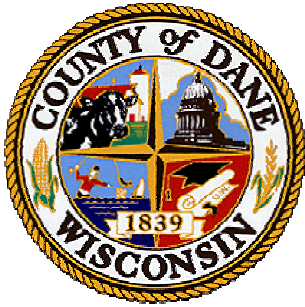


RFB NO. 309001



CONSTRUCTION DOCUMENTS PROJECT MANUAL

DANE COUNTY DEPARTMENT OF PUBLIC WORKS,
HIGHWAY AND TRANSPORTATION

PUBLIC WORKS
ENGINEERING DIVISION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

REQUEST FOR BIDS NO. 309001 TENANT IMPROVEMENTS FIRST AND THIRD FLOOR CITY-COUNTY BUILDING 210 MARTIN LUTHER KING JR. BLVD. MADISON, WISCONSIN

Opening Date: **THURSDAY, APRIL 16, 2009**

Time: **2:00 P.M.**

Performance / Payment Bond: **100% OF CONTRACT AMOUNT**

Bid Deposit: **5% OF BID AMOUNT**

Location: **PUBLIC WORKS OFFICE**

FOR INFORMATION ON THIS REQUEST FOR BIDS, PLEASE CONTACT:

ROB NEBEL, PROJECT ENGINEER
DANE COUNTY DEPARTMENT OF PUBLIC WORKS,
HIGHWAY & TRANSPORTATION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713
TELEPHONE NO.: 608/267-0119
FAX NO.: 608/267-1533
E-MAIL: NEBEL@CO.DANE.WI.US

DOCUMENT INDEX FOR RFB NO. 309001

PROCUREMENT AND CONTRACTING REQUIREMENTS

- Project Manual Cover Page
- Documents Index and Dane County Vendor Registration Program
- Invitation to Bid (Legal Notice)
- Instructions to Bidders
- Bid Form
- Fair Labor Practices Certification
- Best Value Contracting Application
- Sample Public Works Contract
- Sample Bid Bond
- Sample Performance Bond
- Sample Payment Bond
- General Conditions of Contract
- Supplementary Conditions

DIVISION 1 - GENERAL REQUIREMENTS

- 01000 – Basic Requirements
- 01058 – Recycling

DIVISION 2 - SITE CONSTRUCTION

- 02070 – Selective Demolition

DIVISION 3 - CONCRETE

- (Not Used)

DIVISION 4 - MASONRY

- 04400 – Stone Masonry

DIVISION 5 - METALS

- 05500 – Metal Fabrications

DIVISION 6 - WOOD AND PLASTICS

- 06100 – Rough Carpentry
- 06200 – Finish Carpentry
- 06600 – Plastic Fabrications

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

- 07900 – Joint Sealers

DIVISION 8 - DOORS AND WINDOWS

- 08110 – Steel Doors and Frames
- 08210 – Wood Doors
- 08310 – Access Doors and Frames
- 08710 – Door Hardware
- 08800 – Glass and Glazing

DIVISION 9 - FINISHES

- 09250 – Gypsum Board
- 09300 – Tiling
- 09510 – Acoustical Ceilings
- 09650 – Resilient Flooring
- 09680 – Carpet
- 09720 – Dry Erase Wallcovering
- 09900 – Painting

DIVISION 10 - SPECIALTIES

10522 – Fire Extinguisher Cabinets

DIVISION 11 - EQUIPMENT

(Not Used)

DIVISION 12 - FURNISHINGS

12304 – Plastic Laminate-Faced Casework

12490 – Interior Roller Shades

DIVISION 13 - SPECIAL CONSTRUCTION

(Not Used)

DIVISION 14 - CONVEYING SYSTEMS

(Not Used)

