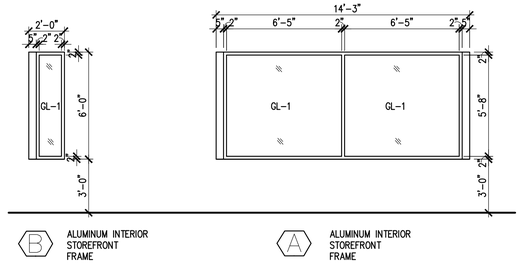
DOOR & FRAME SCHEDULE - LEVEL 3 FELIX FRAGA

ROOM NAME	DOOR NUMBER	DOOR WIDTH	DOOR HEIGHT	DOOR THICK	DOOR TYPE	DOOR MATL.	FRAME TYPE	FRAME MATL	DETAIL HEAD	DETAIL JAMB	DETAIL THRESHOLD	FIRE RATING	HDWE SET	REMARKS
LIBRARY	302A	6'-0"	7'-10"	1 3/4"	F1	ALUM	3	ALUM	1/A3.01	---	3B/A3.01	---		AUTOMATIC OPENER
OFFICE	302B	3'-0"	7'-10"	1 3/4"	G1	WD	6	ALUM	1/A3.01	2/A3.01	3B/A3.01	---		
STORAGE	302C	3'-0"	7'-10"	1 3/4"	A1	WD	1	ALUM	1/A3.01	2/A3.01	3A/A3.01	---		
LIBRARY	302D	6'-0"	7'-10"	1 3/4"	F1	ALUM	5	ALUM	1/A3.01	2/A3.01	3B/A3.01	---		
COMPUTER LAB	304	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3B/A3.01	---		
A+ CLASSROOM	305	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3B/A3.01	---		
CHEMISTRY CLASSROOM	306	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
BIOLOGY CLASSROOM	307	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
STAIR 309	309	---	---	---	---	---	---	---	---	---	---	60	---	EXISTING DOOR
SAMPLE PREP	310	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---	---	
PRE-ENGINEERING	311	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	1/A3.01	2/A3.01	3B/A3.01	---	---	
MECHANICAL	313	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
PLUMBING ROOM	314	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
STAIR C 315	315	---	---	---	---	---	---	---	---	---	---	60	---	EXISTING DOOR
TR	316	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
VESTIBULE	317A	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
ELECTRICAL	317B	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
JANITOR CLOSET	317C	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
PRE-ENGINEERING	318	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	1/A3.01	2/A3.01	3B/A3.01	---	---	
MATH CLASSROOM	319	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
MATH CLASSROOM	320	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
BUSINESS CLASSROOM	321	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3B/A3.01	---		
BUSINESS CLASSROOM	322	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3B/A3.01	---		
COMPUTER TECHNOLOGY	323	3'-0"	7'-10"	1 3/4"	C1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
LECTURE HALL	326A	6'-0"	7'-10"	1 3/4"	D1	WD	3	ALUM	6/A3.01	7/A3.01	3A/A3.01	60		
LECTURE HALL	326B	6'-0"	7'-10"	1 3/4"	D1	WD	3	ALUM	6/A3.01	7/A3.01	3A/A3.01	60		
STORAGE	327A	6'-0"	7'-10"	1 3/4"	F1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
STORAGE	327B	6'-0"	7'-10"	1 3/4"	F1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
MENS TOILET ROOM	330	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
WOMENS TOILET ROOM	331	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
STORAGE	332	3'-0"	7'-10"	1 3/4"	A1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
MOTHER'S ROOM	333	3'-0"	7'-10"	1 3/4"	A1	WD	2	HM	6/A3.01	7/A3.01	3A/A3.01	---		
WATER HEATER ROOM	335	---	---	---	---	---	---	---	---	---	---	---	---	EXISTING DOOR
PUMP ROOM	336	---	---	---	---	---	---	---	---	---	---	60	---	EXISTING DOOR
STORAGE	337	3'-0"	7'-10"	1 3/4"	A1	WD	1	HM	6/A3.01	7/A3.01	3A/A3.01	---		

DOOR AND FRAME SCHEDULE

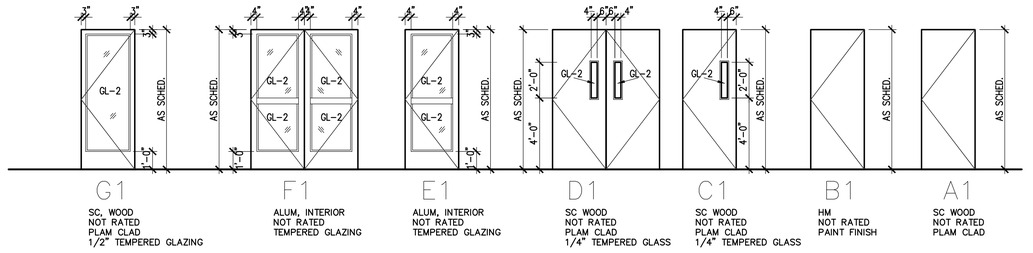
NO SCALE (3)





STOREFRONT WINDOW TYPES

1/4"=1'-0" (11)



DOOR AND FRAME TYPES

1/4"=1'-0" (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

SMITH&COMPANY ARCHITECTS
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SEAL:

PROJECT NAME :

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ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER

SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE : APRIL 22, 2013
PROJECT NO.: N012813
SCALE :
DRAWN BY : JAW
CHECKED BY : TDS

SHEET TITLE :

DOOR AND FRAME TYPES

DOOR AND FRAME SCHEDULED

SHEET NO. :

A3.00

PARTITION SCHEDULE

TYPE	DETAIL REFERENCE	BASE DETAIL	STRUC. WIDTH	OVERALL DIMENSION	INSULATION THICKNESS	NOTES
1A	1/A3.02	AS SCHED.	3 5/8"	4 7/8"	3"	
1B	1/A3.02	AS SCHED.	3 5/8"	4 7/8"	3"	
6A	6/A3.02	AS SCHED.	3 5/8"	4 7/8"	3"	
6B	6/A3.02	AS SCHED.	6"	7 1/4"	3	
11	12/A3.02	AS SCHED.	EXISTING	5/8" (NEW)	EXISTING	
12	12/A3.02	AS SCHED.	2 1/2"	4 1/4"	2"	
16	16/A3.02	AS SCHED.	3 5/8"	8 1/2"	3"	
18	18/A3.02	AS SCHED.	3 5/8"	8 1/2"	3"	

NOTES

A. ALL WOOD STUDS TO BE SPACED AT 1'-4" O.C., UNLESS NOTED OTHERWISE.

B. INSULATION COLUMN:
(1) --- INDICATES NO INSULATION TO BE PLACED IN PARTITION CAVITY.
(2) DIMENSION INDICATES THICKNESS OF SOUND ATTENUATION BLANKETS TO BE PLACED IN PARTITION CAVITY. ATTACH BLANKETS SECURELY IN WALL CAVITY TO PREVENT FALLING.

C. ALL GYPSUM BOARD TO BE 5/8" THICK, UNLESS NOTED OTHERWISE.

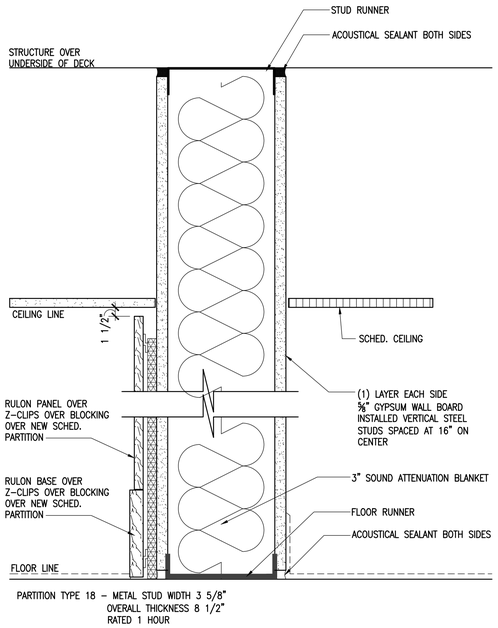
SPECIFIC NOTES

PARTITION SCHEDULE & NOTES — 3"=1'-0" (9)

GENERAL NOTES

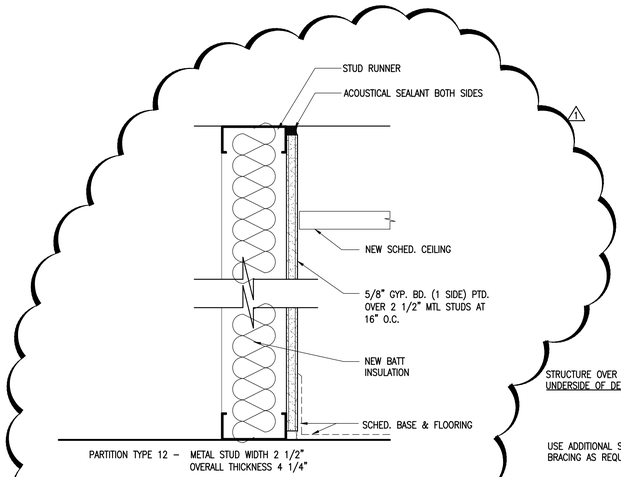
1. PARTITION TYPE DRAWINGS ARE NOT TO SCALE.
2. WALLS AND PARTITIONS ARE INTERIOR NON-BEARING SYSTEMS AND ARE NOT REQUIRED TO INTENDED TO RESIST WIND LOADS OR SUPPORT FLOOR LOADS (UNLESS OTHERWISE NOTED).
3. PARTITIONS ARE CONTINUOUS ACROSS DOORWAYS, OPENINGS AND ABUTTING PARTITIONS A TAG SHOWN IN ONE SEGMENT OF A PARTITION APPLIES TO ALL UNMARKED SEGMENTS THAT ARE IN LINE WITH AND CONTINUOUS WITH THE TAGGED SEGMENT.

GENERAL NOTES — 3"=1'-0" (4)



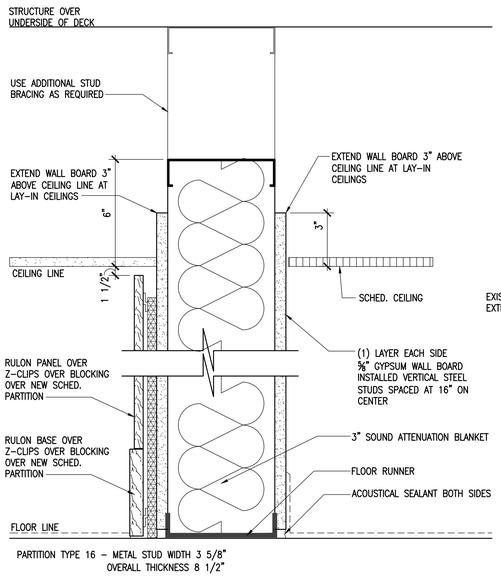
PARTITION TYPE 18 – METAL STUD WIDTH 3 5/8" OVERALL THICKNESS 8 1/2" RATED 1 HOUR

PARTITION TYPE 18 — 3"=1'-0" (18)



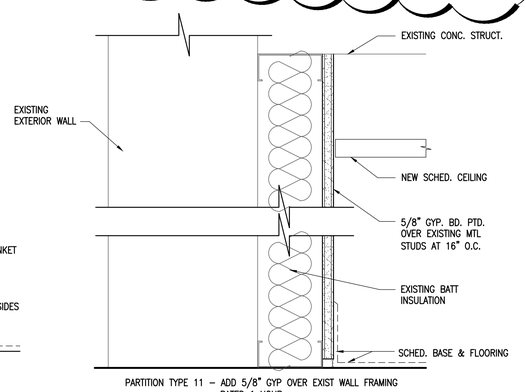
PARTITION TYPE 12 – METAL STUD WIDTH 2 1/2" OVERALL THICKNESS 4 1/4"

PARTITION TYPE 12 — 3"=1'-0" (12)



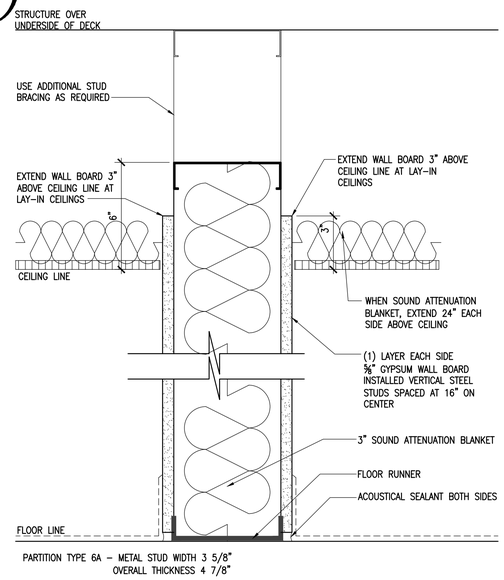
PARTITION TYPE 16 – METAL STUD WIDTH 3 5/8" OVERALL THICKNESS 8 1/2"

PARTITION TYPE 16 — 3"=1'-0" (16)



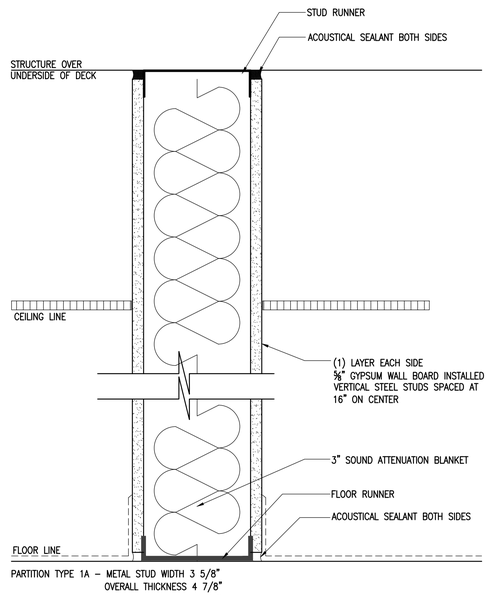
PARTITION TYPE 11 – ADD 5/8" GYP OVER EXIST WALL FRAMING RATED 1 HOUR

PARTITION TYPE 11 — 3"=1'-0" (11)



PARTITION TYPE 6A – METAL STUD WIDTH 3 5/8" OVERALL THICKNESS 4 7/8"

PARTITION TYPE 6A AND 6B — 3"=1'-0" (6)



PARTITION TYPE 1A – METAL STUD WIDTH 3 5/8" OVERALL THICKNESS 4 7/8"
PARTITION TYPE 1B – METAL STUD WIDTH 3 5/8" OVERALL THICKNESS 4 7/8" RATED 1 HOUR

PARTITION TYPE 1A AND 1B — 3"=1'-0" (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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SEAL:

REGISTERED ARCHITECT * LAWRENCE D. SMITH * STATE OF TEXAS 18438
5/13/2013

PROJECT NAME :

DRENNAN CAMPUS
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

PARTITION TYPES

SHEET NO. :

A3.02

RM. NO.	ROOM NAME	FLOOR	BASE	WALL					CEILING	CLG. HT.	REMARKS
				ALL	NORTH	EAST	SOUTH	WEST			
THIRD FLOOR											
316	TR	VCT-1	RB-1	PT-1					–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
302A	LIBRARY	CPT-1, 2	RB-1						–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
302B	OFFICE	CPT-2	RB-1	PT-3					–	OPEN	NOTE 1
315	STAIR C	CONC	RB-1	PT-5/CMU					–	OPEN	NOTE 8
302C	STORAGE	CPT-2	RB-1	T&F					–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
304	COMPUTER LAB	CPT-1, 2	RB-1		PT-1	PT-1	PT-2	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
314	PLUMBING ROOM	VCT-5	RB-1	PT-3					–	OPEN	
305	A+ CLASSROOM	VCT-3, 7	RB-1		PT-1	PT-1	PT-2	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
309	STAIR B	N/A	N/A	N/A					–	OPEN	NOTE 2, NOTE 8, NOTE 15.
306	CHEMISTRY TEACHING LAB	VCT-3,1&6	RB-1		PT-1	PT-1	PT-2	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
313	MECHANICAL ROOM	VCT-5	RB-1	PT-1					–	OPEN	
307	BIOLOGY TEACHING LAB	VCT-3, 2&5	RB-1		PT-3	PT-1	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
336	PUMP ROOM	VCT-5	RB-1	PT-1					–	OPEN	
317A	VESTIBULE	VCT-5	RB-1	PT-1					–	OPEN	
317B	ELECTRICAL	VCT-5	RB-1	PT-1					–	OPEN	
317C	JANITOR	VCT-5	RB-1	PT-1					–	OPEN	CWT-1 AT WET WALLS
335	WATER HEATER ROOM	VCT-5	RB-1	PT-1					–	OPEN	NOTE 15, NOTE 16.
311	PRE-ENGINEERING	VCT-3, 4&1	RB-1		PT-3	PT-1	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
310	SAMPLE PREP	VCT-3	RB-1		PT-1	PT-3	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
338	STAIR D	N/A	N/A	N/A					–	OPEN	NOTE 2, NOTE 8, NOTE 15.
318	PRE-ENGINEERING	VCT-1-7	RB-1		PT-1	PT-3	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
319	MATH CLASSROOM	VCT-1/4	RB-1		MK-1	PT-3	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
330	MENS RESTROOM	N/A	N/A	N/A					N/A	9'-0"	
331	WOMENS RESTROOM	N/A	N/A	N/A					N/A	9'-0"	
329	RESTROOM VESTIBULE	N/A	N/A	N/A					N/A	9'-0"	
320	MATH CLASSROOM	VCT-3, 2&7	RB-1		PT-3	MK-1	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
321	BUSINESS CLASSROOM	VCT-3, 4&5	RB-1		PT-3	PT-1	PT-1	PT-1	–	OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
322	BUSINESS CLASSROOM	VCT-3 1&2	RB-1		PT-3	PT-1	PT-1	PT-1		OPEN	NO GYP. BD. ON EXTERIOR WALLS, NOTE 18.
323	COMPUTER TECHNOLOGY	VCT-3 1&2	RB-1		PT-3	PT-1	PT-1	PT-1		9'-0"	
326	LECTURE HALL	CPT-1 & 2	WB-1/RB-1	PT-1						9'-0"	
327	STORAGE	VCT-5	RB-1	PT-1						9'-0"	
337	STORAGE	VCT-5	RB-1	PT-1						9'-0"	
332	STORAGE	VCT-5	RB-1	PT-1						9'-0"	
333	MOTHER'S ROOM	VCT-5	RB-1	PT-1						9'-0"	
325	CORRIDOR	VCT-5	RB-1	PT-2							
328	CORRIDOR	VCT-5	RB-1	PT-2							
324	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
334	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
301	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
303	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
308	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
312	CORRIDOR	VCT-5	RB-1	PT-2						9'-0"	
300	LOBBY	VCT-1,4,5,6&7	RB-1	PT-2						9'-0"	

ROOM FINISH SCHEDULE — NO SCALE — 4

MATERIALS AND FINISHES

FLOOR FINISHES

VCT-1 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-234
- SIZE: 12"x12"x1/8"
- COLOR: PINCH OF SALT
- REMARKS:

VCT-2 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-2605
- SIZE: 12"x12"x1/8"
- COLOR: BUTTERNUT
- REMARKS:

VCT-3 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-222
- SIZE: 12"x12"x1/8"
- COLOR: STONEBED
- REMARKS:

VCT-4 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-243
- SIZE: 12"x12"x1/8"
- COLOR: ADIRONDACK BLUE
- REMARKS:

VCT-5 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-220
- SIZE: 12"x12"x1/8"
- COLOR: CAST PEWTER
- REMARKS:

VCT-6 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-229
- SIZE: 12"x12"x1/8"
- COLOR: SHUTTLE GREY
- REMARKS:

VCT-7 VINYL COMPOSITION TILE
- LOCATION: LOBBY, MULTI-PURPOSE ROOM
- MFR/NAME/NO./: JOHNSONITE/AZROCK/ V-214
- SIZE: 12"x12"x1/8"
- COLOR: ASHES
- REMARKS:

CPT-1 CARPET TILE
- LOCATION: LECTURE HALL, LIBRARY, OFFICE, COMPUTER LAB 304
- MFG/NAME/NO.: MILLIKEN/ SIMPLY THAT/AMBIANCE 37
- COLOR: SIMPLY INSPIRED/ AMBIANCE 37
- CONTENT: SOLUTION DIED
- INSTALLATION:
- SIZE: 36" X 36"

CPT-2 CARPET TILE
- LOCATION: LECTURE HALL, LIBRARY, OFFICE, COMPUTER LAB 304
- MFG/NAME/NO.: MILLIKEN/THEORY/ P-6387
- COLOR: BUP-412 CAMEL
- CONTENT: SOLUTION DIED
- INSTALLATION:
- SIZE: 36" X 36"

WALL FINISHES

PT-1 WALL PAINT
- LOCATION: GENERAL
- MFR/NAME/NO./: PITTSBURGH PAINTS/ VOICE OF COLOR
- TYPE: LATEX ENAMEL
- COLOR: 416-1; MOUNTAIN GRAY
- FINISH: SATIN
- REMARKS:

PT-2 WALL PAINT
- LOCATION: CORRIDORS, LIBRARY & OFFICE
- MFR/NAME/NO./: PITTSBURGH PAINTS/ VOICE OF COLOR
- TYPE: LATEX ENAMEL
- COLOR: 416-3; GRAY BEIGE
- FINISH: SATIN
- REMARKS:

PT-3 WALL PAINT
- LOCATION: LECTURE HALL, CLASSROOM ACCENT WALLS
- MFR/NAME/NO./: PITTSBURGH PAINTS/ VOICE OF COLOR
- TYPE: LATEX ENAMEL
- COLOR: 416-4; STONINGTON
- FINISH: SATIN
- REMARKS:

PT-4 WALL PAINT
- LOCATION: LECTURE HALL ACCENT PAINT
- MFR/NAME/NO./: PITTSBURGH PAINTS/ VOICE OF COLOR
- TYPE: LATEX ENAMEL
- COLOR: 416-5; OYSTER SHELL
- FINISH: SATIN
- REMARKS:

PT-5 WALL PAINT
- LOCATION: LECTURE HALL ACCENT
- MFR/NAME/NO./: PITTSBURGH PAINTS/ VOICE OF COLOR
- TYPE: LATEX ENAMEL
- COLOR: 454-5; BARITONE
- FINISH: SATIN
- REMARKS:

MK-1 MARKER BOARD
- LOCATION: MATH CLASSROOMS 319 & 320
- MFG/NAME/NO./: KOROSEAL/ WALLTALKERS/
- TYPE: FLOOR TO CEILING
- SIZE:
- COLOR: WHITE
- REMARKS:

WD-1 WOOD WALL
- LOCATION: LECTURE HALL
- MFR/NAME/NO./: ARMSTRONG/ CERTIFIED WOODWORKS TEGULAR/ 6487 W4 NLC/ WITH ACOUSTICAL FLEECE
- COLOR: NATURAL VARIATIONS LIGHT CHERRY
- TRIM/ACCESSORIES: 4" WOODWORKS TRIM W/ ALUM. SUB./ 5659 W1 NLC
- SUSPENSION: 15/16" VECTOR PRELUDE
- REMARKS: SEE FINISH PLANS FOR WALLS RECEIVING FINISH REFER TO ELEVATIONS FOR PATTERN. A202

WD-2 WOOD WALL

CEILING FINISHES

ACT-1 ACOUSTICAL CEILING TILE
- LOCATION: CORRIDORS 101A, 101B, 103, 105
- MFR/NAME/NO./: USG/ OLYMPIA MICRO CLIMA PLUS PANELS/4231
- GRID: FINELINE DXF 2' x 2' x 5/8" GRID
- COLOR: WHITE
- FINISH:
- REMARKS:

WD-3 WOOD CEILING
- LOCATION: LECTURE HALL
- MFR/NAME/NO./: ARMSTRONG/ CERTIFIED WOODWORKS TEGULAR/ 6487 W4 NLC/ WITH ACOUSTICAL FLEECE
- COLOR: NATURAL VARIATIONS LIGHT CHERRY
- TRIM/ACCESSORIES: 4" WOODWORKS TRIM W/ ALUM. SUB./ 5659 W1 NLC
- SUSPENSION: 15/16" VECTOR PRELUDE
- REMARKS: INCLUDE HANGER WIRE FOR SUSPENSION