DIVISION 15 - MECHANICAL

A15010 – Basic Plumbing General Requirements

A15050 – Basic Plumbing Materials and Methods

A15250 – Plumbing Systems Insulation

A15400 – Plumbing Systems

B15010 – Basic HVAC General Requirements

B15050 – Basic HVAC Materials and Methods

B15250 – HVAC Systems Insulation

B15500 – HVAC Basic Piping Requirements

B15750 – Mechanical Heat Transfer Equipment

B15880 – Air Distribution

B15900 – Facility Management and Control Systems (FMCS)

B15950 – Automatic Temperature Control Work

B15990 – Testing, Adjusting, and Balancing

C15010 – Basic Fire Protection General Requirements

C15050 – Basic Fire Protection Materials and Methods

C15400 – Fire Protection Systems

DIVISION 16 - ELECTRICAL

16001 – General Electrical Requirements

16100 – Basic Materials and Methods

16515 – Lighting

16722 – Fire Alarm System

16751 – Telecommunications Distribution System

16950 – Occupancy Sensor Lighting Control System

DRAWINGS – NOTE: All drawings are to scale if printed on 24” x 36” paper.

G1.0 – Cover Sheet and Index of Drawings

D2.1 – First Floor Demolition Plan

D2.3 – Third Floor Demolition Plan

D3.1 – First Floor Reflected Ceiling Demolition Plan

D3.3 – Third Floor Reflected Ceiling Demolition Plan

A2.1 – First Floor Plan

A2.3 – Third Floor Plan

A3.1 – First Floor Reflected Ceiling Plan

A3.3 – Third Floor Reflected Ceiling Plan

A5.0 – Wall Sections

A5.1 – Casework Sections

A7.0 – Door & Frame Elevation, Partition Types, Details and Schedule

A7.1 – Details
A8.1 – First Floor Interior Elevations
A8.3 – Third Floor Interior Elevations
A9.1 – First Floor Finish Plan and Schedule
A9.3 – Third Floor Finish Plan
P1.1 – First Floor Plan – New Work
P2.1 – First Floor Plumbing Reconstruction Plan
H1-1 – First Floor Plan – HVAC Demo
H1-3 – Third Floor Plan – HVAC Demo
H2-1 – First Floor HVAC Plan – New Work
H2-3 – Third Floor Plan – New Work
H3-1 – Schedules
H3-3 – Third Floor Plan – 1/4” Scale
H4-1 – Details
H4-3 – HVAC Schedules and Details
H5-3 – HVAC Details
E1.1 – Partial First Floor Lighting Plan
E1.2 – Partial First Floor Power Plan
E2.1 – Partial Third Floor Lighting Plan
E2.2 – Partial Third Floor Power Plan
E3.0 – Electrical Symbols, Details and Schedule

DANE COUNTY VENDOR REGISTRATION PROGRAM

All bidders / proposers wishing to submit a bid / proposal should be registered with Dane County Purchasing before bid / proposal opening & must be registered before award of contract. Complete a Vendor Registration Form at www.danepurchasing.com, or obtain one by calling 608/266-4131.

LEGAL NOTICE

INVITATION TO BID

Dane County Department of Public Works, Highway & Transportation, 1919 Alliant Energy Center Way, Madison, WI 53713, will receive sealed Bids until:

2:00 P.M., THURSDAY, APRIL 16, 2009

REQUEST FOR BID NO. 309001

TENANT IMPROVEMENTS FIRST AND THIRD FLOOR CITY-COUNTY BUILDING 210 MARTIN LUTHER KING, JR. BLVD., MADISON, WI

Dane County is inviting Bids for construction services for the tenant build-out of approximately 4,300 sq. ft. on the first floor and renovation of third floor meeting rooms, approximately 5,700 sq. ft., including drywall partitions, flooring, ceiling, HVAC, electrical and fire protection.

A pre-bid tour is scheduled for **Thursday, April 9, 2009 at 10:00 AM**, City-County Building, Room 310. Attendance is strongly advised.

Request for Bids package may be obtained after **2:00 p.m. on Thursday, March 26, 2009**, at Dane County Public Works, Highway & Transportation Dept., 1919 Alliant Energy Center Way, Madison, WI 53713, by calling 608-266-4018, or downloading it from www.countyofdane.com/pwht/bid/logon.aspx. Please call Rob Nebel, Project Manager, at 608-267-0119, for any questions or additional information.

Refundable fee of \$75.00 per Request for Bids package (drawings & specifications) is required for each hard copy. Non-refundable fee of \$15.00 per set is required for shipping. Separate checks are required for shipping. Combined checks will not be accepted. Make checks payable to Dane County.

All Bidders wishing to submit Bids should be a registered & paid vendor with Dane County Purchasing & prequalified as Best Value Contractor before bid opening & must be registered, paid & prequalified before award of contract. Complete Vendor Registration Form at www.danepurchasing.com or obtain one by calling 608/266-4131. Complete Prequalification Application for Contractors at www.co.dane.wi.us/pwht/pwengineer.aspx or obtain one by calling 608/266-4018.

**PUBLISH: MARCH 25 & APRIL 1, 2009 - WISCONSIN STATE JOURNAL
 MARCH 30 & APRIL 6, 2009 - WESTERN BUILDER**

INSTRUCTIONS TO BIDDERS

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1. GENERAL

- A. Before submitting Bid, bidder shall thoroughly examine all Construction Documents. Successful Bidder shall be required to provide all the Work that is shown on Drawings, set forth in Specifications, or reasonably implied as necessary to complete Contract for this project.
- B. Bidder shall visit site to become acquainted with adjacent areas, means of approach to site, conditions of actual site and facilities for delivering, storing, placing, and handling of materials and equipment.
- C. Pre-bid meeting is scheduled on Thursday, April 9, 2009 at 10:00 AM, City-County Building, Room 310. Attendance by all bidders is optional, however bidders and subcontractors are strongly encouraged to attend.
- E. Failure to visit site or failure to examine any and all Construction Documents will in no way relieve successful Bidder from necessity of furnishing any necessary materials or equipment, or performing any work, that may be required to complete the Work in accordance with Drawings and Specifications. Neglect of above requirements will not be accepted as reason for delay in the Work or additional compensation.

2. DRAWINGS AND SPECIFICATIONS

- A. Drawings and Specifications that form part of this Contract, as stated in Article 1 of General Conditions of Contract, are enumerated in Document Index of these Construction Documents.
- B. Complete sets of Drawings and Specifications for all trades will be issued to all Bidders, irrespective of category of work to be bid on, in order that all Bidders may be familiar with work of other trades as they affect their bid.
- C. For deposit refund, return complete sets of Drawings and Specifications to same location they were picked up within 120 days after Bid Opening date. After that time, deposit will be forfeited.

3. INTERPRETATION

- A. No verbal explanation or instructions will be given in regard to meaning of Drawings or Specifications before Bid Opening. Bidders shall bring inadequacies, omissions or conflicts to County or Architect / Engineer's attention at least ten (10) days before Bid Opening. Prompt clarification will be available to all bidders by Addendum.
- B. Failure to so request clarification or interpretation of Drawings and Specifications will not relieve successful Bidder of responsibility. Signing of Contract will be considered as implicitly denoting that Contractor has thorough understanding of scope of the Work and comprehension of Construction Documents.
- C. County and Architect / Engineer will not be responsible for verbal instructions.

4. QUALIFICATIONS OF BIDDER (CONTRACTOR AND SUBCONTRACTOR)

- A. Before award of Contract can be approved, County shall be satisfied that Bidder involved meets following requirements:
 - 1. Has completed at least one (1) project of at least fifty percent (50%) of size or value of Division of work being bid and type of work completed is similar to that being bid. If greater magnitude of experience is deemed necessary, other than size or value of work, such requirements will be described in appropriate section of Specifications.
 - 2. Maintains permanent place of business.
 - 3. Can be bonded for terms of proposed Contract.
 - 4. Complies with Chapter 40 of the Dane County Ordinances with respect to Best Value Contracting qualification. Qualification with State of Wisconsin's Executive Order 108 or City of Madison's Best Value Contracting Ordinance meets qualification requirements of County.
 - 5. Is not presently on ineligible list maintained by County's Department of Administration for noncompliance with equal employment opportunities and affirmative action requirements.
 - 6. Is authorized to conduct business in Wisconsin. By submitting Bid, bidder warrants that it has: complied with all necessary requirements to do business in State of Wisconsin; that persons executing contract on its behalf are authorized to do so; and, if corporation,