GYP-2 PAINTED GYPSUM
- LOCATION: LECTURE HALL
- MFR/NAME/NO./:
- COLOR:
- FINISH: SATIN
- REMARKS:

STR-1 PAINTED STRUCTURE
- LOCATION: LECTURE HALL
- MFR/NAME/NO./: PITTSBURGH PAINT/VOICE OF COLOR
- COLOR: 518-7; BLACK MAGIC
- FINISH: SATIN
- REMARKS:

BASE FINISHES

RB-1 RUBBER BASE
- LOCATION: GENERAL
- MFR/NAME/NO./: ROPPE
- HEIGHT: 4"
- FINISH: 110; BROWN
- COLOR:
- REMARKS:

WB-1 WOOD BASE
- LOCATION: LECTURE HALL
- MFR/NAME/NO./: ARMSTRONG
- HEIGHT: 4"
- COLOR: TBA
- REMARKS:

MILLWORK

WD-1 ACCOUSTIC WOOD PANEL
- LOCATION: LECTURE HALL
- MFR/NAME/NO./: ARMSTRONG
- FINISH:
- SIZE: 2'H x 8'L
- REMARKS:

MATERIAL AND FINISH SCHEDULE — NO SCALE — 1

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDUM 1

SMITH & COMPANY ARCHITECTS
1500 MCGOWEN ST. SUITE 150
HOUSTON, TEXAS 77004
PHONE: 713-524-4202
FAX: 713-524-4071
www.sc-arch.com

SEAL:

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

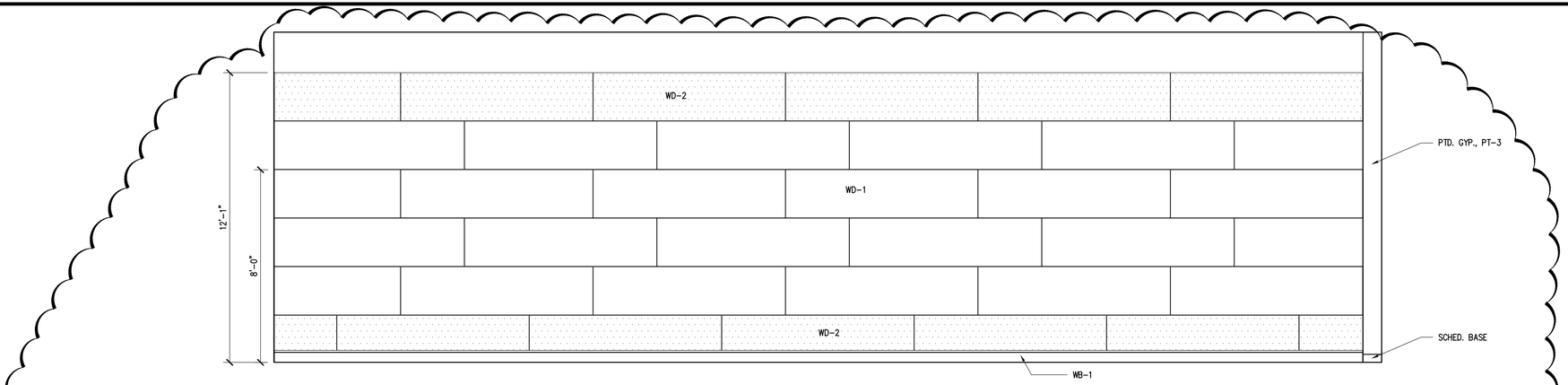
DATE : APRIL 22, 2013
PROJECT NO.: N012813
SCALE :
DRAWN BY : JAW
CHECKED BY : TDS

SHEET TITLE :

MATERIAL AND FINISH SCHEDULE

SHEET NO. :

A3.03

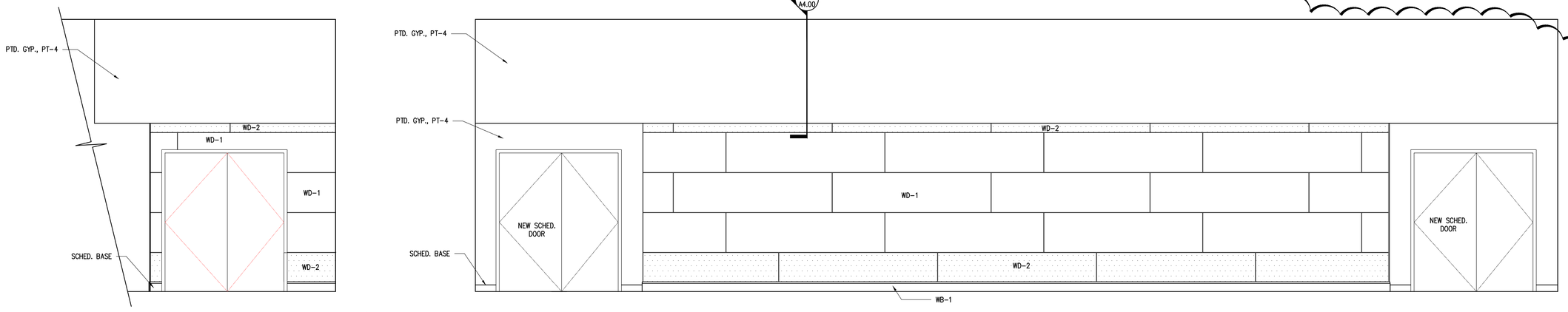


INTERIOR ELEVATION @ RM. 326 — 3/8"=1'-0" (9)

GL-1 – 1/2 CLEAR FLOAT GLASS
– ALL INTERIOR GLASS TO BE TEMPERED
– FIRE RATED WHERE USED IN RATED DOOR ASSEMBLY

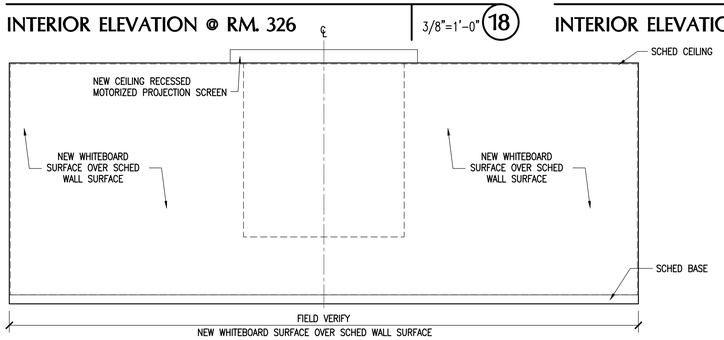
GL-2 – 3/8 CLEAR FLOAT GLASS
– ALL INTERIOR GLASS TO BE TEMPERED
– FIRE RATED WHERE USED IN RATED DOOR ASSEMBLY

GLAZING SCHEDULE — NO SCALE (4)

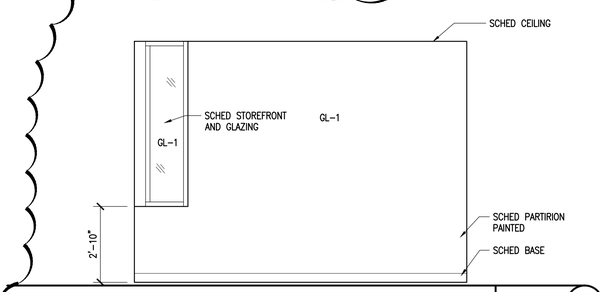


INTERIOR ELEVATION @ RM. 326 — 3/8"=1'-0" (18)

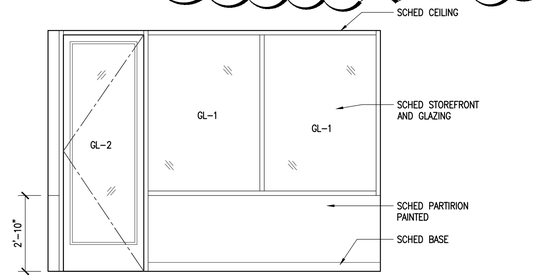
INTERIOR ELEVATION @ RM. 326 — 3/8"=1'-0" (3)



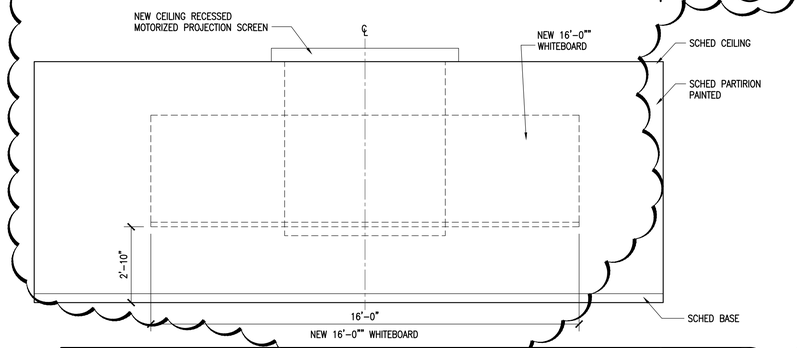
TYPICAL TEACHING WALL @ MATH CLASSROOM — 3/8"=1'-0" (17)



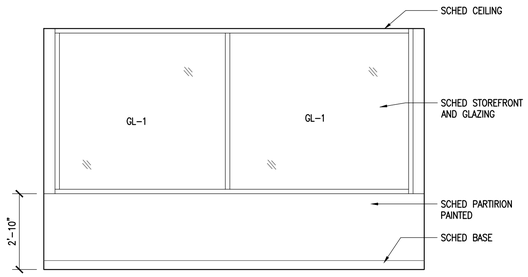
INTERIOR ELEVATION @ RM. 302B — 3/8"=1'-0" (12)



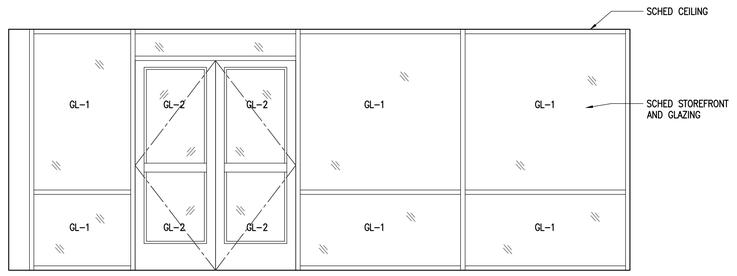
INTERIOR ELEVATION @ RM. 302B — 3/8"=1'-0" (2)



TYPICAL TEACHING WALL — 3/8"=1'-0" (16)



INTERIOR ELEVATION @ RM. 302B — 3/8"=1'-0" (11)



INTERIOR ELEVATION @ RM. 302A — 3/8"=1'-0" (1)

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

SMITH&COMPANY
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1500 MCGOWEN ST. SUITE 150
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SEAL:

PROJECT NAME :

DRENNAN CAMPUS
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

INTERIOR ELEVATIONS

SHEET NO. :

A4.00

SYMBOL LIBRARY

TOP VIEW	FRONT VIEW	SIDE VIEW	DESCRIPTION
			DATA/VOICE – WALL MOUNT
			DATA/VOICE – BENCH MOUNT
			ELECTRICAL CIRCUIT SYMBOL 120V – WALL MOUNT
			ELECTRICAL CIRCUIT SYMBOL 220V – BENCH MOUNT
			ELECTRICAL CIRCUIT SYMBOL 120V – BENCH MOUNT
			EYEWASH – BENCH MOUNT
			DOUBLE TURRET – BENCH MOUNT
			SINGLE TURRET – BENCH MOUNT
			VALVE – BENCH MOUNT
			HOT/COLD WATER (HCW) FAUCET
			DEIONIZED WATER (DI) FAUCET
			COLD WATER (CW) PANEL MOUNT (IN HOOD)
			CUP SINK (CS)
			EPOXY RESIN SINK
			PEGBOARD
			SNORKEL (ADJUSTABLE)
			DIRECT CONNECT
			EYEWASH/SAFETY SHOWER – FLOOR MOUNT
			FUMEHOOD
			HOOD ENCLOSURE
			TURRET – PANEL MOUNT (IN HOOD)
			VALVE
			FUME HOOD REMOTE CONTROL HANDLE USED AT FUME HOODS
			DOUBLE COLD WATER TURRET – BENCH MOUNT
			SINGLE COLD WATER TURRET – BENCH MOUNT

CASEWORK / FUME HOOD SPECIFICATIONS

CASEWORK
- All Casework shown on the Plans and Elevations will be:
- Wood Casework manufactured by Mott Manufacturing Co. or approved.
  - Cabinet Door and Drawer cores will be Particle Board Plywood.
  - Standard Overlay Reveal.
  - Standard front and back rail cabinets.
  - Standard full extension drawer slides.
  - Door & Cabinet Pulls – standard Option 62'
  - Door / Hinges – standard Option 20.
  - Door Pull – configuration 1 standard.
  - Door Catches – standard roller.
  - Lock Type – Option LK4.

- All casework Tops and Splashes will be modified epoxy resin.
  - All tops will be factory cut for all necessary openings for all mechanical / electrical & plumbing fixtures.
  - All mechanical / electrical & plumbing fixtures will be as shown on the MEP Drawings and Specifications.

- Approved Wood Casework vendors are:
  - Kewanee Scientific (Hallmark)
  - Halderman Homme

- All Exhaust Fume Hoods shown on the Plans and Elevations will be:
- Thermo Scientific Hamilton / SafeAire II restricted bypass superstructure of approved equal
  - Fume Hood Size 72" unless noted otherwise.
  - Collar size 6" X 23"
  - 100 FPM vertical sash – 18" opening / 785 FPM – SP 0.13
  - All Fume Hoods shall have Ceiling Closure Panels provided by the Hood Manufacture. Coordinate height of closure panel with actual ceiling heights.

- All Fume Hood Tops and Splashes will be modified epoxy resin.
  - All tops will be factory cut for all necessary openings for all mechanical / electrical & plumbing fixtures.
  - All mechanical / electrical & plumbing fixtures will be as shown on the MEP Drawings and Specifications.

- Approved Fume Hood vendors are:
  - Mott Manufacturing Co.
  - Kewanee Scientific (Hallmark)

All Biological Safety Cabinets shown on the Plans and Elevations will be:.
Labconco – Purifier Logic + Class II complete with hood and leg assemblies.
- Include all lights, electrical outlets, stainless steel tops and surfaces.
- BSC Hood to be ADA–Compliant and will include all service fixtures and utilities as shown on the MEP Drawings and Specifications.

TURNKEY INSTALLATION SPECIFICATIONS: (PROVIDED BY LABORATORY CASEWORK/FUME HOOD MANUFACTURER/SUBCONTRACTOR.

ERECTION
- Take field measurements so that factory can fabricate tops and other items of equipment to fit space allotted.
- Unload all items of laboratory equipment at jobsite.
- Inspect all items for visible and concealed damage (report any damage to carrier). Inspect all tops for chips and breakage. Inventory all items (report shortages in writing).
- Move to proper location where equipment is to be installed. Set, level, anchor and scribe to walls.
- Furnish hangers, fasteners, compounds and silicones necessary to secure each piece of equipment to walls, floors and ceilings. Set mechanical fixtures, large sinks and cup sinks and electrical fixtures permanently in place.
- Supply and install base molding on laboratory equipment to match building cove molding.

SANITARY DRAIN SYSTEM
- Supply and install epoxy sinks, sink strainers, traps and drain line material from opening in sink to point of rough–in within each assembly.
- Cup sinks shall be provided with APG traps; all other sinks shall be provided with non–siphoning APG drum traps.
- RE to MEP Plans and Specifications for all drain line materials.

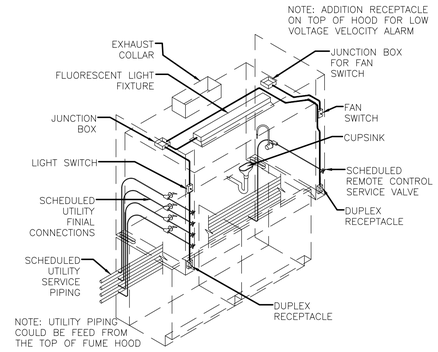
SERVICE PIPING
- Furnish service piping from shank on each fixture to point of rough–in.
- Rough–in shall be provided with cut–off valve one time for each service within each assembly of equipment.

ELECTRICAL
- Furnish electrical conduit and wiring from each receptacle to junction box within each assembly. This includes interlocking blower with blower switch and light with light switch for fume hoods. Also includes disconnect switches and motor starters as required for each blower.
- All wiring to be in accordance with the current issue of the National Electric Code and/or specifications for this project.

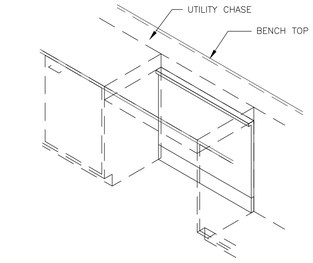
DUCT AND BLOWER SYSTEM
- Hole in roof and duct flashing shall be provided as required by General Contractor.
- Set exhaust blower(s) permanently in place, furnishing blower foundation and vibration isolators.
- Furnish Fume Hood and exhaust BSC exhaust duct from collar on hood to blower and from blower to atmosphere. A Zero Static Pressure Loss Stack head (ZSPL) will be attached to the outlet of the exhaust fan.
- RE to MEP Plans and Specifications for all exhaust duct material.
- Perform fume hood certification in accordance with the ASHRAE / ANSI Z9.5 procedure. Adjust exhaust blower to produce 100 fpm average face velocity. Submit hood certification chart on each hood to Owner. Attach one certification sticker to face of each hood.

MISCELLANEOUS
- Clean, test and adjust ready for use.
- Remove all trash and put in dumpster, dumpster provided by others.
- One year warranty on work.

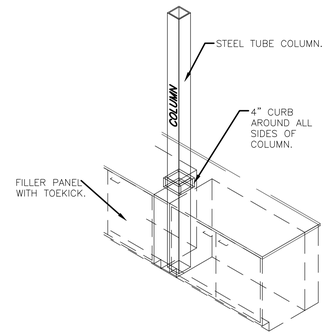
WORK BY OTHERS
- Rough–in of services as noted.
- Grounds in wall for support of wall cases or shelving.
- Properly vented drain rough–ins.



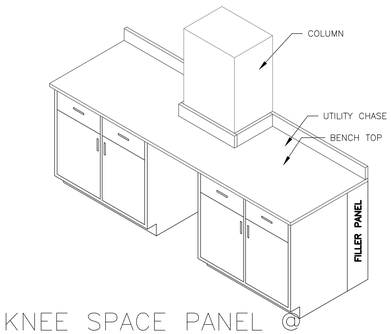
TYPICAL FUME HOOD UTILITY ARRANGEMENT SCALE = NTS



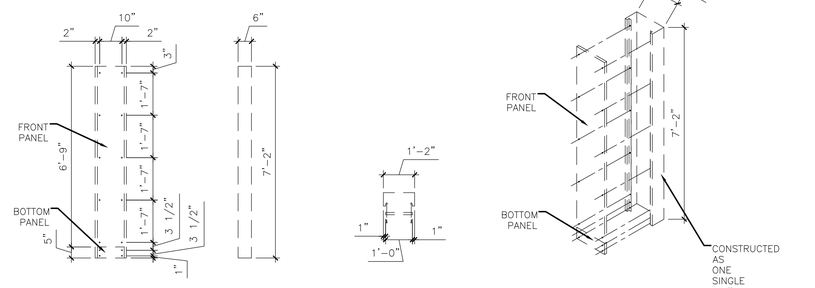
KNEE SPACE PANEL SCALE = NTS



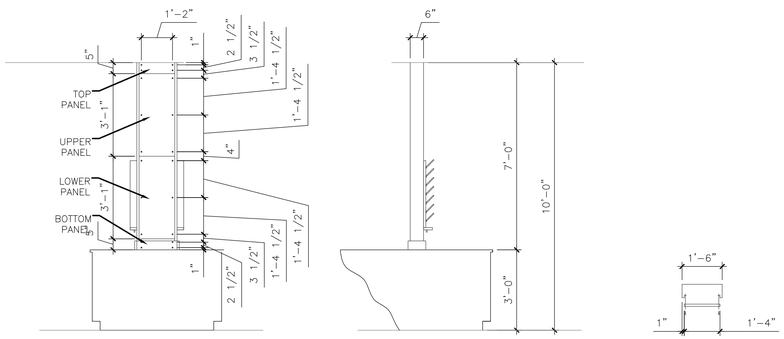
COLUMN/CASEWORK INTERSECTION SCALE = NTS



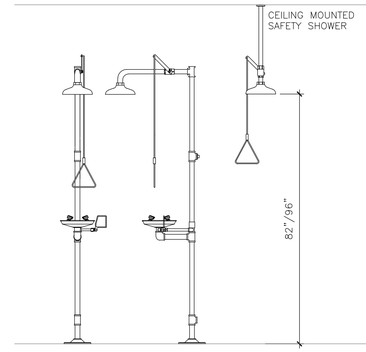
KNEE SPACE PANEL @ COLUMN SCALE = NTS



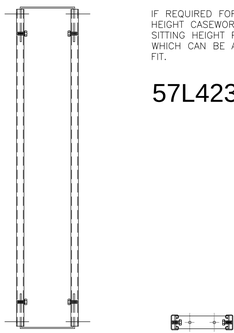
BENCH TOP TO CEILING UTILITY CHASE SCALE = NTS



DETAIL – BENCHTOP TO CEILING UTILITY CHASE SCALE = NTS



SAFETY SHOWER / EYE WASH SCALE = NTS



IF REQUIRED FOR ADA HEIGHT CASEWORK, USE SITTING HEIGHT PRODUCT WHICH CAN BE ADJUSTED TO FIT.

57L42300

SECTION/ELEVATION VIEW PLAN VIEW

STRUT ASSEMBLY SCALE = NTS

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

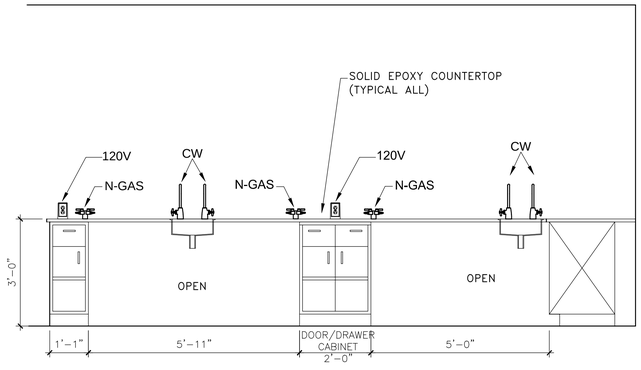
DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

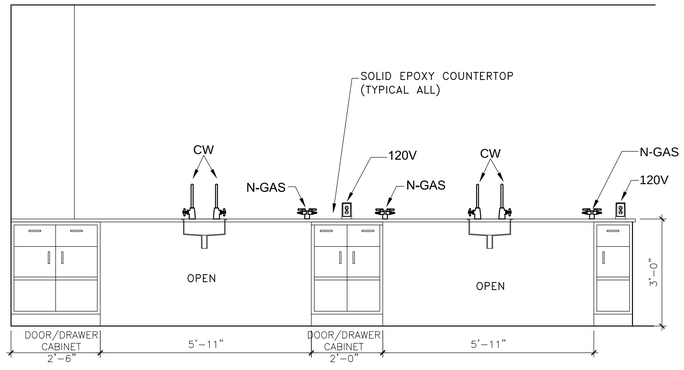
SCHEDULE, LEGENDS & GENERAL NOTES

SHEET NO. :

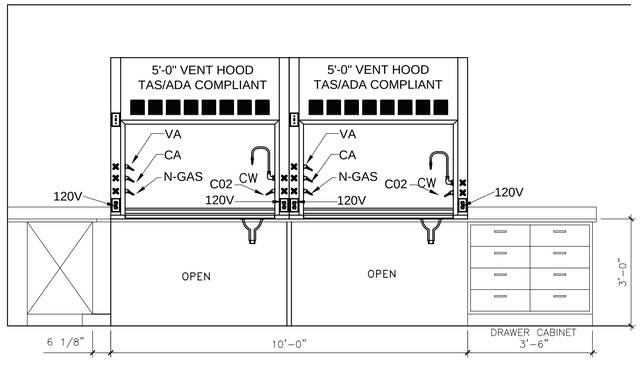
A4.01



LAB CASEWORK ELEVATION 1/4" = 1'-0" 19



LAB CASEWORK ELEVATION 1/4" = 1'-0" 9



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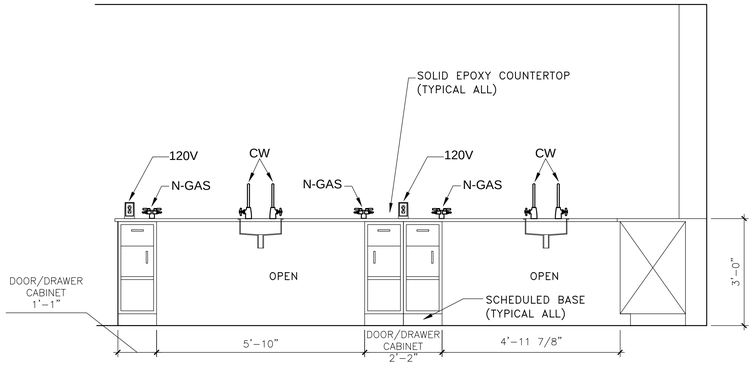

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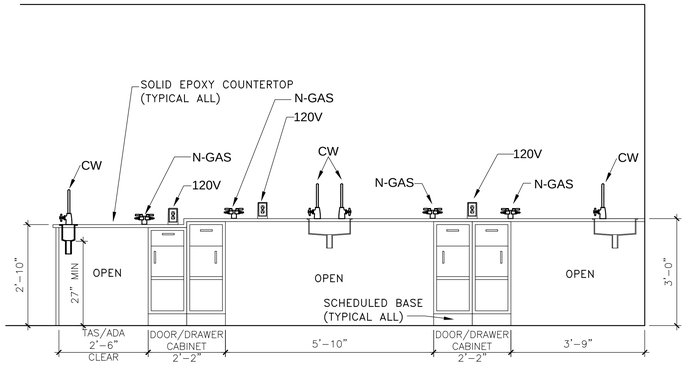
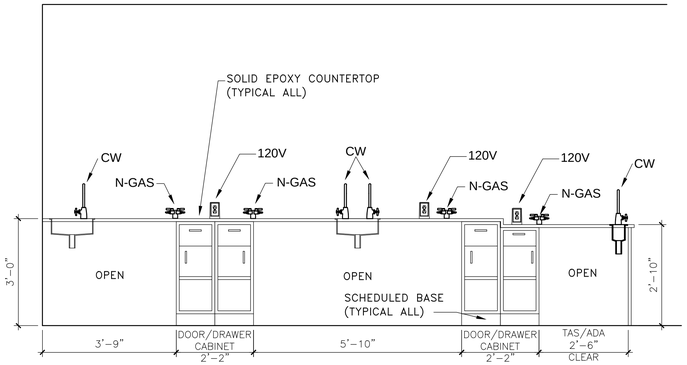
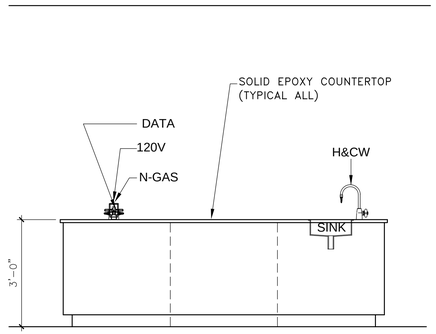


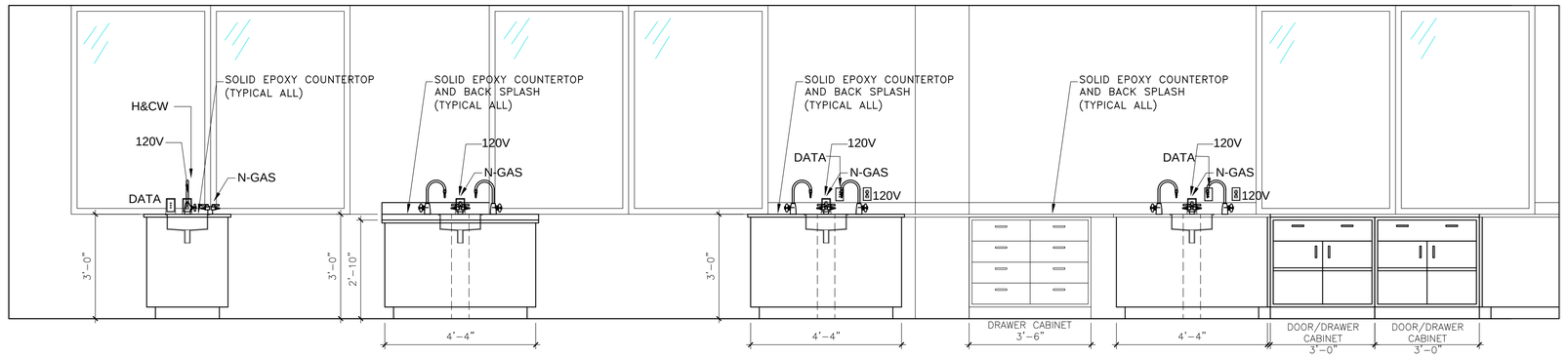
LAB CASEWORK ELEVATION 1/4" = 1'-0" 8



LAB CASEWORK ELEVATION 1/4" = 1'-0" 3



LAB CASEWORK ELEVATION 1/4" = 1'-0" 17



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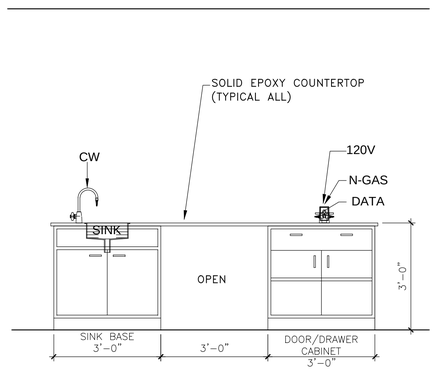

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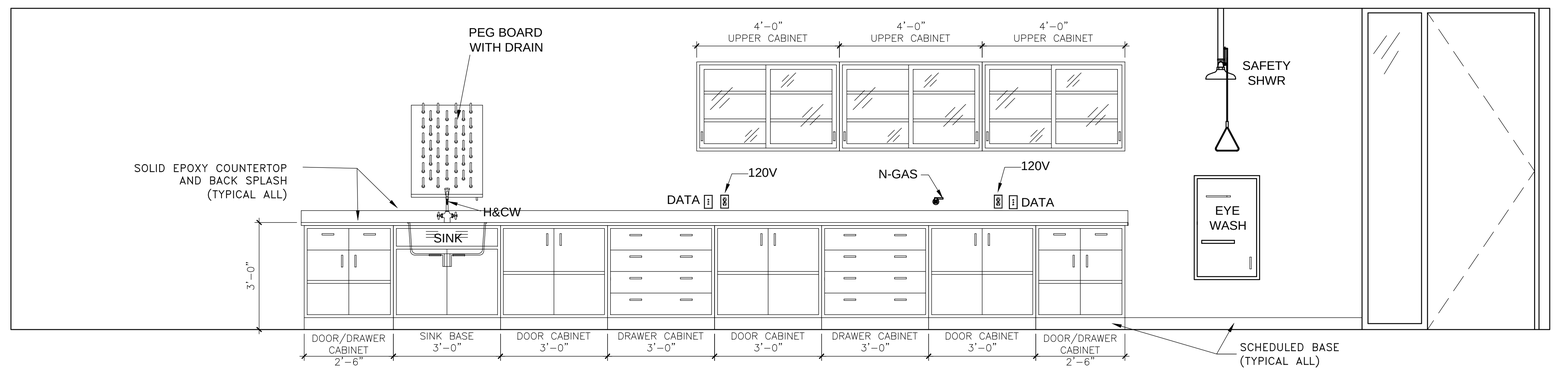

LAB CASEWORK ELEVATION 1/4" = 1'-0" 1

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5-13-2013	ADDENDUM 1

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SEAL:

REGISTERED ARCHITECT
LAWRENCE D. SMITH
18436
STATE OF TEXAS
5/13/2013

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

HCC

KEY MAP:

REVIEWED:

PROJECT MANAGER

SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	JAW
CHECKED BY :	TDS

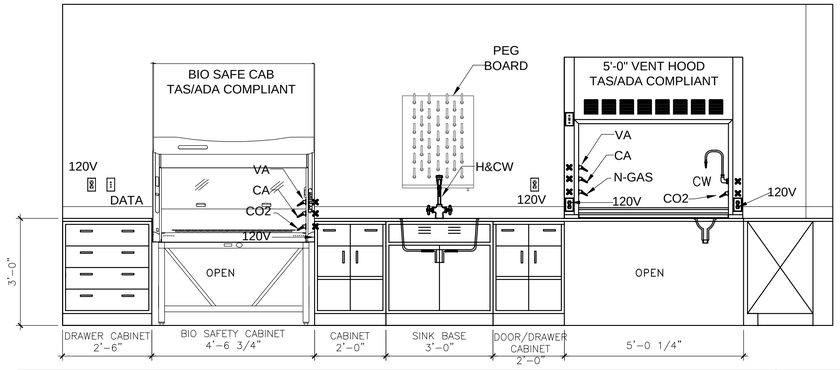
SHEET TITLE :

INTERIOR LAB
CASEWORK ELEVATIONS

1

SHEET NO. :

A4.02



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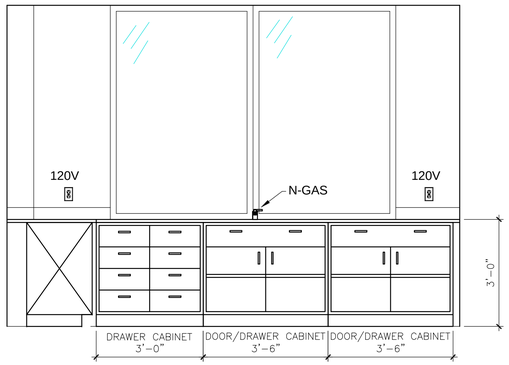

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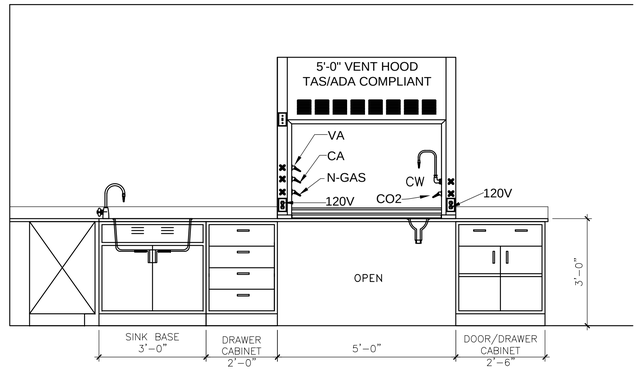

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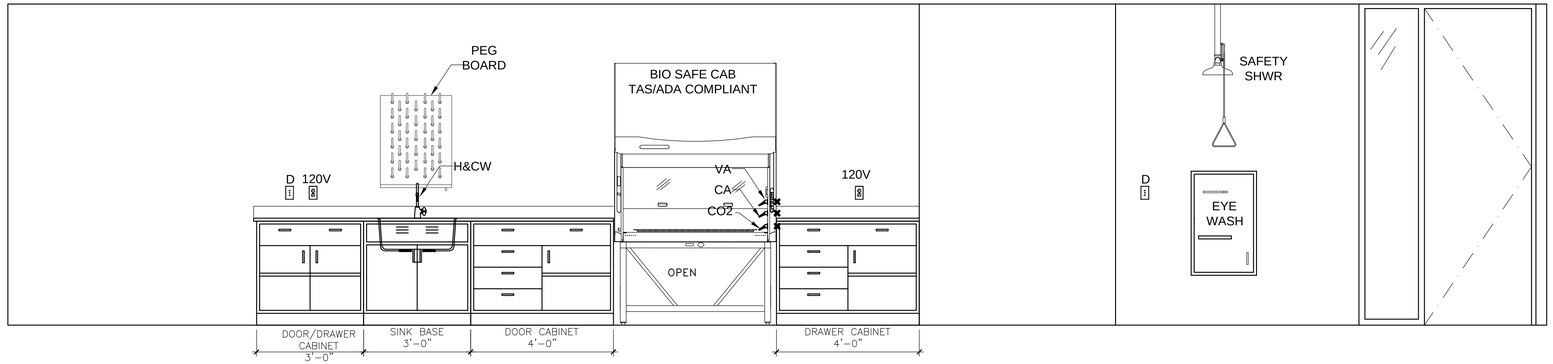

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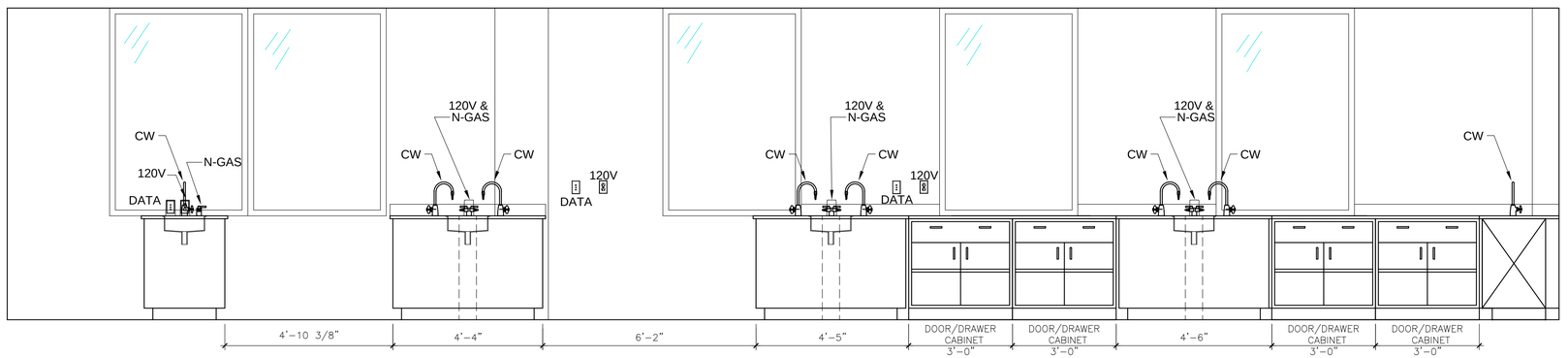

LAB CASEWORK ELEVATION — 1/4" = 1'-0" (1)

ISSUE LOG

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REGISTERED ARCHITECT — LAWRENCE D. SMITH — 16436 — STATE OF TEXAS

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PROJECT MANAGER

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SCALE :	VARIES
DRAWN BY :	JAW
CHECKED BY :	TDS

SHEET TITLE :

INTERIOR LAB
CASEWORK ELEVATIONS

SHEET NO. :

A4.03

LUMINAIRE SCHEDULE

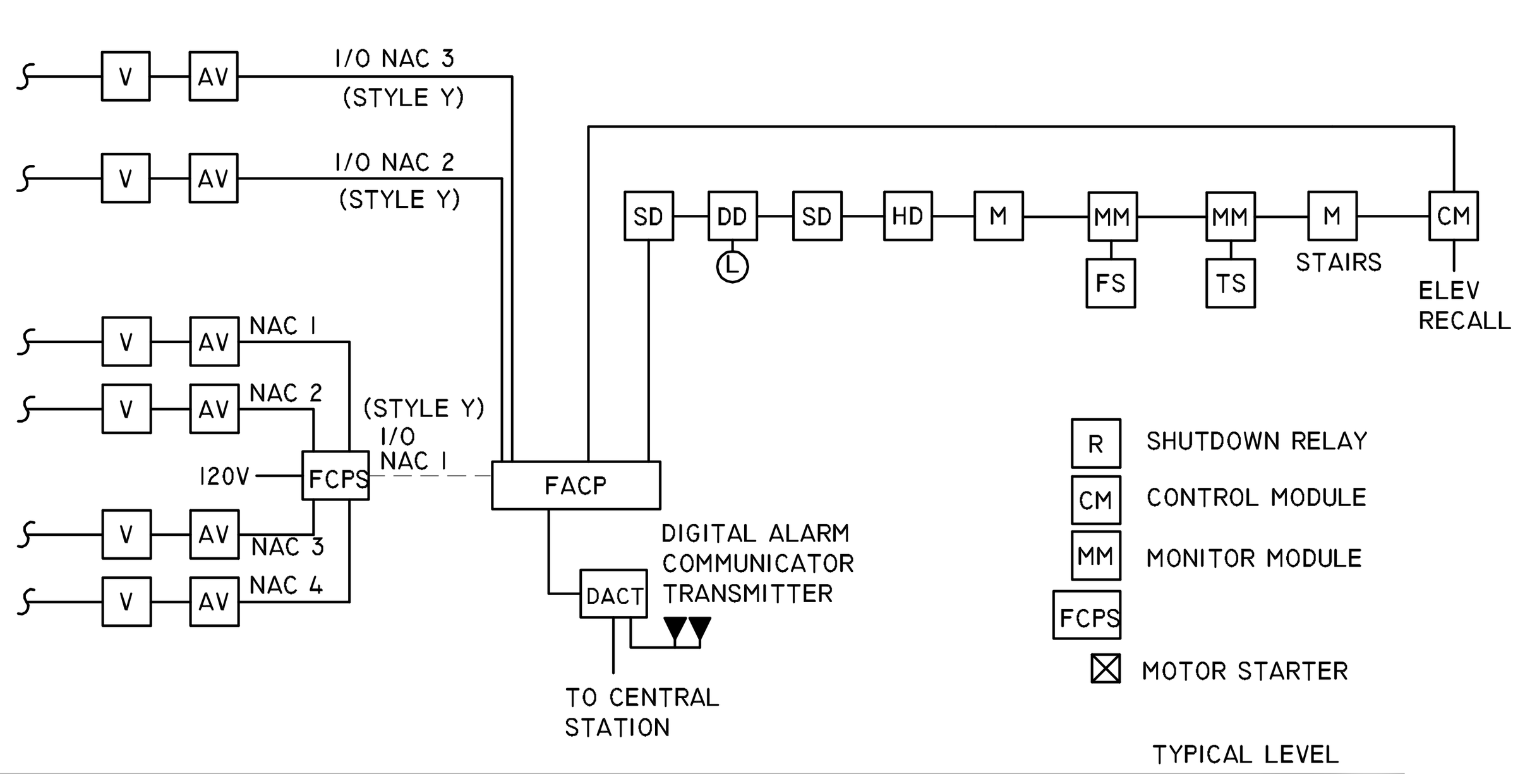
HCC - FRAGA

TYPE	DESCRIPTION	LAMPS	VOLTS	WATTS	MOUNTING	MANUFACTURERS
A	2'X4' RECESSED FLUORESCENT SPECIFICATION GRADE PARABOLIC TROFFER. STATIC-AIR, GRID TRIM, 3-LAMP, 18-CELL PARABOLIC LOUVER, DUAL ELECTRONIC BALLASTS.	(3) T8 FO32/850/XP/ECO 4100°K 85 CRI	MV	88	GRID RECESSED	LITHONIA #2PM3NGB332 18LD 277 GEB10RS
AE	SAME AS FIXTURE "A" ABOVE EXCEPT: PROVIDE GTD PROVIDE NON-SWITCHED NORMAL AND EMERGENCY FEEDS TO GTD	(3) T8 FO32/850/XP/ECO 4100°K 85 CRI	MV	88	GRID RECESSED	LITHONIA #2PM3NGB332 18LD 277 GEB10RS
A2	2'X4' RECESSED FLUORESCENT SPECIFICATION GRADE LENSED TROFFER. STATIC-AIR, 2-LAMP, FLUSH STEEL WHITE FRAME, 0.125" THICK ACRYLIS DIFFUSER.	(2) T8 FO32/850/XP/ECO 85 CRI	MV	58	GRID RECESSED	LITHONIA #2SP8G232 A12125 277 GEB10RS
A2E	SAME AS FIXTURE "A2" ABOVE EXCEPT: PROVIDE GTD PROVIDE NON-SWITCHED NORMAL AND EMERGENCY FEEDS TO GTD	(2) T8 FO32/850/XP/ECO 85 CRI	MV	58	GRID RECESSED	LITHONIA #2SP8G232 A12125 277 GEB10RS
B	30" ROUND 12"DEEP PENDANT MOUNTED FIXTURE WITH WHITE WHITE SWIRL ACRYLIC LENS AND STAINLESS POWDERED COAT FINSH.		120			RENAISSANCE RL-717
B2	56" ROUND 12"DEEP PENDANT MOUNTED FIXTURE WITH WHITE FROSTED ACRYLIC LENS AND BRUSHED NICKEL FINISH.		120		GRID RECESSED	RENAISSANCE RL-717
C	4" DIAMETER COMPACT FLUORESCENT DOWNLIGHT FIXTURE. VERTICAL LAMP, SEMI-SPECULAR FINISH OPEN REFLECTOR, WHITE PAINTED FLANGE, ELECTRONIC BALLAST.	26W-TRT	MV	58	FLANGE RECESSED	LITHONIA, GOTHAM #AFV26TRT 4AR 277 TRW GEB10RS
C1	6" DIAMETER COMPACT FLUORESCENT DOWNLIGHT FIXTURE. VERTICAL LAMP, SEMI-SPECULAR FINISH OPEN REFLECTOR, WHITE PAINTED FLANGE, ELECTRONIC DIMMING BALLAST.	42W-TRT 35K LAMP	MV	58	GRID RECESSED	LITHONIA, GOTHAM #AFV42TRT 4AR 277 TRW DIM 0-10V
D	PENDANT HUNG INCANDESCENT DOWNLIGHT FIXTURE WITH BRONZE FINISH.	150W PAR38/150W BR40	120	175		COOPER HALO#H1312-BZ
X1/X2	LED ALUMINUM EXIT SIGN WITH DIRECTIONAL ARROWS AS INDICATED ON PLANS, SINGLE FACE, RED ON WHITE LETTERS. CONNECT TO NEAREST NON-SWITCH HOT GENERATOR CIRCUIT.	LED	120	5	CEILING	LITHONIA #LES-W-1-RW-**-120/277-EL-N

NOTES

FB- FLUORESCENT T8 BALLAST: OSRAM SYLVANIA QTP (1/2/3)x32T8/UNV ISN-SC PSN T8 ELECTRONIC, PROGRAM START, LBF, THD <= 10%.
COORDINATE MOUNTING HEIGHT OF ALL FIXTURES WITH ARCHITECTURAL DRAWINGS.
PROVIDE EMERGENCY BATTERY PACK PROVIDING MINIMUM 1400 LUMENS FOR 90 MINUTES.
FLUORESCENT LAMPS WILL BE ECOLUX ULTRAMAX F32T8/XLSPX41ECO / 45,000HOUR / AND HAVE A CRI OF 82+.
1 EQUIVALENT FIXTURES FROM LSI AND HE WILLIAMS WILL ALSO BE ACCEPTABLE.