that name and address of bidder's registered agent are as set forth in Contract. Bidder shall notify County immediately, in writing, of any change in its registered agent, their address, and bidder's legal status. For partnership, term "registered agent" shall mean general partner.

- B. County's Public Works Project Engineer will make such investigations as are deemed necessary to determine ability of bidder to perform the Work, and bidder shall furnish to County's Public Works Project Engineer or designee all such information and data for this purpose as County's Public Works Project Engineer may request. County reserves right to reject Bid if evidence submitted by, or investigation of, bidder fails to satisfy County that bidder is responsible and qualified to carry out obligations of Contract and to complete the Work contemplated therein.

5. BID GUARANTEE

- A. Bank certified check, cashier's check or Bid Bond, payable to County in amount not less than five percent (5%) of maximum bid, shall accompany each Bid as guarantee that if Bid is accepted, Bidder will execute and return proposed Contract and Performance and Payment Bonds within ten (10) days after being notified of acceptance of Bid. Company issuing bonds must be licensed to do business in Wisconsin.
- B. Any bid, which is not accompanied by bid guarantee, will be considered "No Bid" and will not be read at Bid Opening.
- C. If successful Bidder so delivers Contract, Certificate of Insurance, and Performance and Payment Bonds, check will be returned to Bidder. In case Bidder fails to deliver such Contract, insurance, and bond, amount of bid guarantee will be forfeited to County as liquidated damages.
- D. All checks tendered as bid guarantee, except those of three lowest qualified, responsible bidders, will be returned to their makers within three (3) days after Bid Opening. All such retained checks will be returned immediately upon signing of Contract and Performance and Payment Bonds by successful Bidder.

6. WITHDRAWAL OF BIDS

- A. Bids may be withdrawn by written request received from bidder or authorized representative thereof prior to time fixed for Bid Opening, without prejudice to right of bidder to file new Bid. Withdrawn Bids will be returned unopened. Negligence on part of bidder in preparing their Bid confers no right for withdrawal of Bid after it has been opened.
- B. No Bid may be withdrawn for period of sixty (60) days after Bid Opening date.
- C. If Bid contains error, omission or mistake, bidder may limit liability to amount of bidder's guarantee by giving written Notice of Intent not to execute Contract to County within seventy-two (72) hours of Bid Opening.

7. CONTRACT FORM

- A. Sample copy of contract that successful Bidder will be required to enter into is included in these Construction Documents and bidders are required to familiarize themselves with all conditions contained therein.

8. CONTRACT INTERESTS BY COUNTY PUBLIC OFFICIALS

- A. In accordance with Wisconsin Statute 946.13, county official may not bid for or enter into any contract involving receipts or disbursements of more than \$7,500.00 in a year, in which they have private pecuniary interest, direct or indirect if at same time they are authorized to take official action with respect to making of this Contract. Any contract entered into in violation of this Statute is void and County incurs no liability thereon. This subsection does not affect application and enforcement of Wisconsin Statute 946.13 by state prosecutors in criminal courts of this state.