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
110 V P C	FIRE ALARM VISUAL ALARM, TYPICALLY 80" A.F.F. TO TOP. XX = CANDELA LEVEL. P = PROTECTIVE COVER. C = CEILING MOUNT	HD WP	FIRE ALARM HEAT DETECTOR (WP)-WEATHERPROOF
M P PD WP	FIRE ALARM MANUAL PULL STATION, 48" A.F.F. PD=PEDESTAL MOUNT P=PROTECTIVE COVER	MSD	FIRE ALARM SMOKE FIRE DAMPER BY DIV. 15. PROVIDE 120V CIRCUIT BY DIV 16
FS	FIRE ALARM SPRINKLER FLOW SWITCH	FACP	FIRE ALARM CONTROL PANEL
TS	FIRE ALARM SPRINKLER VALVE TAMPER SWITCH	FAAP	FIRE ALARM ANNUNCIATOR PANEL
XX AV P C	FIRE ALARM SPEAKER/VISUAL ALARM TYP 80" A.F.F. TO TOP. XX = CANDELA LEVEL. P = PROTECTIVE COVER. C = CEILING MOUNT	CM	CONTROL MODULE
DD	FIRE ALARM DUCT SMOKE DETECTOR WITH REMOTE LED	MM	MONITOR MODULE
R	FIRE ALARM SHUTDOWN RELAY FOR HVAC EQUIPMENT	FCPS	REMOTE FIRE ALARM SYSTEM POWER SUPPLY
SD WP	FIRE ALARM SMOKE DETECTOR, PHOTOELECTRIC (WP)-WEATHERPROOF	DACT	DIGITAL ALARM COMMUNICATOR TRANSMITTER



SYMBOLS ARE INDICATIVE OF TYPES OF DEVICES IN SYSTEM. REFER TO PLANS FOR EXACT QUANTITIES.

FIRE ALARM SYSTEM DIAGRAM

SYMBOLS ARE INDICATIVE OF TYPES OF DEVICES IN SYSTEM. REFER TO PLANS FOR EXACT QUANTITIES.

A. DETECTION & ALARM

WHEN A FIRE ALARM CONDITION IS DETECTED BY ANY ALARM INITIATING DEVICE (SMOKE DETECTOR, DUCT DETECTOR, PULL STATION, OR SPRINKLER FLOW SWITCH), THE FOLLOWING FUNCTIONS WILL OCCUR:

(A.) THE FIRE ALARM CONTROL PANEL COMMON ALARM INDICATOR WILL FLASH AND THE AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGING THE ALARM CONDITION WILL SILENCE THE AUDIBLE DEVICE AND CAUSE THE COMMON ALARM INDICATOR TO ILLUMINATE STEADILY.

(B) THE DISPLAY WILL INDICATE ALL APPLICABLE INFORMATION ASSOCIATED WITH THE ALARM CONDITION INCLUDING ZONE, DEVICE TYPE, DEVICE LOCATION, AND TIME OF ALARM. LOCATION AND ZONING MESSAGES WILL BE CUSTOM FIELD-PROGRAMMED TO MATCH THE RESPECTIVE PREMISES. LOCAL ANNUNCIATOR LED's ASSOCIATED WITH THE ALARM POINT WILL FLASH UNTIL PANEL IS SILENCED.

(C) DISPLAY SYSTEM STATUS CHANGES ON ANY REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THE DISPLAY.

(D) ACTIVATE AN ALARM CONTACT CLOSURE TO ACTIVATE A DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT) FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA TELEPHONE LINES FURNISHED BY OWNER.

(E) ACTIVATE ALL AUDIO/VISUAL SIGNALS THROUGHOUT THE ENTIRE FACILITY.

(F) ACTIVATE ALL VISUAL SIGNALS. VISUAL SIGNALS WILL BE HIGH INTENSITY STROBES (75 cd MINIMUM) TO MEET THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) & TEXAS ACCESSIBILITY STANDARDS (TAS). ACTIVATE THROUGHOUT THE ENTIRE FACILITY.STROBES SHALL SHALL BE XENON TYPE AND WHITE OR CLEAR IN COLOR. THE MAX PULSE DURATION WILL BE 0.2 SECONDS WITH A MAXIMUM DUTY CYCLE OF 40%. THE FLASH RATE WILL BETWEEN 1-HZ AND 3-HZ.

(G) DEACTIVATE ALL FANS RATED OVER 2,000 CFM.

(H) ALARM VERIFICATION WILL BE FIELD-PROGRAMMABLE FOR EACH SMOKE DETECTOR. THE VERIFICATION SEQUENCE IS ACTIVATED AFTER A "CHECK" PROCEDURE AND THE PANEL WILL WAIT FOR A TIME THEN RESAMPLE THE DETECTOR FOR CONTINUED PRESENCE OF SMOKE. IF THE ALARM CONDITION CONTINUES OR A NON-VERIFIED DEVICE IS ACTUATED DURING THIS VERIFICATION PERIOD, THE PANEL WILL INITIATE ALL ALARM SEQUENCES. THIS ENTIRE SEQUENCE WILL OCCUR WITHIN 60 SEC. THE SYSTEM WILL LOG INTO MEMORY THE NUMBER OF VERIFICATION EVENTS.

(I) CLOSE ALL SMOKE FIRE DAMPERS ASSOCIATED WITH THE HVAC UNIT(S).

(J) ALL NON-SILENCEABLE AUXILIARY CONTROL FUNCTIONS (FANS, CENTRAL STATION INTERFACE, ELEVATOR RECALL INTERFACE, ETC) WILL REMAIN IN OPERATION, EVEN WHEN A/V DEVICES ARE SILENCED, UNTIL THE PANEL IS CLEARED AND RESET.

B. SYSTEM TROUBLE DETECTION
WHEN A TROUBLE CONDITION IS DETECTED BY THE FIRE ALARM CONTROL PANEL, THE FOLLOWING FUNCTIONS SHALL OCCUR:

(A) THE FIRE ALARM CONTROL PANEL TROUBLE INDICATOR WILL FLASH AND THE INTERNAL AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGMENT OF THE AUDIBLE DEVICE WILL SILENCE THE AUDIBLE DEVICE AND CAUSE ALL TROUBLE INDICATORS TO ILLUMINATE STEADY.

(B) THE DISPLAY WILL DISPLAY ALL APPLICABLE INFORMATION ASSOCIATED WITH THE RESPECTIVE TROUBLE CONDITIONS. LOCAL ANNUNCIATOR LEDs ASSOCIATED WITH THE ALARM POINT WILL ILLUMINATE.

(D) ACTIVATE A TROUBLE CONTACT CLOSURE TO ACTIVATE A DACT FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA PHONE LINES FURNISHED BY OWNER.

(E) DISPLAY THE SYSTEM STATUS CHANGES ON THE REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THAT DISPLAY.

C. SYSTEM SUPERVISORY ALARM DETECTION
WHEN A SUPERVISORY ALARM CONDITION IS DETECTED DUE TO A FIRE SPRINKLER VALVE BEING PLACED IN AN "OFF-NORMAL" POSITION, THE FOLLOWING FUNCTIONS WILL OCCUR:

(A) THE FIRE ALARM CONTROL PANEL SUPERVISORY INDICATOR WILL
FLASH AND THE INTERNAL AUDIBLE DEVICE WILL SOUND. ACKNOWLEDGMENT OF THE SUPERVISORY CONDITION WILL SILENCE THE AUDIBLE DEVICE.

(B) THE DISPLAY WILL DISPLAY ALL APPLICABLE INFORMATION
ASSOCIATED WITH THE RESPECTIVE SUPERVISORY CONDITION. LOCAL ANNUNCIATOR LEDs WILL ILLUMINATE FOR THE ALARM POINT.

(C) DISPLAY THE SYSTEM STATUS CHANGE ON THE REMOTE ANNUNCIATOR(S) VIA AN ALPHANUMERIC MESSAGE ON THAT DISPLAY.

(D) ACTIVATE A SUPERVISORY ALARM CONTACT CLOSURE TO ACTIVATE THE DACT FOR SIGNALING TO A UL-APPROVED CENTRAL MONITORING STATION VIA PHONE LINES FURNISHED BY OWNER.

D. FIRE ALARM PANEL
EXISTING FACP TO BE UTLIZED. PROVIDE NEW SIGNAL EXPANDER PANEL (AS REQUIRED).

ELECTRICAL GENERAL NOTES AND SPECIFICATIONS
(BOOKS SPECIFICATIONS SUPERCEED ANY NOTES BELOW)

1. SCOPE:THIS DIVISION SHALL INCLUDE ALL EQUIPMENT, MATERIALS, AND LABOR REQUIRED FOR COMPLETE INSTALLATION OF ELECTRICAL SYSTEM.
PROJECT INCLUDES INSTALLATION OF MODIFIED ELECTRICAL DISTRIBUTION SYSTEM, HVAC SYSTEM CONNECTIONS, NEW LIGHTING SYSTEM, NEW RECEPTACLES AND OUTLETS, FIRE ALARM AND NOTIFICATION SYSTEM, AND OTHER ELECTRICAL
WORK AS INDICATED ON THE PLANS. CONTRACTOR SHALL PROVIDE CONDUITS, CONDUCTORS FOR POWER, CONTROLS, AND LIGHTING, LIGHTING CONTACTOR AND CONTACT CLOSURES, AND ALL REQUIRED APPARATUS REQUIRED FOR FULL OPERATION OF THE ELECTRICAL SYSTEM.
2. SITE VISIT AND FAMILIARIZATION: CONTRACTORS PROPOSING TO UNDERTAKE WORK UNDER THIS DIVISION SHALL VISIT THE SITE OF THE WORK, AND FULLY INFORM THEMSELVES OF ALL CONDITIONS THAT AFFECT THE WORK, OR COST THEREOF. CONTRACTOR SHALL EXAMINE THE DRAWINGS AND SPECIFICATIONS AS RELATED TO THE SITE CONDITIONS. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
3. NOTICE:CONSIDERATION WILL NOT BE GRANTED FOR ANY ALLEGED MISUNDERSTANDING OF THE AMOUNT OF WORK TO BE PERFORMED. TENDER OF A PROPOSAL SHALL CONVEY FULL AGREEMENT TO ALL ITEMS AND CONDITIONS SPECIFIED, INDICATED ON THE DRAWINGS, AND/OR REQUIRED BY NATURE OF THE SITE.
4. DISCREPANCIES: SHOULD CONTRACTOR FIND DISCREPANCIES OR OMISSIONS IN THE CONTRACT DOCUMENTS, OR BE IN DOUBT AS TO THE INTENT THEREOF, HE SHALL IMMEDIATELY OBTAIN CLARIFICATION FROM THE ARCHITECT BEFORE SUBMITTING PROPOSAL FOR WORK IN THIS DIVISION.
5. DEMOLITION: ALL ELECTRICAL COMPONENTS OF THE EXISTING SYSTEM WHICH ARE NOT UTILIZED FOR NEW CONFIGURATION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. REFER TO DEMOLITION NOTES AND DRAWINGS FOR EXTENT OF WORK.
6. TIMELY PLACING OF MATERIALS AND EQUIPMENT: ALL ELECTRICAL APPARATUS SHALL BE INSTALLED AT THE PROPER TIME DURING PROGRESS OF CONSTRUCTION. COORDINATE WORK OPERATIONS WITH OTHER CRAFTS.
7. SPACE REQUIREMENTS: CONTRACTOR FOR WORK UNDER THIS DIVISION SHALL BE FULLY RESPONSIBLE FOR DETERMINING IN ADVANCE OF PURCHASE THAT EQUIPMENT AND MATERIALS PROPOSED FOR INSTALLATION SHALL FIT INTO THE CONFINES INDICATED.
8. MANUFACTURERS' LITERATURE: DELIVER ALL PRINTED TAGS, INSTRUCTIONS, CERTIFIED DRAWINGS, PARTS LISTS, CERTIFICATES, ETC., SUPPLIED WITH EQUIPMENT ITEMS, TO THE OWNER.
9. CODES, PERMITS, AND FEES: WORK UNDER THIS DIVISION SHALL BE CONSTRUCTED IN STRICT CONFORMANCE WITH PERTINENT PROVISIONS OF CITY AND STATE BUILDING CODES.
   A. ALL WORK SHALL COMPLY WITH THE 2011 EDITION OF NATIONAL ELECTRICAL CODE (NEC).
   B. OBTAIN ALL REQUIRED PERMITS. PAY ALL LEGAL FEES FOR PERMITS AND INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.
   C. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF CITY OF HOUSTON.
10. CUTTING AND PATCHING:
   A. CONTRACTOR FOR THIS DIVISION SHALL LAYOUT TO DIMENSION AND LOCATIONS, CUT AND PATCH ALL OPENINGS ON SURFACES TO BE FORMED, FRAMED, OR CUT.
   B. SHOULD CONTRACTOR FOR THIS DIVISION FAIL TO ADHERE WITH THIS REQUIREMENT, AS WORK PROGRESSES, ANY OPENINGS SHALL BE CUT AND PATCHED BY GENERAL CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR FOR THIS DIVISION.
11. PROTECTION OF APPARATUS: TAKE ALL PRECAUTIONS NECESSARY FOR PROPER PROTECTION OF NEW EQUIPMENT, APPARATUS, AND MATERIALS FROM DAMAGE. FAILURE TO DO SO WILL BE CAUSE FOR REJECTION OF ANY ITEM COMING UNDER QUESTION.
12. SHOP DRAWINGS: CONTRACTOR FOR THIS DIVISION SHALL SUBMIT SHOP DRAWINGS AND CATALOGUE DATA ON ALL MAJOR ITEMS OF EQUIPMENT AND SYSTEMS AND OTHER MATERIAL REQUESTED BY ARCHITECT/ENGINEER. SUBMIT PRODUCT DATA FOR SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, WIRES, CABLES, SUPPORTING DEVICES, IDENTIFICATION COMPONENTS, LIGHT FIXTURES, FIRE ALARM SYSTEM AND COMPONENTS, WIRING DEVICES, MULTI-OUTLET RACEWAYS, CABINETS, AND BOXES. SUBMIT SIX COPIES WITHIN THIRTY (30) DAYS AFTER CONTRACT AWARD, AND IN NOT MORE THAN TWO GROUPS OF SUBMITTALS. SUBMITTALS SHALL CONSIST OF LAYOUTS, WORKING DRAWINGS, CUTS, AND OPERATING AND PERFORMANCE DATA. ALLOW FOUR (4) WEEKS FOR REVIEW AND APPROVAL OF THE SHOP DRAWINGS BY ENGINEER.
13. MATERIALS AND WORKMANSHIP: ALL MATERIALS AND EQUIPMENT SHALL BE NEW, OF BEST GRADE OF STANDARD MANUFACTURE. APPROVED BY UL, AND BE SO LABELED. FOR WIRE AND CABLE, MARKED AS REQUIRED BY ART. 310-2, NEC. INSTALLED BY SKILLED ELECTRICIAN, WORKING UNDER THE DIRECT SUPERVISION OF COMPETENT EXPERIENCED FOREMAN AND/OR SUPERINTENDENTS. PRODUCTS SHALL BE INSTALLED IN A THOROUGH WORKMANLIKE MANNER, PRESENTING A NEAT, CLEAN-CUT APPEARANCE WHEN COMPLETED. ANY PART OR PARTS NOT MEETING THIS REQUIREMENT SHALL BE REPLACED OR REBUILT WITHOUT EXTRA EXPENSE TO OWNER.
14. PROTECTION OF EXISTING: PLENUM CABLE SHALL BE PROPERLY SECURED ABOVE CEILING PER APPLICABLE CODES.
15. WIRING METHODS:THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE LOCATIONS OF EQUIPMENT AND ARRANGEMENT OF CIRCUITS ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY ACTUAL MEASUREMENT AT THE SITE. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL RISES, DROPS, OFFSETS, ETC. NECESSARY TO AVOID CONFLICT WITH STRUCTURAL MEMBERS, AND SIMILAR ITEMS, WHEN INSTALLING ELECTRICAL CONDUITS. INSTALL EXPOSED CONDUIT AS SHOWN OR NOTED, PARALLEL TO HORIZONTAL AND VERTICAL LINES OF STRUCTURES. MAKE BENDS WITH 90 DEGREE TURN ONLY, OR WITH APPROVED FITTINGS.
16. CONDUIT:FURNISH A COMPLETE RACEWAY SYSTEM FOR BUT NOT LIMITED TO FEEDER, BRANCH CIRCUITS, CONTROL WIRING, AND AUXILIARY SYSTEM WIRING.
   A. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT AND FITTINGS FOR ALL MOTORIZED CONNECTIONS, WHERE EQUIPMENT IS SUBJECT TO MOVEMENT, OR LOCATED OUTDOOR.
   B. WHERE ENTERING PANELS, PULL BOXES, J-BOXES, OR OUTLET BOXES, SECURED I PLACE WITH LOCK-NUTS INSIDE AND OUTSIDE, AND INSULATED BUSHING INSIDE.
   C. BENDS AND OFFSETS MADE WITH APPROVED TOOLS ONLY. BENDS OR OFFSETS IN WHICH THE PIPE IS CRUSHED OR DEFORMED SHALL NOT BE INSTALLED.
   D. USE EMT FOR INTERIOR DRY LOCATIONS, PVC FOR UNDERGROUND INSTALLATION, AND RIGID GALVANIZED STEEL FOR EXPOSED LOCATIONS SUBJECT TO DAMAGE.
17. OUTLET AND JUNCTION BOXES: FURNISH AND INSTALL ALL JUNCTION BOXES REQUIRED TO FACILITATE INSTALLATION OF THE VARIOUS CONDUIT SYSTEMS. JUNCTION BOXES SHALL BE SUITABLE FOR ENVIRONMENT AND APPLICATION USED FOR.
18. WIRE AND CABLE: ALL WIRE AND CABLE SHALL:
   A. BE NEW AND OF SOFT DRAWN, ANNEALED, COPPER HAVING A CONDUCTIVITY OF NOT LESS THAN 98% OF THAT OF PURE COPPER; EACH WIRE CONTINUOUS WITHOUT WELD, SPLICE OR JOINT THROUGHOUT ITS LENGTH; UNIFORM IN CROSS SECTION AND FREE FROM FLAWS, SCALES, AND OTHER IMPERFECTIONS.
   B. UNLESS OTHERWISE SPECIFIED OR NOTED, WIRES SHALL BE # 12 AWG (FOR PHASE, NEUTRAL, AND GROUND CONDUCTORS) TYPE THW, THWN, THHN, AS MANUFACTURED BY TRIANGLE, GENERAL ELECTRIC, OKONITE, OR ANACONDA.
   C. ALL WIRE SHALL BE STRANDED.
   D. NOT BE DRAWN INTO A CONDUIT UNTIL ALL WORK WHICH MAY CAUSE INJURY T INSULATION IS COMPLETE. WHERE TWO OR MORE CIRCUITS RUN TO A SINGLE OUTLET BOX, TAG EACH CIRCUIT AS A GUIDE.
   E. HAVE ALL STRANDED CONDUCTORS FURNISHED WITH COPPER CONNECTING LUGS, DRILLED, OR REAMED THE FULL DIAMETER OF THE BARE CONDUCTORS. MAINS AND FEEDERS SHALL BE RUN THEIR ENTIRE LENGTH IN CONTINUOUS PIECES WITHOUT JOINTS OR SPLICES.
19. IDENTIFICATION OF CONDUCTORS AND PANELBOARD ELEMENTS:
   A. EACH AND EVERY MAIN AND FEEDER CONDUCTOR SHALL BE IDENTIFIED AT EACH OUTLET POINT WHERE SUCH CONDUCTOR TERMINATES. FEEDER BUNDLES PASSING THROUGH A JUNCTION OR SUPPORT BOX SHALL ALSO BE IDENTIFIED WITHIN SUCH ENCLOSURE, BUT MAY BE IDENTIFIED IN SUCH LOCATIONS AS A GROUP.
   B. IDENTIFY BY USE OF PERMANENT TYPE BANDS, BRADY, OR T AND B. A DEFINITE NUMBER AND/OR LETTER CODE SHALL BE EMPLOYED AND BE UNIFORM THROUGHOUT EACH CONDUCTOR.
   C. IDENTIFY EACH SWITCH, INCLUDING MAIN DISCONNECT AND MOTOR STARTER WITH WHITE-ON-BLACK NAMEPLATE, EACH HAVING ¼" HIGH LETTERS. NEATLY AND SECURELY ADHERE NAMEPLATES TO THE UNIT.
20. SWITCHES:FURNISH AND INSTALL ALL FUSIBLE AND NON-FUSIBLE SWITCHES AS REQUIRED BY CODES, WHETHER OR NOT SHOWN AND/OR NOTED. SWITCHES SHALL BE:
   A. HEAVY DUTY WITH NEMA-1 OR 3R ENCLOSURE, AS REQUIRED, AND BE PROVIDED WITH PAD-LOCKING FEATURE.
   B. PROVIDED AT EACH MOTOR THAT IS OUT OF SIGHT OF THE SWITCH OR PANEL FROM WHICH FED; AND BE NON-FUSIBLE DISCONNECT FOR SUCH USE.
   C. SWITCH MANUFACTURER SHALL BE GE, CUTLER-HAMMER, OR SQUARE D.
   D. DISCONNECT SWITCHES INSTALLED OUTSIDE THE BUILDING SHALL BE IN NEMA-3 ENCLOSURES.
   E. FUSIBLE SWITCH-STARTER UNITS: EACH UNIT SHALL BE TOTALLY ENCLOSED AN EFFECTIVELY BARRIERED, MANUALLY OPERATED QUICK-MAKE, QUICK BREAK, HORSEPOWER RATED STARTER. PROVIDE CLASS R TYPE REJECTION FUSE CLIPS.
   F. IDENTIFY EACH DEVICE WITH NAMEPLATE SHOWING THE LOAD SERVED, MATCHING THE EXISTING NAMEPLATES.
21. WIRING DEVICES:FURNISH AND INSTALL ALL WIRING DEVICES AS INDICATED ON THE DRAWINGS. DEVICES FURNISHED SHALL IN ALL CASES BE SUITABLE FOR THE USE INTENDED AND SHALL HAVE VOLTAGE AND CURRENT RATINGS ADEQUATE FOR THE LOADS TO BE SERVED.
   A. MOUNTING: HEIGHTS OF ALL DEVICES ARE FROM FINISH FLOOR TO CENTERLINE OF DEVICE. DEVICES SHOWN ON THE DRAWINGS IN GROUPS OF TWO OR MORE SHALL BE LOCATED HORIZONTALLY IN SUCH A MANNER AS TO BE AS CLOSE AS POSSIBLE FROM THE CENTERLINE OF THE FIRST DEVICE TO THE CENTERLINE OF THE NEXT DEVICE UNLESS OTHERWISE NOTED.
   B. WALL SWITCHES: SHALL BE LEVITON ROCKER TYPE, WHITE IN COLOR. USE CORRESPONDING DOUBLE POLE, THREE-WAY, FOUR-WAY, KEYED AND DIMMER SWITCHES WHERE NOTED. MOUNT AT 3'-10" A.F.F. AND WITHIN 6" OF ADJACENT DOOR JAMB, UNLESS OTHERWISE NOTED. USE "KEYED" SWITCHES IN LOCATIONS INDICATED.
   C. CONVENIENCE OUTLETS: SHALL BE GROUNDING TYPE, 20 AMP, 125 VOLT, LEVITON, WHITE COLOR. WEATHERPROOF DUPLEX OUTLETS SHALL BE LEVITON 5342 WITH SIERRA NO. WPD-8 PLATE. MOUNT AT 18" A.F.F., UNLESS OTHERWISE NOTED. PROVIDE NEMA 5-20R DEVICES UNLESS OTHERWISE INDICATED. PROVIDE SPECIFICATION (SPEC) GRADE HEAVY DUTY STRAIGHT BLADE DEVICES UNLESS OTHERWISE NOTED. PROVIDE HOSPITAL GRADE DEVICES WHERE INDICATED, OR AS REQUIRED BY CODES.
   D. ACCEPTABLE ALTERNATE MANUFACTURERS: SHALL BE HUBBELL, P&S AND BRYANT, PROVIDED THEIR DEVICES ARE OF THE SAME TYPE AND QUALITY AND THAT ONLY ONE MANUFACTURER SHALL BE USED THROUGHOUT THE WORK.
   E. PLATES: SHALL BE MATCHING TYPE FOR FINISHED AREAS AND GALVANIZED STEEL FOR AREAS WITH EXPOSED CONDUIT. PROVIDE STAINLESS STEEL PLATES FOR FLUSH MOUNTED DEVICES. PROVIDE CAST ALUMINUM WET LOCATION TYPE COVER PLATES WITH HINGED COVERS FOR DEVICES LOCATED OUTSIDE. GANG OUTLETS GROUPED TOGETHER UNDER A SINGLE WALL PLATE.
   F. INCANDESCENT DIMMERS: 120V SLIDE TO OFF, DECORA STYLE SIMILAR TO SWITCHES, WITH WATTAGE AS REQUIRED PER MANUFACTURER'S RECOMMENDATIONS. POWER FAILURE MEMORY. RFI SUPPRESSION. WHERE SWITCHES ARE SHOWN NEXT TO DIMMERS, PROVIDE MULTI-GANG COVER PLATES. PROVIDE DIMMERS WITH IVORY FINISH, SAME AS SWITCHES UNLESS OTHERWISE DIRECTED.
   G. INSTALL WIRING DEVICES AND ACCESSORIES PLUMB AND LEVEL, IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, APPLICABLE REQUIREMENTS OF NEC AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO FULFILL PROJECT REQUIREMENTS.
   H. TIGHTEN CONNECTORS AND TERMINALS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S PUBLISHED TORQUE VALUES FOR WIRING DEVICES.
   I. COORDINATE WITH OTHER WORK, INCLUDING PAINTING, ELECTRICAL BOXES AND WIRING INSTALLATIONS, AS NECESSARY TO INTERFACE INSTALLATION OF WIRING DEVICES WITH OTHER WORK.
   J. INSTALL WIRING DEVICES AFTER WIRING WORK IS COMPLETED. INSTALL ONLY IN ELECTRICAL BOXES THAT ARE CLEAN; FREE FROM EXCESS BUILDING MATERIALS, DIRT, AND DEBRIS. INSTALL WALL PLATES AFTER PAINTING WORK IS COMPLETED.
   K. NO RECEPTACLE OR SWITCH OUTLETS SHALL BE MOUNTED BACK TO BACK. A MINIMUM OF ONE (1) STUD MUST BE BETWEEN OUTLETS.
   L. INSTALL RECEPTACLES WITH GROUND PIN UP. INSTALL SWITCHES WITH THE "ON" POSITION UP. EXCLUDING EXTERIOR WEATHERPROOF WPD-8 RECEPTACLES.
   M. ALL EXTERIOR DEVICES TO BE WEATHER PROOF AND EXTERIOR RECEPTACLES SHALL BE A GFCI TYPE DEVICE.
   N. ALL 120-VOLT RECEPTACLES OUTLETS LOCATED WITHIN SIX FEET OF SINKS SHALL HAVE GROUND FAULT CIRCUIT INTERRUPTION PROTECTION. GROUND FAULT OUTLETS SHALL BE CONNECTED ON DEDICATED NEUTRAL WIRE SERVING ONLY THE INDIVIDUAL OUTLET WITH THE GROUND FAULT PROTECTION.
   O. USE JUMBO SIZE WALL PLATES FOR OUTLETS INSTALLED IN MASONRY WALLS.
   P. DO NOT SHARE NEUTRAL CONDUCTORS ON DIMMERS.
22. FUSES: FUSES IN MAIN, FEEDER, AND BRANCH CIRCUIT SWITCHES, RATED 600 AMPS AND BELOW, FEEDING MOTORS, TRANSFORMERS, AND GENERAL PURPOSE CIRCUITS (UNLESS OTHERWISE SPECIFIED), SHALL BE UL LISTED AND LABELED AS CURRENT LIMITING, TIME-DELAY, 200,000 A.I.C., CLASS RK-5 FUSES SHALL BE BUSSMAN TYPE FRN-R (250V), AND FRS-R (600V).
23. GROUNDING: ALL CONDUIT WORK, MOTOR, STARTERS, AND OTHER ELECTRICAL EQUIPMENT WIRED AND CONNECTED BY THIS CONTRACTOR SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN FULL ACCORDANCE WITH NEC 250.
24. OTHER MATERIALS: FURNISH AND INSTALL ALL OTHER MATERIALS SUCH AS HARDWARE, TAPE, CLAMPS, CONNECTORS, FITTINGS, SUPPORTS, AND ALL OTHER APPURTENANCES REQUIRED TO COMPLETE THE WORK TO THE FULL INTENT OF THE CONTRACT. TERMINAL LUGS SHALL BE FURNISHED BY ELECTRICAL CONTRACTOR.
25. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL TEMPERATURE, CO2, AND HUMIDITY SENSOR STUB-UPS (1/2"C TO ACCESSIBLE CEILING SPACE) FOR THE MECHANICAL HVAC SYSTEM. REFER TO MECHANICAL PRINTS FOR SENSOR QUANTITY AND LOCATIONS.
26. ELECTRICAL CONTRACTOR WILL CONNECT ALL LOW VOLTAGE PLUMBING CONTRACTOR SUPPLIED TRANSFORMERS (FOR AUTOMATIC FLUSH) TO THE NEAREST 120V CIRCUIT (OR IF INDICATED ON PLANS WITH A CIRCUIT NUMBER). CONTRACTOR TO ASSUME ONE TRANSFORMER PER BATHROOM. THE PLUMBING CONTRACTOR WILL BE RESPONSIBLE FOR LOW VOLTAGE WIRING TO THE FIXTURES.
27. THERMOSTATS, LIGHT SWITCHES, WALL PHONES, PROJECTOR SCREEN, ETC. WILL BE COORDINATED BY CONTRACTOR, REFERENCING EXACT LOCATIONS AGAINST ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN.

(1) SPECIFICATIONS AND NOTES
SCALE: NTS

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

SMITH & COMPANY ARCHITECTS
1500 MCGOWEN ST. SUITE 150
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SEAL:
STATE OF TEXAS ANWAR HASSAN 64671 LICENSED PROFESSIONAL ENGINEER 5/9/13

PROJECT NAME :
FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE
301 NORTH DRENNAN ST.
HOUSTON, TX 77003

HCC

KEY MAP:

REVIEWED:
PROJECT MANAGER
SPONSORING DEPARTMENT
PROJECT MANAGER

CONSULTANT(S) :

MEP IT Engineers + Consultants
MEP-IT ENGINEERS
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Houston, Texas 77057
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TBPE REGISTRATION NO. 11203

DATE : APRIL 22, 2013
PROJECT NO.: N012813
SCALE : VARIES
DRAWN BY : AH, WJK, CJT
CHECKED BY : AH

SHEET TITLE :
SPECIFICATIONS AND NOTES

SHEET NO. :
E1.02

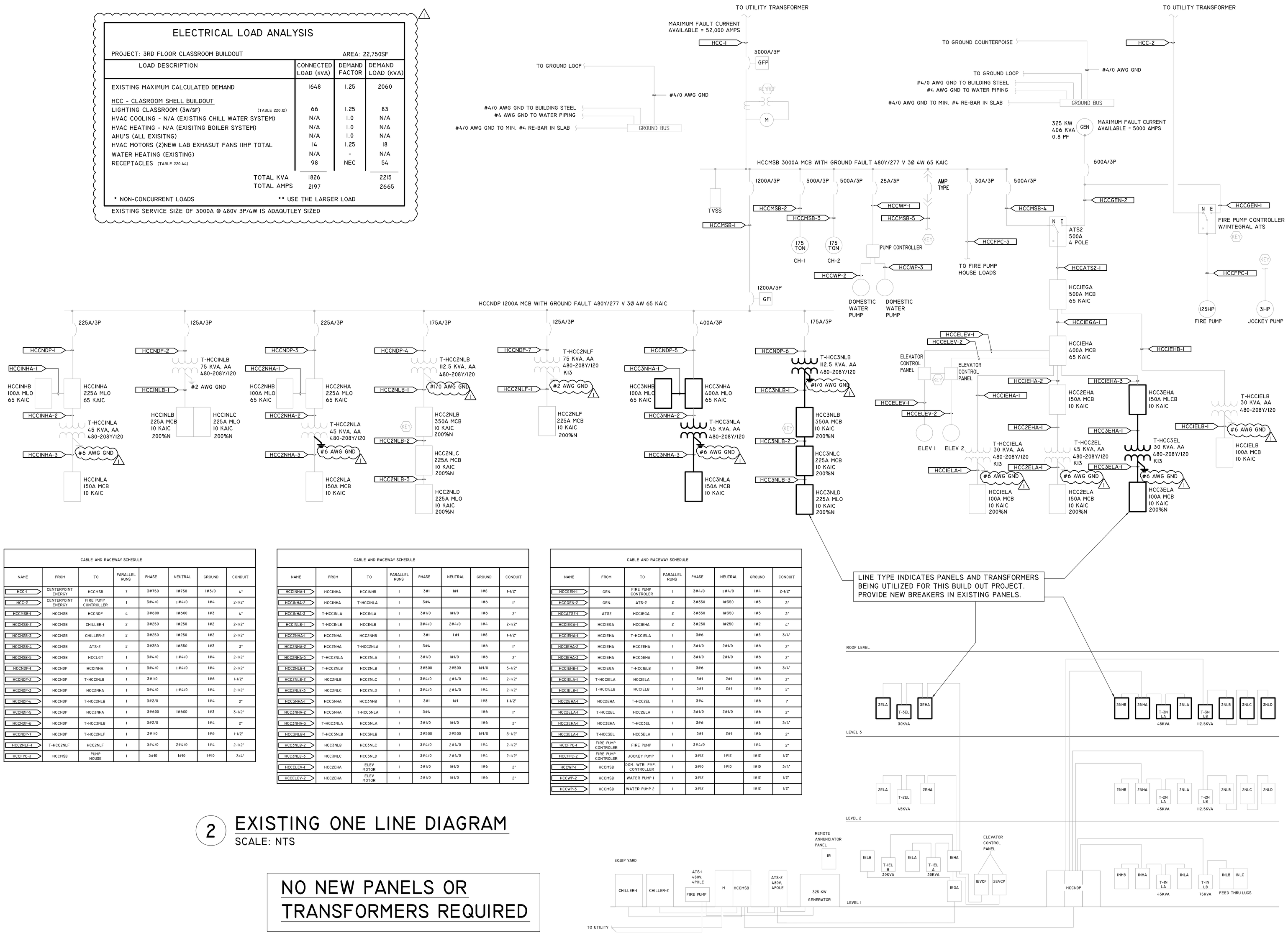
ELECTRICAL LOAD ANALYSIS

PROJECT: 3RD FLOOR CLASSROOM BUILDOUT — AREA: 22,750SF

LOAD DESCRIPTION	CONNECTED LOAD (kVA)	DEMAND FACTOR	DEMAND LOAD (kVA)
EXISTING MAXIMUM CALCULATED DEMAND	1648	1.25	2060
HCC - CLASROOM SHELL BUILDOUT			
LIGHTING CLASSROOM (3W/SF) (TABLE 220.12)	66	1.25	83
HVAC COOLING - N/A (EXISTING CHILL WATER SYSTEM)	N/A	1.0	N/A
HVAC HEATING - N/A (EXISITNG BOILER SYSTEM)	N/A	1.0	N/A
AHU'S (ALL EXISITNG)	N/A	1.0	N/A
HVAC MOTORS (2)NEW LAB EXHASUT FANS 1IHP TOTAL	14	1.25	18
WATER HEATING (EXISTING)	N/A	-	N/A
RECEPTACLES (TABLE 220.44)	98	NEC	54
TOTAL KVA	1826		2215
TOTAL AMPS	2197		2665

* NON-CONCURRENT LOADS ** USE THE LARGER LOAD

EXISTING SERVICE SIZE OF 3000A @ 480V 3P/4W IS ADAQUTLEY SIZED



2 EXISTING ONE LINE DIAGRAM
SCALE: NTS

CABLE AND RACEWAY SCHEDULE

NAME	FROM	TO	PARALLEL RUNS	PHASE	NEUTRAL	GROUND	CONDUIT
HCC-1	CENTERPOINT ENERGY	HCCMSB	7	3#750	1#750	1#3/0	4"
HCC-2	CENTERPOINT ENERGY	FIRE PUMP CONTROLLER	1	3#4/0	1#4/0	1#4	2-1/2"
HCCMSB-1	HCCMSB	HCCNDP	4	3#600	1#600	1#3	4"
HCCMSB-2	HCCMSB	CHILLER-1	2	3#250	1#250	1#2	2-1/2"
HCCMSB-3	HCCMSB	CHILLER-2	2	3#250	1#250	1#2	2-1/2"
HCCMSB-4	HCCMSB	ATS-2	2	3#350	1#350	1#3	3"
HCCMSB-5	HCCMSB	HCCLGT	1	3#4/0	1#4/0	1#4	2-1/2"
HCCNDP-1	HCCNDP	HCCINHA	1	3#4/0	1#4/0	1#4	2-1/2"
HCCNDP-2	HCCNDP	T-HCCINLB	1	3#1/0		1#6	1-1/2"
HCCNDP-3	HCCNDP	HCC2NHA	1	3#4/0	1#4/0	1#4	2-1/2"
HCCNDP-4	HCCNDP	T-HCC2NLB	1	3#2/0		1#4	2"
HCCNDP-5	HCCNDP	HCC3NHA	1	3#600	1#600	1#3	3-1/2"
HCCNDP-6	HCCNDP	T-HCC3NLB	1	3#2/0		1#4	2"
HCCNDP-7	HCCNDP	T-HCC2NLF	1	3#1/0		1#6	1-1/2"
HCCELEV-1	T-HCC2NLF	HCC2NLF	1	3#4/0	2#4/0	1#4	2-1/2"
HCCFPC-3	HCCMSB	PUMP HOUSE	1	3#10	1#10	1#10	3/4"

CABLE AND RACEWAY SCHEDULE

NAME	FROM	TO	PARALLEL RUNS	PHASE	NEUTRAL	GROUND	CONDUIT
HCCINHA-1	HCCINHA	HCCINHB	1	3#1	1#1	1#8	1-1/2"
HCCINHA-2	HCCINHA	T-HCCINLA	1	3#4		1#6	1"
HCCINHA-3	T-HCCINLA	HCCINLA	1	3#1/0	1#1/0	1#6	2"
HCCINLB-1	T-HCCINLB	HCCINLB	1	3#4/0	2#4/0	1#4	2-1/2"
HCC2NHA-1	HCC2NHA	HCC2NHB	1	3#1	1#1	1#8	1-1/2"
HCC2NHA-2	HCC2NHA	T-HCC2NLA	1	3#4		1#6	1"
HCC2NHA-3	T-HCC2NLA	HCC2NLA	1	3#1/0	1#1/0	1#6	2"
HCC2NLB-1	T-HCC2NLB	HCC2NLB	1	3#500	2#500	1#1/0	3-1/2"
HCC2NLB-2	HCC2NLB	HCC2NLC	1	3#4/0	2#4/0	1#4	2-1/2"
HCC2NLB-3	HCC2NLC	HCC2NLD	1	3#4/0	2#4/0	1#4	2-1/2"
HCC3NHA-1	HCC3NHA	HCC3NHB	1	3#1	1#1	1#8	1-1/2"
HCC3NHA-2	HCC3NHA	T-HCC3NLA	1	3#4		1#6	1"
HCC3NHA-3	T-HCC3NLA	HCC3NLA	1	3#1/0	1#1/0	1#6	2"
HCC3NLB-1	T-HCC3NLB	HCC3NLB	1	3#500	2#500	1#1/0	3-1/2"
HCC3NLB-2	HCC3NLB	HCC3NLC	1	3#4/0	2#4/0	1#4	2-1/2"
HCC3NLB-3	HCC3NLC	HCC3NLD	1	3#4/0	2#4/0	1#4	2-1/2"
HCCELEV-1	HCC2EHA	ELEV MOTOR	1	3#1/0	1#1/0	1#6	2"
HCCELEV-2	HCC2EHA	ELEV MOTOR	1	3#1/0	1#1/0	1#6	2"

CABLE AND RACEWAY SCHEDULE

NAME	FROM	TO	PARALLEL RUNS	PHASE	NEUTRAL	GROUND	CONDUIT
HCCGEN-1	GEN.	FIRE PUMP CONTROLLER	1	3#4/0	1 #4/0	1#4	2-1/2"
HCCGEN-2	GEN.	ATS-2	2	3#350	1#350	1#3	3"
HCCATS2-1	ATS2	HCCIEGA	2	3#350	1#350	1#3	3"
HCCIEGA-1	HCCIEGA	HCCIEHA	2	3#250	1#250	1#2	4"
HCCIEHA-1	HCCIEHA	T-HCCIELA	1	3#6		1#8	3/4"
HCCIEHA-2	HCCIEHA	HCC2EHA	1	3#1/0	2#1/0	1#6	2"
HCCIEHA-3	HCCIEHA	HCC3EHA	1	3#1/0	2#1/0	1#6	2"
HCCIEHB-1	HCCIEGA	T-HCCIELB	1	3#6		1#6	3/4"
HCCIELA-1	T-HCCIELA	HCCIELA	1	3#1	2#1	1#6	2"
HCCIELB-1	T-HCCIELB	HCCIELB	1	3#1	2#1	1#6	2"
HCC2EHA-1	HCC2EHA	T-HCC2EL	1	3#4		1#6	1"
HCC2ELA-1	T-HCC2EL	HCC2ELA	1	3#1/0	2#1/0	1#6	2"
HCC3EHA-1	HCC3EHA	T-HCC3EL	1	3#6		1#8	3/4"
HCC3ELA-1	T-HCC3EL	HCC3ELA	1	3#1	2#1	1#6	2"
HCCFPC-1	FIRE PUMP CONTROLLER	FIRE PUMP	1	3#4/0		1#4	2"
HCCFPC-2	FIRE PUMP CONTROLLER	JOCKEY PUMP	1	3#12	1#12	1#12	1/2"
HCCWP-1	HCCMSB	DOM. WTR. PMP. CONTROLLER	1	3#10	1#10	1#10	3/4"
HCCWP-2	HCCMSB	WATER PUMP 1	1	3#12		1#12	1/2"
HCCWP-3	HCCMSB	WATER PUMP 2	1	3#12		1#12	1/2"

NO NEW PANELS OR TRANSFORMERS REQUIRED

FOR INFORMATION ONLY

1 EXISTING RISER DIAGRAM
SCALE: NTS

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

SMITH&COMPANY ARCHITECTS
1500 MCGOWEN ST. SUITE 150
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PHONE: 713-524-4202
FAX: 713-524-4071
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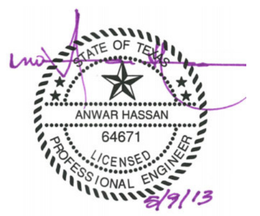
SEAL:



PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

MEP IT Engineers + Consultants
MEP-IT ENGINEERS
6117 Richmond Avenue, Suite 200
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F. 832.622.0557
TBPE REGISTRATION NO. 11203

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

One Line

SHEET NO. :

E1.10

EXISTING PANEL

PANEL: HCC3EHA — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 225 AMP BUS 3 ø 4 WIRE — Cu MAT - AMP MLO 35 KAIC — 150 AMP MCB 277/480 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
-	(E) XFMR T-HCC3EL	6.0	50	1		2	25	14.5	(E) CU-2	-
			/	3		4				-
			3	5		6	3			-
-	(E) LIGHTING (345)	0.6	20/1	7		8	20/1	2.2	EMEGENCY LIGHTS (GTD'S)	#12
-	(E) LIGHTING (307)	0.7	20/1	9		10	20/1	1.4	EMEGENCY LIGHTS (GTD'S)	#12
-	(E) LIGHTING STAIR-B	0.4	20/1	11		12	20/1	0.4	EMEGENCY EXIT LIGHTS	#12
-	(E) LIGHTING STAIR-C	0.5	20/1	13		14			SPACE	-
-	(E) LIGHTING STAIR-D	0.4	20/1	15		16	-	-	SPACE	-
-	(E) LIGHTING LEVEL-4	0.6	20/1	17		18	-	-	SPACE	-
-	(E) ACU-3, 1/5HP, 2.3FLA	0.6	15/1	19		20	-	-	SPACE	-
-	SPACE	-	-	21		22	-	-	SPACE	-
-	SPACE	-	-	23		24	-	-	SPACE	-
-	SPACE	-	-	25		26	-	-	SPACE	-
-	SPACE	-	-	27		28	-	-	SPACE	-
-	SPACE	-	-	29		30	-	-	SPACE	-
-	SPACE	-	-	31		32	-	-	SPACE	-
-	SPACE	-	-	33		34	-	-	SPACE	-
-	SPACE	-	-	35		36	-	-	SPACE	-
-	SPACE	-	-	37		38	-	-	SPACE	-
-	SPACE	-	-	39		40	-	-	SPACE	-
-	SPACE	-	-	41		42	-	-	SPACE	-

CONN LTG 7 x1.25= 9 KVA — XFMR LOAD - x1.0= - KVA — CONN EQUIP - x1.0= - KVA — CONN RCPT - xNEC= - KVA — CONN HVAC 15 x1.0= 15 KVA — TOTAL LOAD 24 KVA 29 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3ELA — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 225 AMP BUS 3 ø 4 WIRE — Cu MAT - AMP MLO 22 KAIC — 100 AMP MCB 120/208 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
-	(E) BAS CONTROL	0.4	20/1	1		2	20	2.4	(E) CU-1	-
	(E) BAS CONTROL	0.4	20/1	3		4	2			-
	(E) HEAT TRACE	0.4	20/1	5		6	20	2.4	(E) CU-3	-
#12	FIRE ALARM EXPANDER PANEL	0.8	20/1	7		8	2			-
#12	BOOK SECURITY SYSTEM - LIBRARY 302A	0.2	20/1	9		10	20/1	0.4	(E) FIRE/SMOKE DAMPER	-
				11		12	-	-	SPACE	-
				13		14	-	-	SPACE	-
-	SPACE	-	-	15		16	-	-	SPACE	-
-	SPACE	-	-	17		18	-	-	SPACE	-
-	SPACE	-	-	19		20	-	-	SPACE	-
-	SPACE	-	-	21		22	-	-	SPACE	-
-	SPACE	-	-	23		24	-	-	SPACE	-
-	SPACE	-	-	25		26	-	-	SPACE	-
-	SPACE	-	-	27		28	-	-	SPACE	-
-	SPACE	-	-	29		30	-	-	SPACE	-
-	SPACE	-	-	31		32	-	-	SPACE	-
-	SPACE	-	-	33		34	-	-	SPACE	-
-	SPACE	-	-	35		36	-	-	SPACE	-
-	SPACE	-	-	37		38	-	-	SPACE	-
-	SPACE	-	-	39		40	-	-	SPACE	-
-	SPACE	-	-	41		42	-	-	SPACE	-

CONN LTG - x1.25= - KVA — XFMR LOAD - x1.0= - KVA — CONN EQUIP 1 x1.0= 1 KVA — CONN RCPT - xNEC= - KVA — CONN HVAC 6 x1.0= 6 KVA — TOTAL LOAD 7 KVA 19 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NHA — LOCATION: ELEC ROOM — MTG: [ ] SURFACE [X] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC - AMP BUS 3 ø 4 WIRE — Cu MAT 400 AMP MLO 65 KAIC — 400 AMP MCB 277/480 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
-	(E) XFMR T-HCC3NLA	24	70	1		2	40	17.5	(E) AHU-5	-
-			/	3		4				-
-			3	5		6	3			-
-	(E) SUB-FEED PNL "HCC3NHB"	60	100	7		8	60	21.6	(E) AHU-6	-
-			/	9		10				-
-			3	11		12	3			-
-	(E) FCU-4	0.8	15/1	13		14	70	28.3	(E) CWP-1	-
-	(E) FCU-3	2.7	20/1	15		16				-
-	SPACE	-	-	17		18	3			-
-	SPACE	-	-	19		20	70	28.3	(E) CWP-2	-
-	(E) FCU-3, 1/2HP, 4.2FLA	1.2	15/1	21		22				-
-	(E) FCU-4, 1/4HP, 2.5FLA	0.7	15/1	23		24	3			-
-	(E) AC-1	5.0	15	25		26	30	11.7	(E) HWP-1	-
-			/	27		28				-
-			3	29		30	3			-
#10	LIGHTING - CLASSROOMS	3.6	20/1	31		32	30	11.7	(E) HWP-2	-
#10	LIGHTING - CORRIDOR	1.8	20/1	33		34				-
#10	LIGHTING - CLASSROOMS	3.4	20/1	35		36	3			-
#10	LIGHTING - CORRIDOR	2.1	20/1	37		38	-	-	SPACE	-
#10	LIGHTING - CLASSROOMS	2.9	20/1	39		40	-	-	SPACE	-
#10	LIGHTING - LECTURE HALL	1.4	20/1	41		42	-	-	SPACE	-

CONN LTG - x1.25= - KVA — XFMR LOAD 47 x1.0= 47 KVA — CONN EQUIP - x1.0= - KVA — CONN RCPT 25 xNEC= 18 KVA — CONN HVAC - x1.0= - KVA — TOTAL LOAD 65 KVA 180 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NHB — LOCATION: ELEC ROOM — MTG: [ ] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 100 AMP BUS 3 ø 4 WIRE — Cu MAT 100 AMP MLO 65 KAIC — - AMP MCB 277/480 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
-	(E) LIGHTING (321)	1.7	20/1	1		2	40	17.4	(E) OAHU-R-1	-
-	(E) LIGHTING (345)	1.5	20/1	3		4				-
-	(E) LIGHTING	2.0	20/1	5		6	3			-
-	(E) LIGHTING	0.7	20/1	7		8	30	9.1	(E) EF-1	-
-	SPACE	-	-	9		10				-
-	SPACE	-	-	11		12	3			-
-	SPACE	-	-	13		14	30	9.1	(E) EF-2	-
-	SPACE	-	-	15		16				-
-	SPACE	-	-	17		18	3			-
-	SPACE	-	-	19		20	30	2.5	(E) EF-3	-
-	SPACE	-	-	21		22				-
-	SPACE	-	-	23		24	3			-
-	SPACE	-	-	25		26	30	4	EF-4 [5HP]	3#12
-	SPACE	-	-	27		28			VIA DIV 26 SUPPLIED CMB STARTER	1#12G
-	SPACE	-	-	29		30	3		30AS/NF/3P/SI/N3R CMB STARTER	3/4"C
-	SPACE	-	-	31		32	30	9	EF-5 [7.5HP]	3#12
-	SPACE	-	-	33		34			VIA DIV 26 SUPPLIED CMB STARTER	1#12G
-	SPACE	-	-	35		36	3		30AS/NF/3P/SI/N3R CMB STARTER	3/4"C
-	SPACE	-	-	37		38				
-	SPACE	-	-	39		40				
-	SPACE	-	-	41		42				

CONN LTG 6 x1.25= 8 KVA — XFMR LOAD - x1.0= - KVA — CONN EQUIP - x1.0= - KVA — CONN RCPT - xNEC= - KVA — CONN HVAC 52 x1.0= 52 KVA — TOTAL LOAD 60 KVA 72 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NLA — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 225 AMP BUS 3 ø 4 WIRE — Cu MAT - AMP MLO 65 KAIC — 150 AMP MCB 120/208 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
-	(E) RECEP. ROOM #.C330	0.9	20/1	1		2	20/1	0.8	(E) WATER HEATER BI & B2	-
-	(E) RECEP. ROOM #.C320	0.9	20/1	3		4	20/1	0.4	(E) EDF	-
-	(E) RECEP. ROOM #.C300	0.9	20/1	5		6	20/1	1.2	(E) GWH-1	-
-	(E) RECEP. ROOM #.C360	0.9	20/1	7		8	20/1	1.2	(E) DHWRP-1	-
-	(E) RECEP. ROOM #.C340	0.9	20/1	9		10	20/1	0.5	(E) 3 D.R. SERVICE RECEPTACLES	-
-	(E) RECEP. ROOM #.C341	1.0	20/1	11		12	20/1	1.6	(E) 9 D.R. AUTOMATIC TOILETS	-
-	(E) RECEP. ROOM #.C321	0.9	20/1	13		14	20/1	1.9	(E) LVL 1 HVAC CONTROL	-
-	(E) RECEP	0.7	20/1	15		16	20/1	-	(E) LVL 2 HVAC CONTROL	-
-	(E) AC-1 AIR DRYER	0.5	20/1	17		18	20/1	-	(E) LVL 3 HVAC CONTROL	-
-	(E) 1 D.R. ROOF	0.2	20/1	19		20	20/1	0.4	(E) FLUSH VALVES AND FAUCETS	-
-	(E) RECEP	0.7	20/1	21		22	20/1	0.2	(E) ROOF RECEP	-
-	(E) WATER HEATER	0.4	20/1	23		24	20/1	0.4	(E) ROOF L10-30R	-
-	(E) AC-1 TANK DRAIN VALVE	0.6	20/1	25		26	20/1	0.4	(E) PHWP1&2 CONTROL POWER	-
#12	EXHAUST AIR VAVLES	0.3	20/1	27		28	-	-	SPACE	-
#12	LAB CONTROL PANEL	0.2	20/1	29		30	-	-	SPACE	-
#10	LIGHTING - LECTURE HALL	1.2	20/1	31		32	20/1	-	(E) WINDOW WASHING - ROOF	-
#10	LIGHTING - LECTURE HALL	1.1	20/1	33		34	30	-	(E) WINDOW WASHING - ROOF	-
#10	LIGHTING - COORIDOR	0.8	20/1	35		36	2			-
#10	LIGHTING - LECTURE HALL	1.2	20/1	37		38	20/1	0.4	(E) VAV CONTROL POWER	-
-	SPACE	-	-	39		40	20/1	0.4	(E) VAV CONTROL POWER	-
-	SPACE	-	-	41		42	-	-	-	-

CONN LTG 4.3 x1.25= 5.4 KVA — XFMR LOAD - x1.0= - KVA — CONN EQUIP 11 x1.0= 11 KVA — CONN RCPT 7 xNEC= 7 KVA — CONN HVAC - x1.0= - KVA — TOTAL LOAD 24 KVA 67 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NLB — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [X] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 400 AMP BUS 3 ø 4 WIRE — Cu MAT - AMP MLO 22 KAIC — 350 AMP MCB 120/208 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
#12	RECEPTACLE LAB - 307	0.6	20/1	1		2	20/1	0.6	RECEPTACLE LAB - 307	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	3		4	20/1	-	SPARE	-
#12	RECEPTACLE LAB - 307	0.4	20/1	5		6	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.8	20/1	7		8	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	9		10	20/1	0.8	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	11		12	20/1	0.8	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	13		14	20/1	0.8	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	15		16	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	17		18	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	19		20	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	21		22	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	23		24	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	25		26	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.4	20/1	27		28	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE LAB - 307	0.2	20/1	29		30	20/1	0.4	RECEPTACLE LAB - 306	#12
#12	RECEPTACLE ROOM - 311	1.6	20/1	31		32	20/1	0.2	RECEPTACLE ROOM - 311	#12
#12	RECEPTACLE ROOM - 311	1.6	20/1	33		34	20/1	1.6	RECEPTACLE ROOM - 311	#12
#12	RECEPTACLE ROOM - 311	1.6	20/1	35		36	20/1	1.6	RECEPTACLE ROOM - 311	#12
#12	RECEPTACLE ROOM - 311	1.6	20/1	37		38	-	4.7	HCC3NLC	-
#12	RECEPTACLE ROOM - 311	0.8	20/1	39		40	-	-	FEED-THRU LUGS	-
#12	RECEPTACLE ROOM - 311	0.2	20/1	41		42	-	-	-	-

CONN LTG - x1.25= - KVA — XFMR LOAD 47 x1.0= 47 KVA — CONN EQUIP - x1.0= - KVA — CONN RCPT 25 xNEC= 18 KVA — CONN HVAC - x1.0= - KVA — TOTAL LOAD 65 KVA 180 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NLC — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 225 AMP BUS 3 ø 4 WIRE — Cu MAT - AMP MLO 22 KAIC — 225 AMP MCB 120/208 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
#12	RECEPTACLE LAB - 306	0.4	20/1	1		2	20/1	1.2	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE LAB - 306	0.4	20/1	3		4	20/1	1.6	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE LAB - 306	0.2	20/1	5		6	20/1	1.2	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE LAB - 306	0.4	20/1	7		8	20/1	1.6	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	9		10	20/1	1.2	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	11		12	20/1	1.6	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	13		14	20/1	1.2	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	15		16	20/1	1.6	RECEPTACLE LIBRARY - 302A	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	17		18	20/1	1.6	RECEPTACLE LIBRARY - 302A	#12
#12	RECEPTACLE CLASSROOM - 305	1.6	20/1	19		20	20/1	1.6	RECEPTACLE LIBRARY - 302A	#12
#12	RECEPTACLE CLASSROOM - 305	0.8	20/1	21		22	20/1	1.6	RECEPTACLE LIBRARY - 302A	#12
-	SPARE	-	20/1	23		24	20/1	0.8	RECEPTACLE LIBRARY - 302A/333	#12
#12	RECEPTACLE LAB - 304/305	1.2	20/1	25		26	20/1	0.8	RECEPTACLE LIBRARY - 302A	#12
#12	RECEPTACLE LAB - 304	0.8	20/1	27		28	20/1	1.6	RECEPTACLE LAB - 304	#12
#12	RECEPTACLE LAB - 304	1.6	20/1	29		30	20/1	-	SPARE	#12
#12	RECEPTACLE ROOM - 310	0.6	20/1	31		32	20/1	1.0	(3) PROJECTORS / SCREENS	#12
#12	RECEPTACLE ROOM - 310	0.8	20/1	33		34	20/1	0.8	RECEPTACLE ROOM - 310	#12
#10	(3) PROJECTORS / SCREENS	1.0	20/1	35		36	-	-	SPACE	-
#10	(3) PROJECTORS / SCREENS	1.0	20/1	37		38	-	-	HCC3NLD	-
#10	(2) PROJECTORS / SCREENS	0.6	20/1	39		40	-	-	FEED-THRU LUGS	-
#10	(3) PROJECTORS / SCREENS	1.0	20/1	41		42	-	-	-	-

CONN LTG - x1.25= - KVA — XFMR LOAD - x1.0= - KVA — CONN EQUIP 4.6 x1.0= 4.6 KVA — CONN RCPT 73 xNEC= 42 KVA — CONN HVAC - x1.0= - KVA — TOTAL LOAD 47 KVA 130 AMPS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

EXISTING PANEL

PANEL: HCC3NLD — LOCATION: ELEC ROOM — MTG: [X] SURFACE [ ] FLUSH — BUS: [X] NEUTRAL [X] SYS GND [ ] ISO GND — OPT: [ ] INT TVSS [ ] FEED THRU — NEMA-1 — ENC 225 AMP BUS 3 ø 4 WIRE — Cu MAT 225 AMP MLO 22 KAIC — - AMP MCB 120/208 VOLT

WIRE SIZE	LOAD DESCRIPTION	LOAD KVA	BRKR SIZE	CKT NO	A B C	CKT NO	BRKR SIZE	LOAD KVA	LOAD DESCRIPTION	WIRE SIZE
#12	RECEPTACLE LIBRARY - 302A	1.2	20/1	1		2	20/1	1.4	RECEPTACLE CLASSROOM - 322	#12
#12	RECEPTACLE LIBRARY - 302A	1.2	20/1	3		4	20/1	0.8	RECEPTACLE CLASSROOM - 322	#12
#12	RECEPTACLE LIBRARY - 302A	1.2	20/1	5		6	20/1	0.8	RECEPTACLE CLASSROOM - 321	#12
#12	RECEPTACLE HALL - 326	0.4	20/1	7		8	20/1	1.6	RECEPTACLE CLASSROOM - 320/321	#12
#12	RECEPTACLE HALL - 326	0.8	20/1	9		10	20/1	0.4	RECEPTACLE CLASSROOM - 320	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	11		12	20/1	-	SPARE	#12
#12	RECEPTACLE TECH. - 323	0.8	20/1	13		14	20/1	1.4	RECEPTACLE CLASSROOM - 318/319	#12
#12	RECEPTACLE TECH. - 322/323	1.6	20/1	15		16	20/1	0.8	RECEPTACLE CLASSROOM - 319	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	17		18	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	19		20	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	21		22	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	23		24	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	25		26	20/1	0.8	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	1.6	20/1	27		28	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE TECH. - 323	0.8	20/1	29		30	20/1	1.6	RECEPTACLE ROOM - 318	#12
#12	RECEPTACLE LAB - 306	0.8	20/1	31		32	-	-	SPACE	-
#12	RECEPTACLE LAB - 306	0.8	20/1	33		34	-	-	SPACE	-
-	SPACE	-	-	-		36	-	-	SPACE	-
-	SPACE	-	-	37		38	-	-	SPACE	-
-	SPACE	-	-	39		40	-	-	SPACE	-
-	SPACE	-	-	41		42	-	-	SPACE	-

REFER TO HC3NLC FOR LOADS

ALL WIRING FOR 20A/1P CKT SHALL CONSIST OF 3#12 CU/THWN IN 3/4"C UNLESS OTHERWISE NOTED.

PROVIDE NEW BREAKERS FOR THIS PANEL IN EXISTING SPACES

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

SMITH&COMPANY
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1500 MCGOWEN ST. SUITE 150
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STATE OF TEXAS — ANWAR HASSAN — 64671 — LICENSED PROFESSIONAL ENGINEER — 4/9/13

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION

HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER — SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

MEP IT Engineers + Consultants
MEP-IT ENGINEERS
6117 Richmond Avenue, Suite 200
Houston, Texas 77057
P. 713.622.0120
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TBPE REGISTRATION NO. 11203

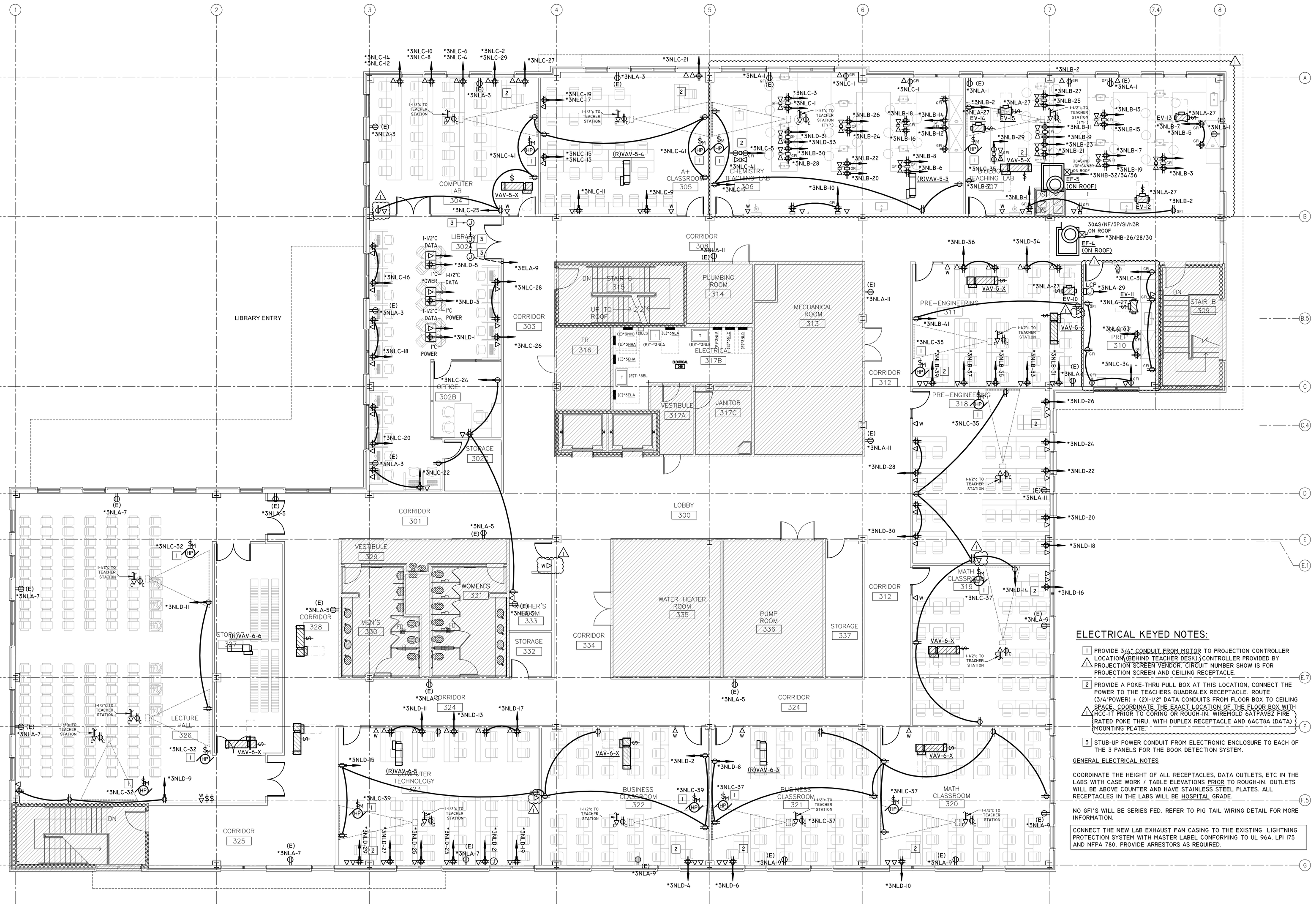
DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

Panel Schedule

SHEET NO. :

E1.11



ELECTRICAL KEYED NOTES:

1. PROVIDE 3/4" CONDUIT FROM MOTOR TO PROJECTION CONTROLLER LOCATION (BEHIND TEACHER DESK). CONTROLLER PROVIDED BY PROJECTION SCREEN VENDOR. CIRCUIT NUMBER SHOW IS FOR PROJECTION SCREEN AND CEILING RECEPTACLE.
2. PROVIDE A POKE-THRU PULL BOX AT THIS LOCATION. CONNECT THE POWER TO THE TEACHERS QUADRALEX RECEPTACLE. ROUTE (3/4"POWER) + (2)-1/2" DATA CONDUITS FROM FLOOR BOX TO CEILING SPACE. COORDINATE THE EXACT LOCATION OF THE FLOOR BOX WITH HCC-IT PRIOR TO CORING OR ROUGH-IN. WIREMOLD 6ATPAVBZ FIRE RATED POKE THRU. WITH DUPLEX RECEPTACLE AND 6ACT8A (DATA) MOUNTING PLATE.
3. STUB-UP POWER CONDUIT FROM ELECTRONIC ENCLOSURE TO EACH OF THE 3 PANELS FOR THE BOOK DETECTION SYSTEM.

GENERAL ELECTRICAL NOTES

COORDINATE THE HEIGHT OF ALL RECEPTACLES, DATA OUTLETS, ETC IN THE LABS WITH CASE WORK / TABLE ELEVATIONS PRIOR TO ROUGH-IN. OUTLETS WILL BE ABOVE COUNTER AND HAVE STAINLESS STEEL PLATES. ALL RECEPTACLES IN THE LABS WILL BE HOSPITAL GRADE.

NO GFI'S WILL BE SERIES FED. REFER TO PIG TAIL WIRING DETAIL FOR MORE INFORMATION.

CONNECT THE NEW LAB EXHAUST FAN CASING TO THE EXISTING LIGHTNING PROTECTION SYSTEM WITH MASTER LABEL CONFORMING TO UL 96A, LPI 175 AND NFPA 780. PROVIDE ARRESTORS AS REQUIRED.

1 FLOOR PLAN - POWER
SCALE: 1/8" = 1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

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STATE OF TEXAS
ANWAR HASSAN
64671
LICENSED PROFESSIONAL ENGINEER
5/9/13

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION
HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

MEP IT Engineers + Consultants
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TBPE REGISTRATION NO. 11203

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

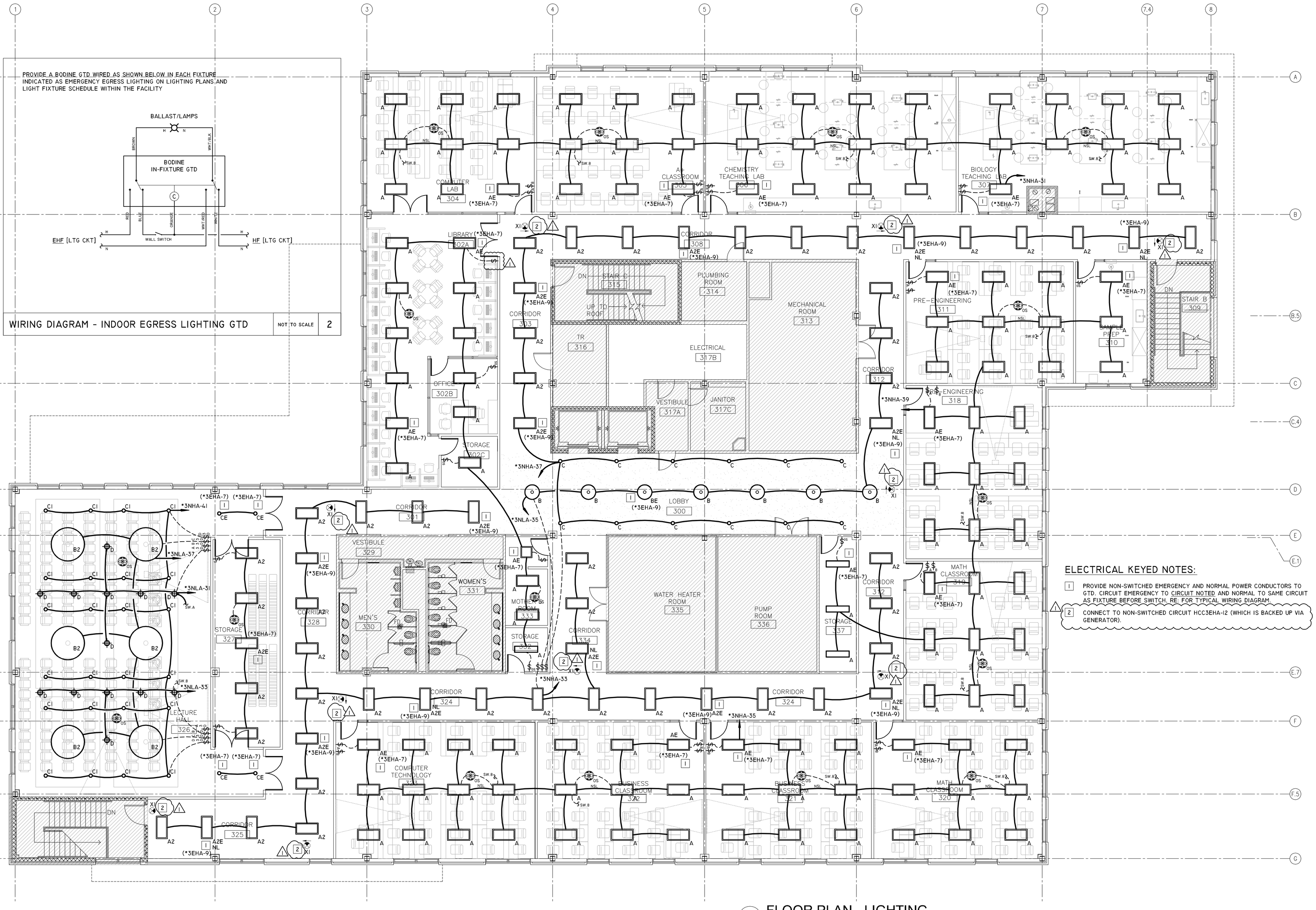
FLOOR PLAN
POWER

SHEET NO. :

E2.01

PROVIDE A BODINE GTD WIRED AS SHOWN BELOW IN EACH FIXTURE INDICATED AS EMERGENCY EGRESS LIGHTING ON LIGHTING PLANS AND LIGHT FIXTURE SCHEDULE WITHIN THE FACILITY

WIRING DIAGRAM - INDOOR EGRESS LIGHTING GTD | NOT TO SCALE | 2



1 FLOOR PLAN - LIGHTING
SCALE: 1/8" = 1'-0"

ELECTRICAL KEYED NOTES:

1. PROVIDE NON-SWITCHED EMERGENCY AND NORMAL POWER CONDUCTORS TO GTD. CIRCUIT EMERGENCY TO CIRCUIT NOTED AND NORMAL TO SAME CIRCUIT AS FIXTURE BEFORE SWITCH. RE: FOR TYPICAL WIRING DIAGRAM.
2. CONNECT TO NON-SWITCHED CIRCUIT HCC3EHA-12 (WHICH IS BACKED UP VIA GENERATOR).

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

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PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION

HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

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TBPE REGISTRATION NO. 11203

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

FLOOR PLAN
LIGHTING

SHEET NO. :

E3.01

1 FLOOR PLAN - SPECIAL SYSTEMS
SCALE: 1/8" = 1'-0"

ISSUE LOG

NO.	DATE	DESCRIPTION
1	5/13/2013	ADDENDA #1

SMITH&COMPANY ARCHITECTS
1500 MCGOWEN ST. SUITE 150
HOUSTON, TEXAS 77004
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SEAL:

STATE OF TEXAS
ANWAR HASSAN
64671
LICENSED PROFESSIONAL ENGINEER
4/9/13

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION

HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

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MEP-IT ENGINEERS
6117 Richmond Avenue, Suite 200
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TBPE REGISTRATION NO. 11203

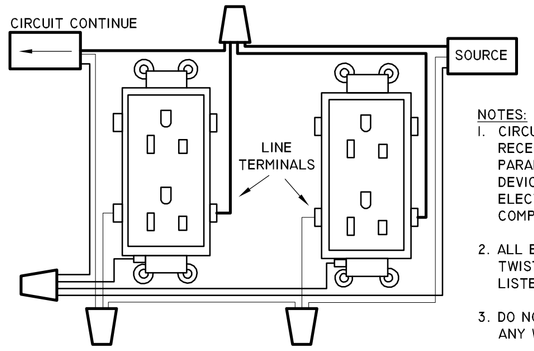
DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

FLOOR PLAN
SPECIAL SYSTEMS

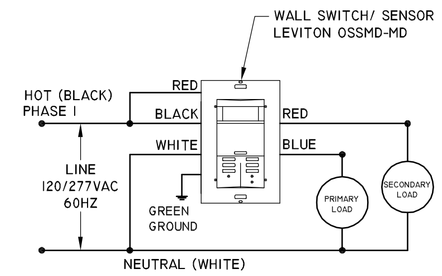
SHEET NO. :

E4.01

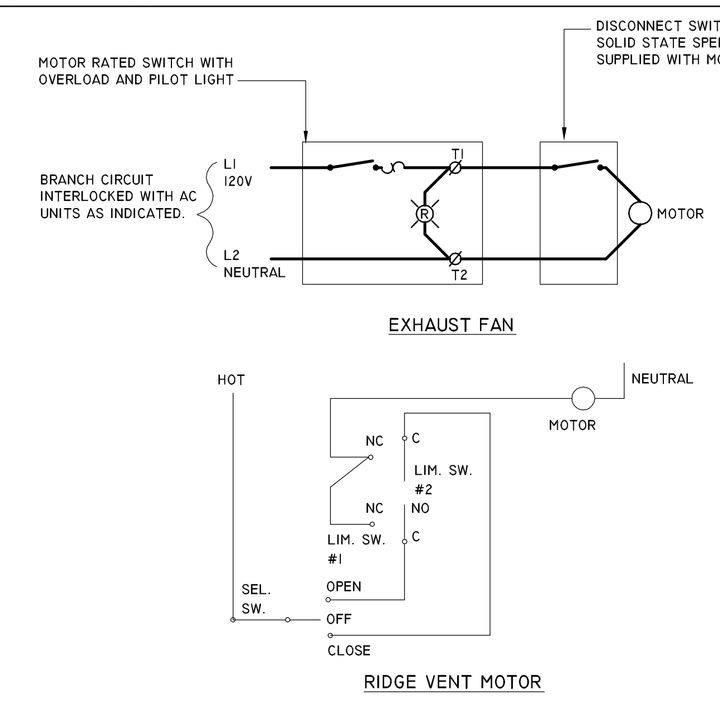


NOTES:
1. CIRCUITING TO ALL NON DEDICATED ELECTRICAL RECEPTACLES AND SWITCHES ARE REQUIRED TO UTILIZE PARALLEL CIRCUITING BY THE USE OF "PIG TAILS" TO EACH DEVICE SO THAT IF AN OUTLET IS REMOVED OR FAILS ELECTRICAL CONTINUITY THE CIRCUIT WILL NOT BE COMPROMISED.
2. ALL ELECTRICAL WIRING MUST BE PROPERLY SPLICED BY TWISTING THE WIRES TOGETHER AND USE OF APPROVED AND LISTED COMPRESSION WIRE NUTS FOR ANY WIRING.
3. DO NOT USE END TO END BUTT-SPLICING CONNECTORS FOR ANY WIRING.

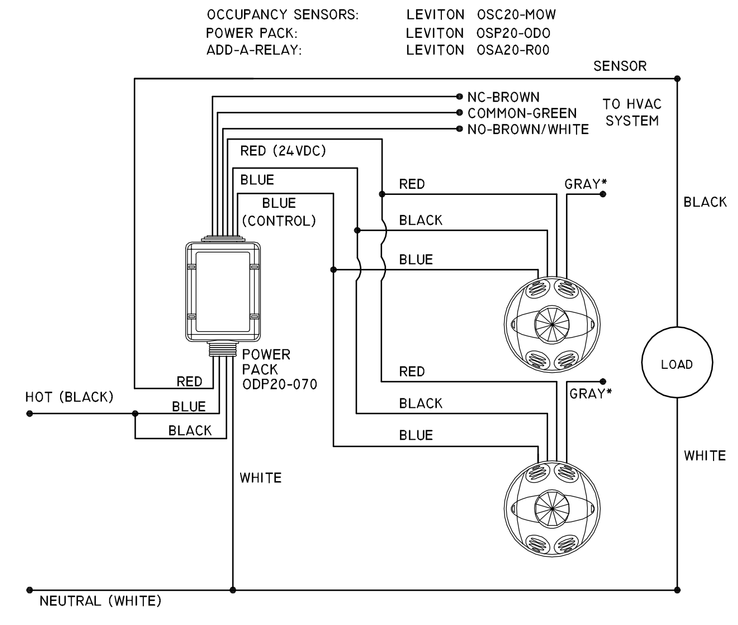
DETAIL - PIGTAIL | NOT TO SCALE | 6



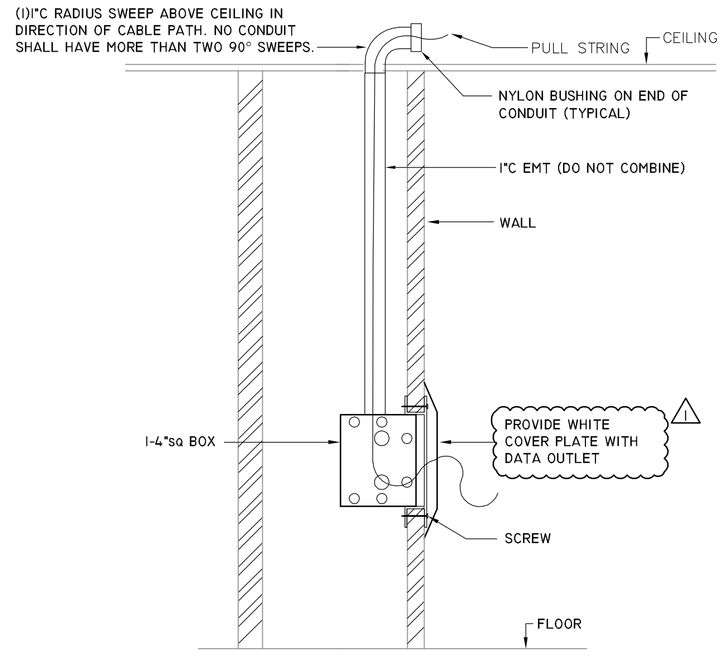
DETAIL - WALL OCCUPANCY SENSOR | NOT TO SCALE | 3



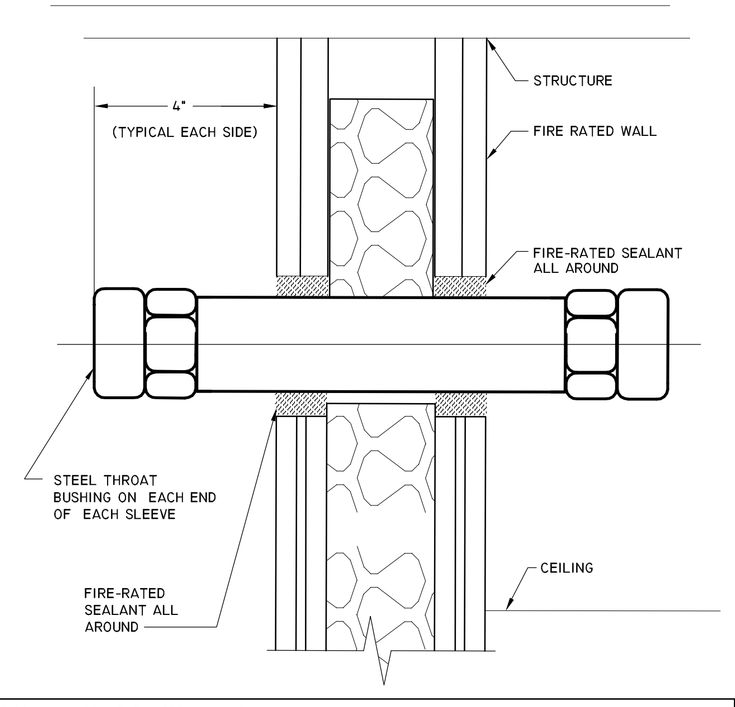
DETAIL - SINGLE PHASE MOTOR CONTROL | NOT TO SCALE | 5



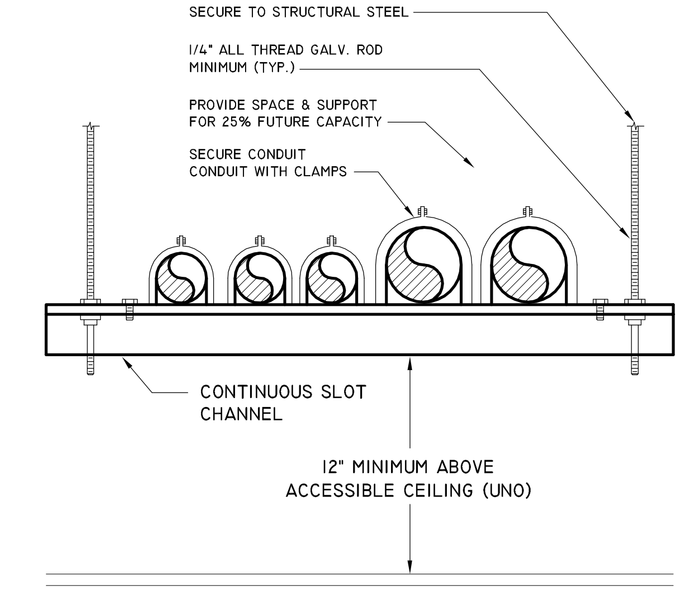
DETAIL - CEILING OCCUPANCY SENSOR | NOT TO SCALE | 2



DETAIL - DATA OUTLETS | NOT TO SCALE | 7



DETAIL - WALL SLEEVE | NOT TO SCALE | 4



DETAIL - CONDUIT RACK | NOT TO SCALE | 1

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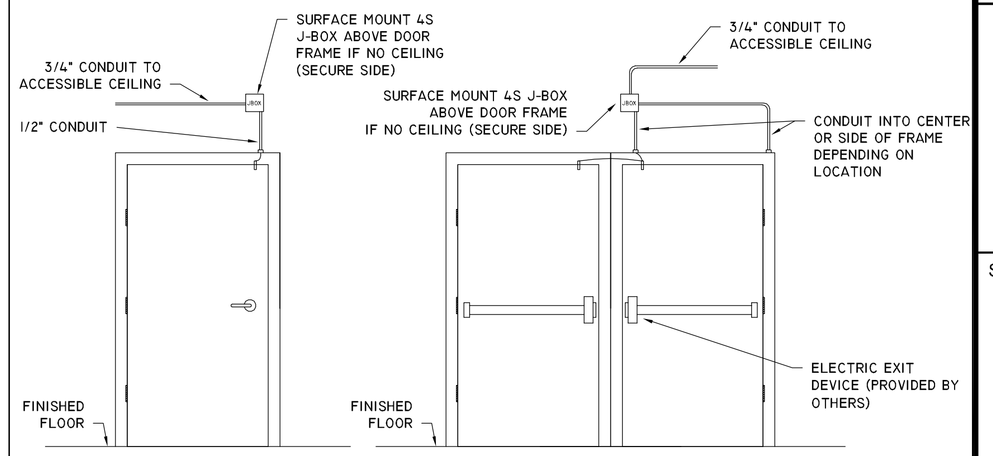
SHEET TITLE :

DETAILS

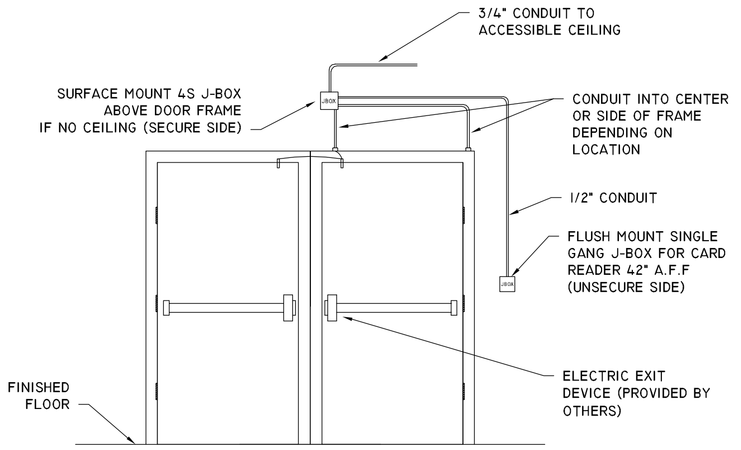
SHEET NO. :

E5.01



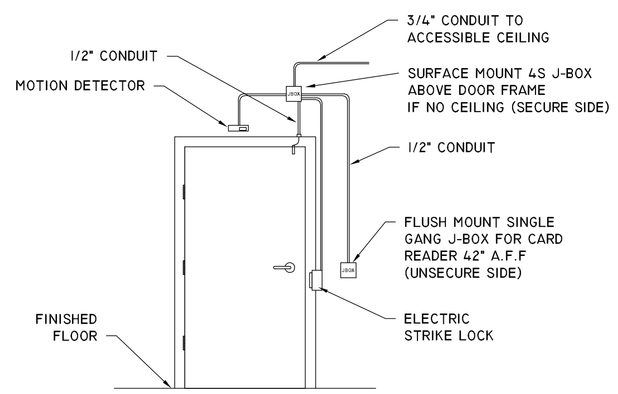
REFER TO SECURITY DRAWINGS FOR APPLICABLE LOCATIONS

DETAIL - DOOR CONTACT - SINGLE DOOR, DOUBLE DOOR | NOT TO SCALE | 3



REFER TO SECURITY DRAWINGS FOR APPLICABLE LOCATIONS

DETAIL - CARD READER - DOUBLE DOOR | NOT TO SCALE | 2



REFER TO SECURITY DRAWINGS FOR APPLICABLE LOCATIONS

DETAIL - CARD READER - SINGLE DOOR | NOT TO SCALE | 1

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DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

DETAILS

SHEET NO. :

E5.02 1

FAN SCHEDULE

PLAN MARK	SERVING	AIR VOLUME (CFM)	FAN TYPE	DRIVE TYPE	E.S.P. INCH W.C.	FAN SPEED (RPM)	MOTOR			MANUFACTURER & MODEL	LOCATION	I/4W (4" MIN.) REMARKS
							HP	V/P/Hz	RPM			
EF-4	BSC	1,800	LAB EXHAUST FAN	BELT DRIVE	3.0	2,945	3	480/3/60	3,600	GREENHECK - VEKTOR-CD-12	ROOF	PROVIDE VOLUME DAMPER ON ALL BRANCH DUCTS
EF-5	FUMEHOOD	3,200	LAB EXHAUST FAN	BELT DRIVE	2.5	4,134	7.5	480/3/60	3,600	GREENHECK - VEKTOR-CD-12	ROOF	1

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY EXISTING LAB EXHAUST SYSTEM AND PROVIDE NEW EF-4 AND EF-5 WITH SAME ACCESSORIES.

VAV TERMINAL UNIT SCHEDULE

MARK	SERVICE	INLET SIZE	MAX CFM	DESIGN CFM	MIN CFM	HEATING COIL					BASIS OF DESIGN		NOTES
						CFM	EAT °F	LAT °F	MBTU	GPM	MFR	MODEL	
(E)VAV-5-1	LIBRARY	12	1420	1420	475	710	55	86	23.8	2.4	TITUS	DESV	1
(E)VAV-5-2	CLASSRM 305	10	1075	800	360	540	55	89	19.9	2.0	TITUS	DESV	1
(R)VAV-5-3	CHEM 306	12	1370	1370	460	685	55	90	25.9	2.6	TITUS	DESV	1
(R)VAV-5-4	CLASSRM 305	9	960	700	320	480	55	88	17.2	1.8	TITUS	DESV	1
(N)VAV-5-5	COMP LAB 304	12	2000	1400	700	700	55	90	24.5	2.5	TITUS	DESV	1, 2, 3
(N)VAV-5-6	BIO LAB 307	12	2000	1500	750	750	55	90	26.3	2.6	TITUS	DESV	1, 2, 3
(N)VAV-5-7	PRE-ENG 311	10	1400	1100	550	550	55	90	19.3	1.9	TITUS	DESV	1, 2, 3
(N)VAV-5-8	SAMPLE 310	12	2000	1500	750	750	55	90	26.3	2.6	TITUS	DESV	1, 2, 3
(E)VAV-6-1	LOBBY 300	5	255	250	85	130	55	80	3.6	0.4	TITUS	DESV	1
(E)VAV-6-2	PRE-ENG 318	10	1290	1290	430	630	55	89	23.7	2.4	TITUS	DESV	1
(R)VAV-6-3	BUSINESS 321	10	1160	1000	390	580	55	89	21.3	2.2	TITUS	DESV	1
(E)VAV-6-4	RE PLANS	6	355	355	120	180	55	81	5.1	0.6	TITUS	DESV	1
(R)VAV-6-5	COMP. 323	12	1470	1470	490	735	55	88	26.2	2.7	TITUS	DESV	1
(R)VAV-6-6	LECT. 326	14	1945	1600	650	825	55	86	32.7	3.3	TITUS	DESV	1
(N)VAV-6-7	MATH 319	10	1400	1100	550	550	55	90	19.3	1.9	TITUS	DESV	1, 2, 3
(N)VAV-6-8	MATH 320	10	1400	1200	600	600	55	90	21.0	2.1	TITUS	DESV	1, 2, 3
(N)VAV-6-9	BUSINESS 322	10	1400	1000	500	500	55	90	17.5	1.8	TITUS	DESV	1, 2, 3
(N)VAV-6-10	CORRIDOR	8	900	700	350	350	55	90	12.3	1.2	TITUS	DESV	1, 2, 3
(N)VAV-6-11	CORRIDOR	10	1400	1300	650	650	55	90	22.8	2.3	TITUS	DESV	1, 2, 3
(N)VAV-6-12	LECT. 326	12	2000	1600	800	800	55	90	28.0	2.8	TITUS	DESV	1, 2, 3

NOTES:

1. MAXIMUM FACE VELOCITY THROUGH HEATING COIL NOT TO EXCEED 700 FPM.
2. PROVIDE UNIT WITH INTEGRAL SILENCER.
3. INLET DUCT SIZE SHALL BE SAME AS UNITS INLET.

LEGEND:

(E) EXISTING VAV BOX TO REMAIN
(R) RELOCATED VAV BOX TO BE REUSED
(N) NEW VAV BOX

EXHAUST AIR VALVE SCHEDULE

MARK	ROOM NAME AND SERVICE	MAX. CFM	MIN. CFM	SUPPLY VAV INTERLOCK	VALVE SIZE	BASIS OF DESIGN	
						MANUFACTURER	MODEL
EV-10	SAMPLE PREP 310 - BS CABINET	900	0	VAV-5-8	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO
EV-11	SAMPLE PREP 310 - FUME HOOD	800	0	VAV-5-8	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO
EV-12	BIOLOGY LAB 307 - BS CABINET	900	0	VAV-5-6	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO
EV-13	BIOLOGY LAB 307 - FUME HOOD	800	0	VAV-5-6	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO
EV-14	CHEMISTRY LAB 306 - FUME HOOD	800	0	VAV-5-3	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO
EV-15	CHEMISTRY LAB 306 - FUME HOOD	800	0	VAV-5-3	12	PHOENIX SHUT-OFF	EXVBF12M-SMHHO

AIR OUTLET SCHEDULE

PLAN MARK	MAKE	TYPE	MODEL	FACE SIZE	NECK/DUCT SIZE	MATERIAL	FINISH	MOUNTING	REMARKS
A	TITUS	SUPPLY	OMNI-AA	24x24	SEE NECK SCHEDULE	ALUMINUM	OFF WHITE	CEILING	1, 2, 3, 4, 5
B	TITUS	RETURN	50F	24X24	SEE NECK SCHEDULE	ALUMINUM	OFF WHITE	CEILING	1, 2, 3, 4, 5
C	TITUS	RETURN	50F	-	REFER TO PLANS	ALUMINUM	OFF WHITE	SIDE WALL	1, 2, 3, 4, 5
D	TITUS	SUPPLY	TRITEC-AL	48x24	REFER TO PLANS	STAINLESS S.	OFF WHITE	CEILING	1, 2, 3, 4, 5

NOTES:

1. PROVIDE ROUND NECK ADAPTER FOR ALL SUPPLY, RETURN, AND EXHAUST AIR DIFFUSERS WHERE NECESSARY.
2. REFER TO PLANS FOR AIR FLOW RATE.
3. REFER TO DIFFUSER NECK-DUCT SIZE SCHEDULE FOR TAKE OFF BRANCH SIZES.
4. ARCHITECT/OWNER TO SELECT FINISH FROM MANUFACTURES STANDARD COLORS FOR DIFFUSERS/GRILLES & LOUVERS.
5. SEE DIFFUSER NECK-DUCT SIZE SCHEDULE UNLESS OTHERWISE SPECIFIED ON PLANS.

OUTDOOR AIR BASED ON TABLE 4-1, 2006 UNIFORM MECHANICAL CODE

SPACES	TOTAL AREA (FT2)	CFM/FT2 REQUIRED	TOTAL CFM
OFFICE	279	0.08	22
CORRIDORS	5,041	0.05	252
JAN/STORAGE	1,018	0.05	51
CLASSROOM	8,660	0.22	1,949
LECTURE HALL	2,015	0.50	1,008
LIBRARY	852	0.15	128
TOTAL			3,410

BATHROOM VENTILATION			
BATHROOMS	NUMBER OF FIXTURES	CFM/FIXTURE	TOTAL CFM
-	-	-	-

TOTAL OUTSIDE AIR REQUIREMENT BASED ON 2006 UMC TABLE 4-1:	3,410 CFM
TOTAL OUTSIDE AIR SCHEDULED FOR AIR HANDLING UNITS (EXISTING OAHU-R-1):	7,465 CFM

AIR FLOW BALANCE (RM#306)	
DESIGN AIR FLOW	1,370
DESIGN TRANSFER AIR FLOW	230
DESIGN EXH. AIR FLOW	1,600
MINIMUM AIR FLOW	0
MINIMUM TRANSFER AIR FLOW	0
MINIMUM EXH. AIR FLOW	0
NEGATIVE PRESSURE	

AIR FLOW BALANCE (RM#307)	
DESIGN AIR FLOW	1,500
DESIGN TRANSFER AIR FLOW	200
DESIGN EXH. AIR FLOW	1,700
MINIMUM AIR FLOW	0
MINIMUM TRANSFER AIR FLOW	0
MINIMUM EXH. AIR FLOW	0
NEGATIVE PRESSURE	

AIR FLOW BALANCE (RM#310)	
DESIGN AIR FLOW	1,500
DESIGN TRANSFER AIR FLOW	200
DESIGN EXH. AIR FLOW	1,700
MINIMUM AIR FLOW	0
MINIMUM TRANSFER AIR FLOW	0
MINIMUM EXH. AIR FLOW	0
NEGATIVE PRESSURE	

DIFFUSER NECK-DUCT SIZE SCHEDULE

SUPPLY AIR (CFM)	DIFFUSER NECK AND BRANCH DUCT SIZE
0 - 100	6"Ø
101 - 200	8"Ø
201 - 300	10"Ø
301 - 400	12"Ø
401 - 500	14"Ø

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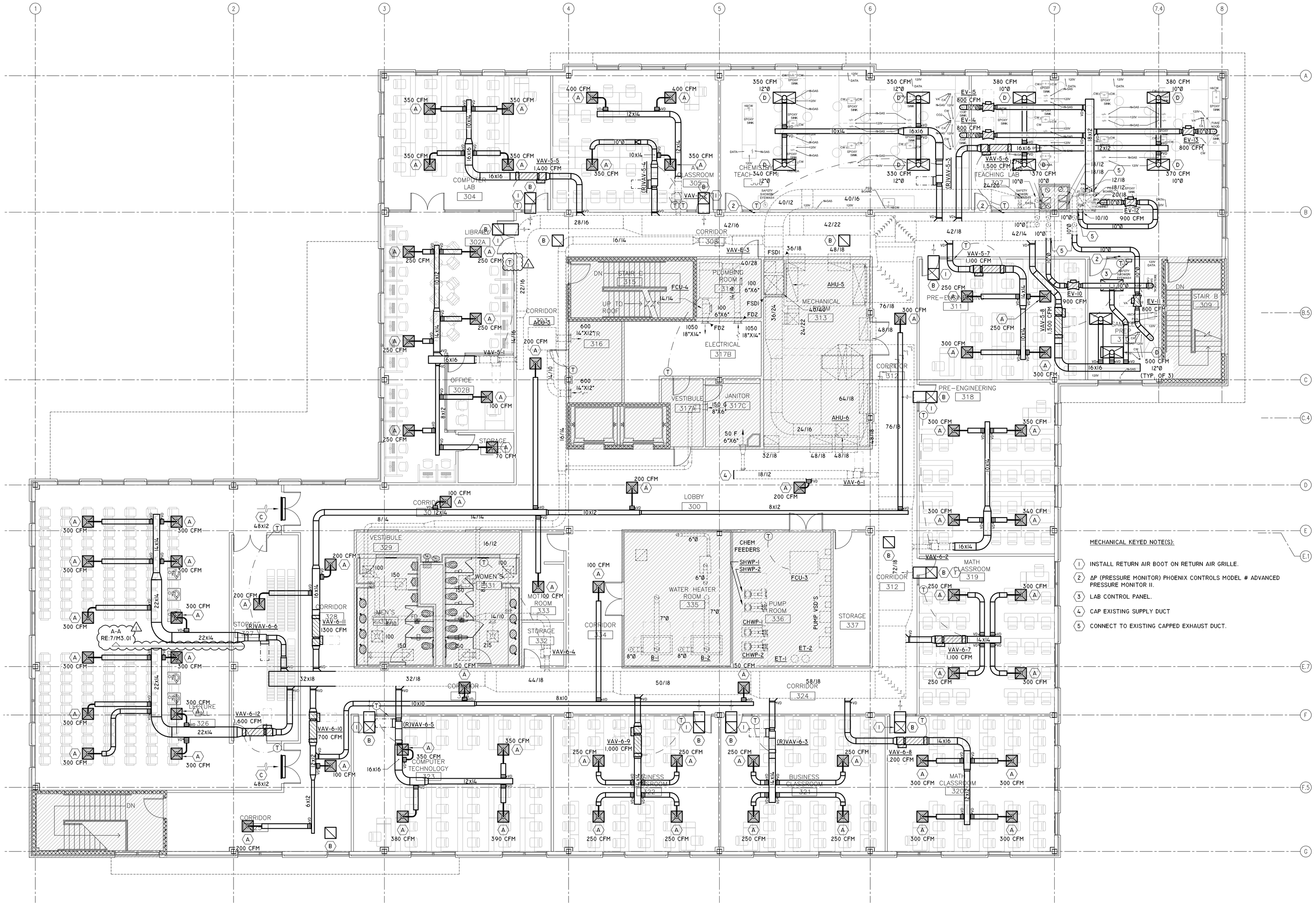
SCHEDULES

SHEET NO. :

M0.02



MECHANICAL KEYED NOTE(S):

1. INSTALL RETURN AIR BOOT ON RETURN AIR GRILLE.
2. ΔP (PRESSURE MONITOR) PHOENIX CONTROLS MODEL # ADVANCED PRESSURE MONITOR II.
3. LAB CONTROL PANEL.
4. CAP EXISTING SUPPLY DUCT
5. CONNECT TO EXISTING CAPPED EXHAUST DUCT.

1 THIRD FLOOR PLAN - NEW - MECHANICAL
SCALE: 1/8" = 1'-0"

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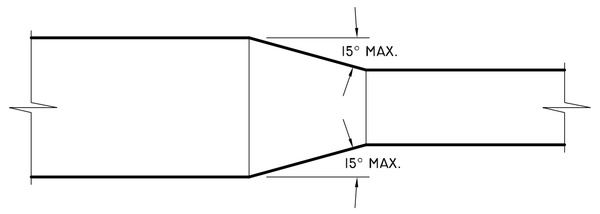
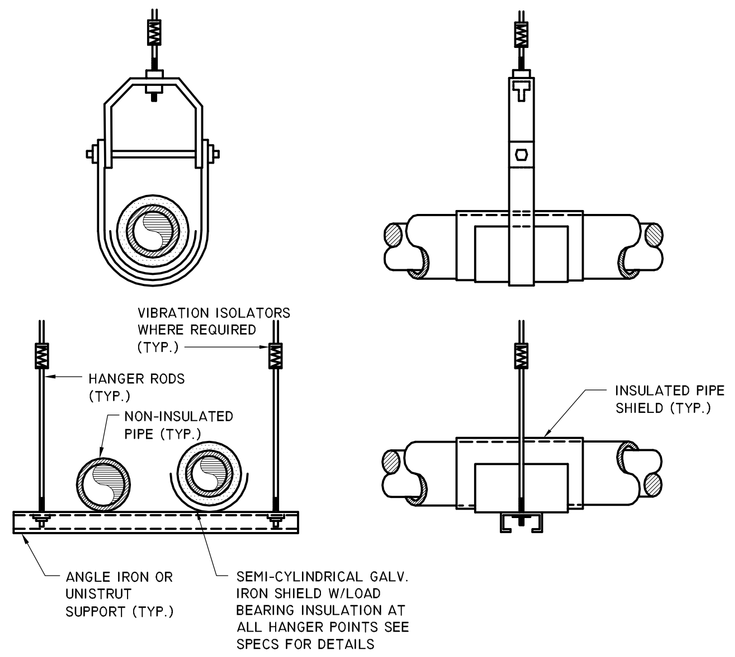
THIRD FLOOR PLAN - NEW - MECHANICAL

SHEET NO. :

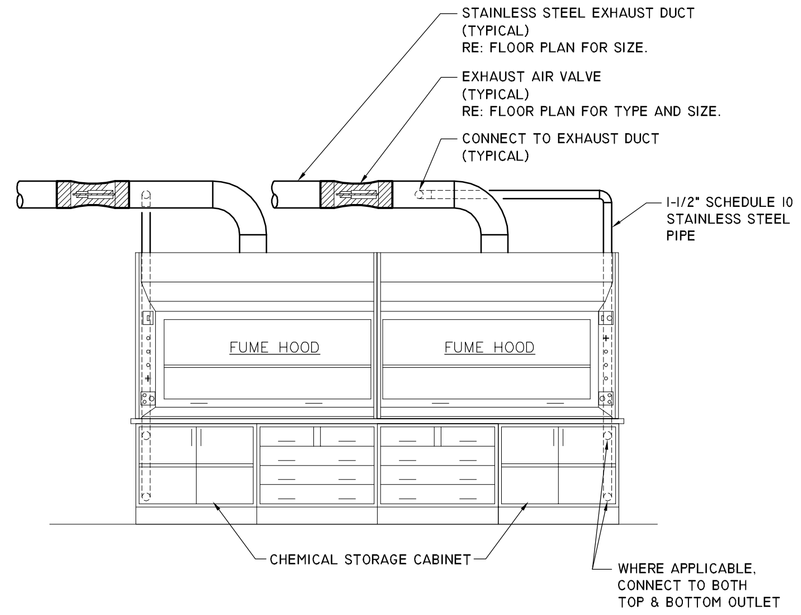
M2.01



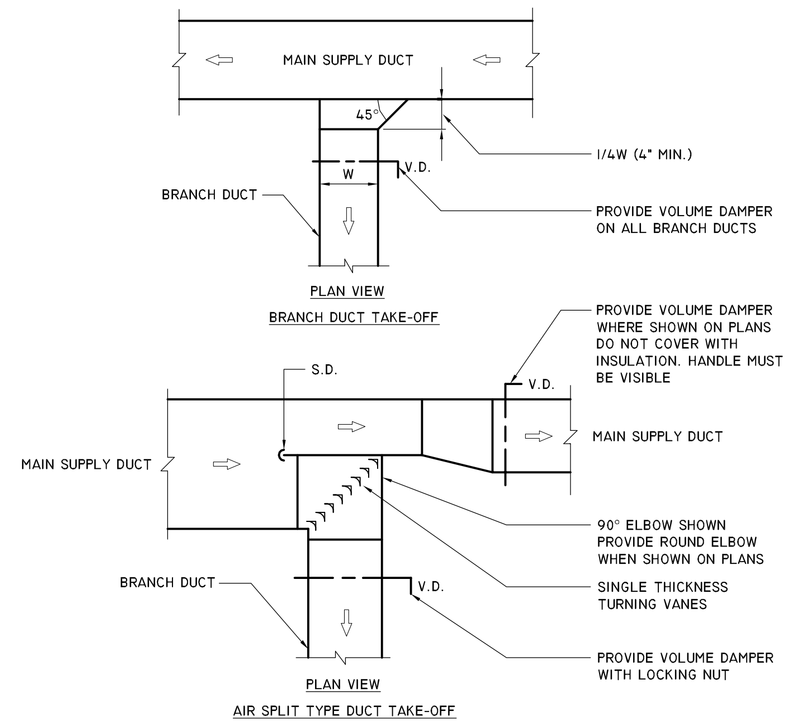
DUCT TRANSITION DETIAL | 11



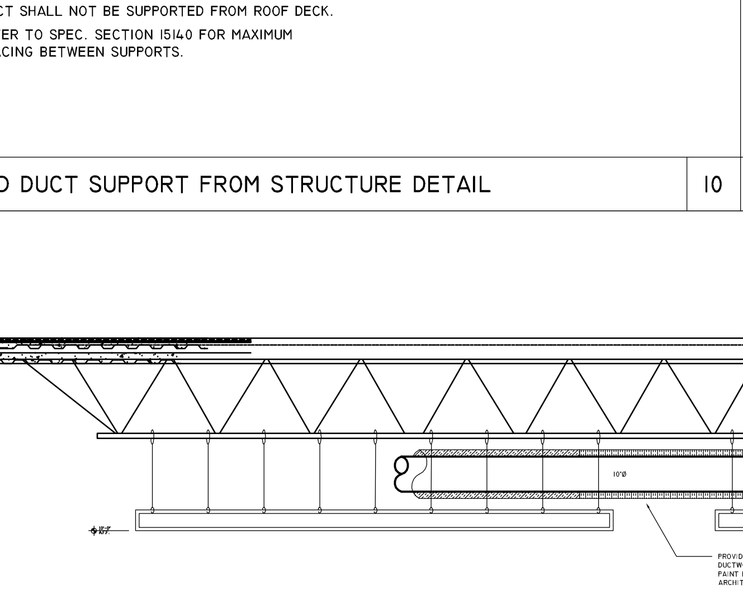
PIPE HANGER DETAIL | 9



FUME HOOD VENTILATION DETAIL | 6

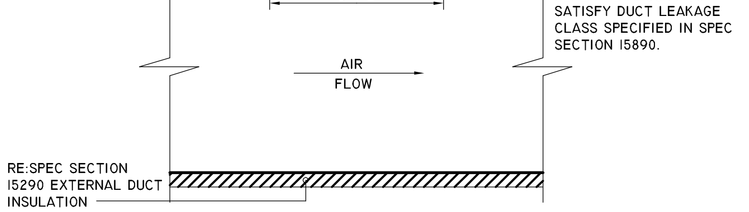


BRANCH DUCT DETAIL | 3



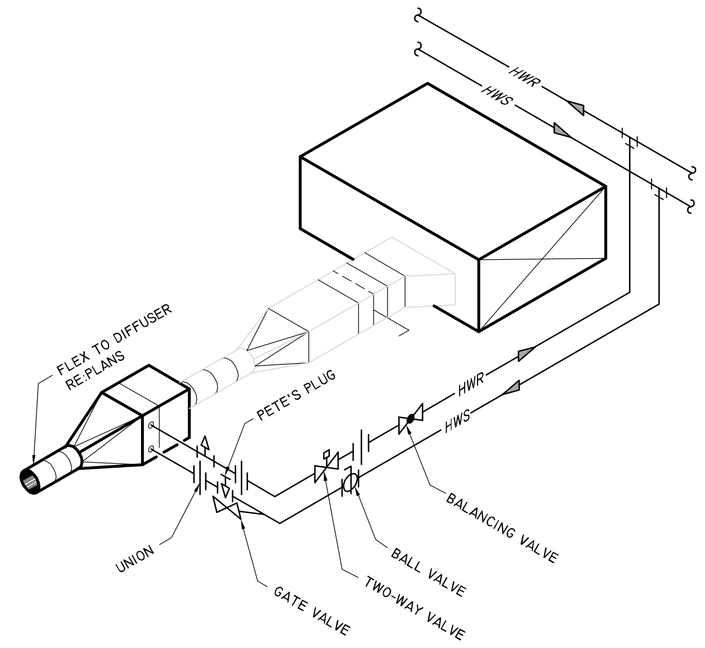
NOTES:
1. SUPPORT DUCTWORK FROM STRUCTURE. DUCT SHALL NOT BE SUPPORTED FROM ROOF DECK.
2. REFER TO SPEC. SECTION 15140 FOR MAXIMUM SPACING BETWEEN SUPPORTS.

ROUND DUCT SUPPORT FROM STRUCTURE DETAIL | 10

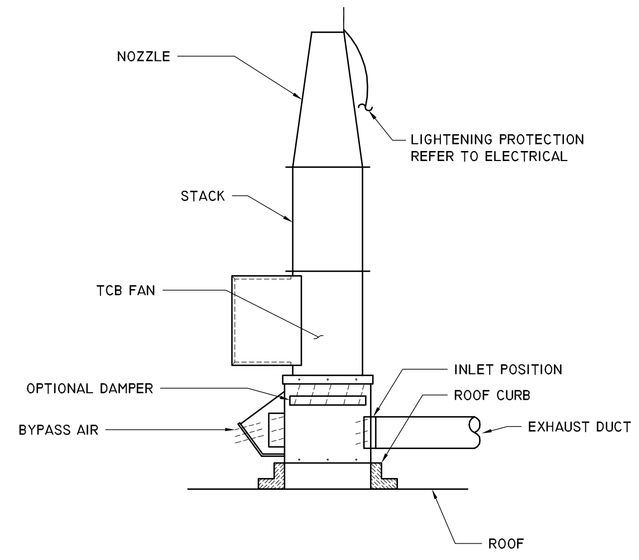


NOTES:
1. USE THIS DETAIL FOR EXTERNALLY INSULATED DUCTWORK.
2. EXTEND ROUND SHEET METAL DUCTWORK AND ASSOCIATED DUCT INSULATION FROM MAIN DUCT. SO FLEXIBLE DUCT LENGTH DOES NOT EXCEED 6 FEET.

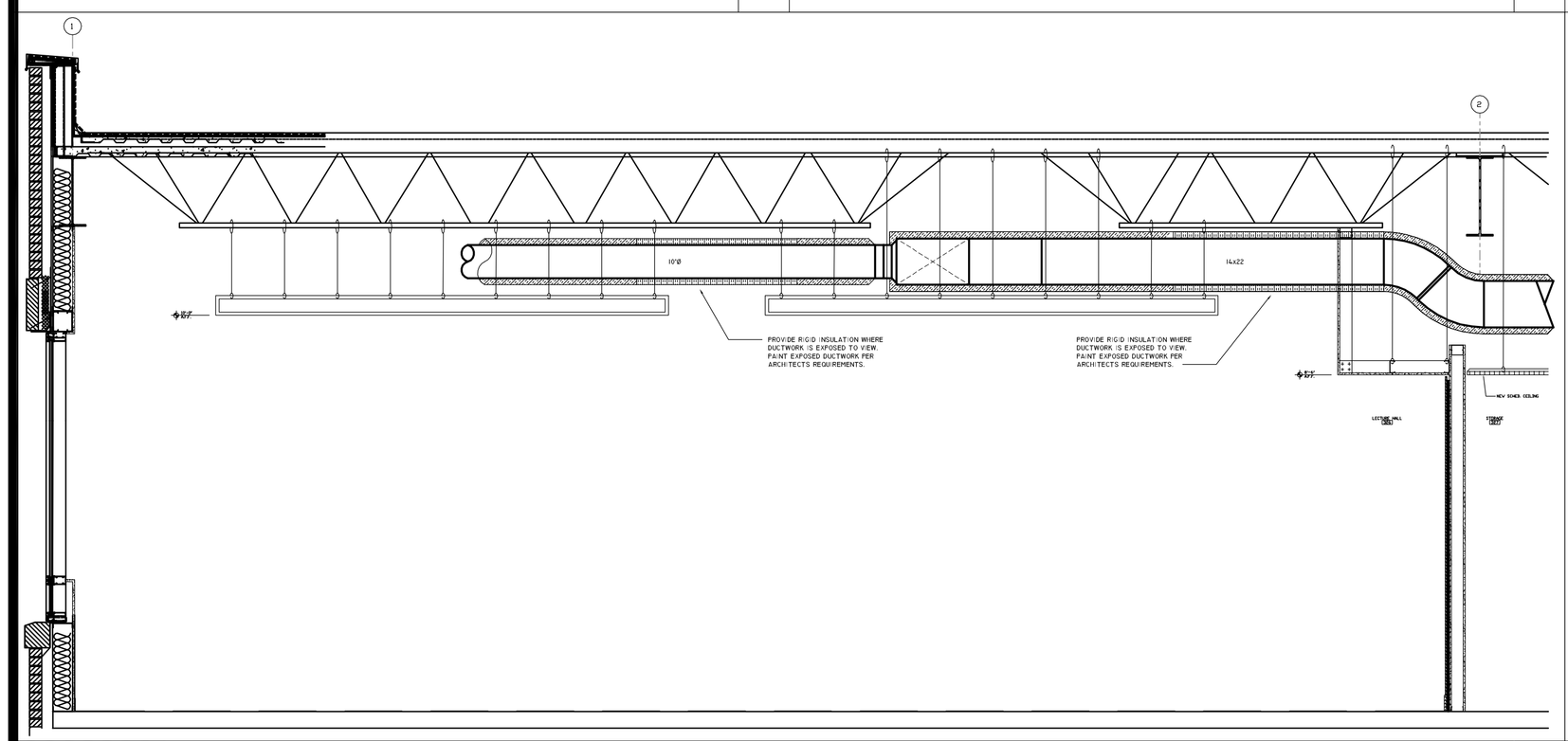
SPIN FITTING DETAIL | 8



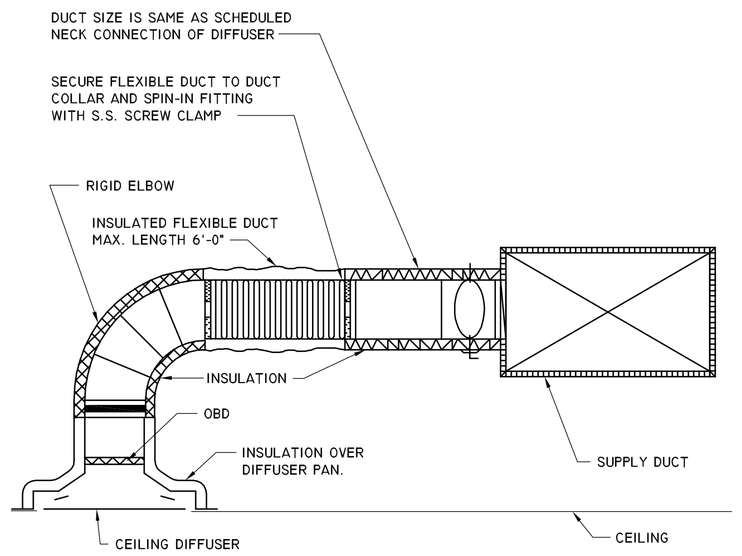
HOT WATER COIL PIPING DETAIL | 5



LAB HOOD EXHAUST FAN DETAIL | 2

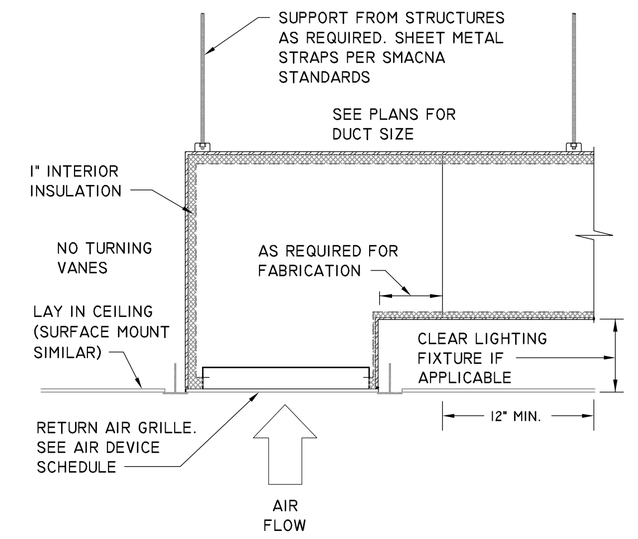


SECTION A-A ⚠1 | 7



NOTE:
THE FLANGED BELLMOUTH FITTING MUST BE PROVIDED. WHERE HEIGHT OF DUCT SHOWN ON PLANS CAN ACCOMODATE THE FITTING. ONLY WHERE THE DUCT HEIGHT DOES NOT ALLOW THE INSTALLATION OF BELLMOUTH FITTING. PROVIDE STRAIGHT FITTING. FLEX DUCT MAY BE LOCATED IN RISER OR HORIZONTAL RUN.

CEILING DIFFUSER CONNECTION DETAIL | 4



NOTE:
1. REFER TO AIR DEVICE SCHEDULE ON DRAWINGS FOR ADDITIONAL REQUIREMENTS.

RETURN AIR GRILLE WITH BOOT DETAIL | 1

ISSUE LOG

NO.	DATE	DESCRIPTION
⚠1	5/13/2013	ADDENDA #1

SMITH&COMPANY
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SEAL:

PROJECT NAME :

FELIX FRAGA
ACADEMIC CENTER
LEVEL 3 RENOVATION

HOUSTON COMMUNITY COLLEGE

301 NORTH DRENNAN ST.
HOUSTON, TX 77003

KEY MAP:

REVIEWED:

PROJECT MANAGER | SPONSORING DEPARTMENT

PROJECT MANAGER

CONSULTANT(S) :

MEP IT Engineers + Consultants
MEP-IT ENGINEERS
6117 Richmond Avenue, Suite 200
Houston, Texas 77057
P. 713.622.0120
F. 832.622.0557
TBPE REGISTRATION NO. 11203

DATE :	APRIL 22, 2013
PROJECT NO.:	N012813
SCALE :	VARIES
DRAWN BY :	AH, WJK, CJT
CHECKED BY :	AH

SHEET TITLE :

DETAILS

SHEET NO. :

M3.01