9. EMERGING SMALL BUSINESS PROVISIONS

- A. **Emerging Small Business Definition.** For purposes of this provision, ESB is defined as:
1. Independent business concern that has been in business minimum of one year;
 2. Business located in State of Wisconsin;
 3. Business comprised of less than 25 employees;
 4. Business must not have gross sales in excess of three million dollars (\$3,000,000.00) over past three years; and
 5. Business does not have history of failing to complete projects.
- B. **Emerging Small Business (ESB) Involvement.** Bidder shall make good faith effort to award minimum of ten percent (10%) of the Work to ESBs. Bidder shall submit report to Dane County Contract Compliance Officer within ten (10) days after Bid Opening demonstrating such efforts. Good faith efforts means significant contact with ESBs for purposes of soliciting bids from them. Failure to make or demonstrate good faith efforts will be grounds for disqualification.
- C. **Emerging Small Business Report.** Emerging Small Business Enterprise Report is to be submitted by Bidder in separate envelope marked "Emerging Small Business Report". This report is due by 2:00 p.m. following specified ten (10) days after Bid Opening. Bidder who fails to submit Emerging Small Business Report shall be deemed not responsive.
- D. **ESB Goal.** Ten percent (10%) ESB participation is goal of this project. ESB utilizations are shown as percentage of total Bid. If Bidder meets or exceeds specified goal, Bidder is only required to submit Form A - Certification, and Form B - Involvement. Goal shall be met if Bidder qualifies as ESB.
- E. **Report Contents.** Following award of Contract, Bidder shall submit copies of executed contracts for all Emerging Small Businesses. Emerging Small Business Report shall consist of these:
1. Form A - Certification;
 2. Form B - Involvement;
 3. Form C - Contacts;

4. Form D - Certification Statement (if appropriate); and
 5. Supportive documentation (i.e., copies of correspondence, telephone logs, copies of advertisements).
- F. **ESB Listing.** Bidders will solicit bids from ESB listing provided by Dane County.
- G. **ESB Certification.** All contractors, subcontractors and suppliers seeking ESB certification must complete and submit Emerging Small Business Certification Application to Dane County Contract Compliance Program.
- H. **Certification Statement.** If ESB firm has not been certified by County as ESB prior to submittal of this Bid, ESB Report cannot be used to fulfill ESB goal for this project unless firm provides "Form D - Certification Statement". Certification statement must be completed and signed by ESB firm.
- I. **Questions.** Questions concerning Emerging Small Business provisions shall be directed to:
Dane County Contract Compliance Officer
City-County Building, Room 421
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
608/266-5623
- J. **Substituting ESBs.** In event of any significant changes in subcontract arrangements or if need arises to substitute ESBs, Bidder shall report such proposed changes to Contract Compliance Officer to making any official changes and request authorization to substitute ESB firm. Bidder further agrees to make every possible effort to replace ESB firm with another qualified ESB firm.
- K. **Good Faith Efforts.** Good faith efforts can be demonstrated by meeting all of these obligations:
1. Selecting portions of the Work to be performed by ESBs in order to increase likelihood of meeting ESB goal including, where appropriate, breaking down Contract into smaller units to facilitate ESB participation.
 2. Advertising in general circulation, trade associations, and women / minority focus media concerning subcontracting opportunities.
 3. Providing written notices to reasonable number of specific ESBs that their interest in Contract was being solicited in sufficient time to allow ESBs to participate effectively.
 4. Following up on initial solicitations of interest by contacting ESBs within five (5) working days prior to Bid Opening date to determine with certainty whether ESB were interested, to allow ESBs to prepare bids.
 5. Providing interested ESB with adequate information about Drawings, Specifications and requirements of Contract.
 6. Using services of available minority, women and small business organizations and other organizations that provide assistance in recruitment of MBEs / WBEs / ESBs.
 7. Negotiating in good faith with interested ESBs, not rejecting ESBs as unqualified without sound reason based on thorough investigation of their capabilities.

8. Submitting required project reports and accompanying documents to County's Contract Compliance Officer within twenty-four (24) hours after Bid Opening.

L. **Appeals Disqualification of Bid.** Bidder who is disqualified may appeal to Public Works & Transportation Committee and Equal Opportunity Commission.

10. METHOD OF AWARD - RESERVATIONS

- A. Following will be basis of award of Contract, providing cost does not exceed amount of funds then estimated by County as available to finance Contract(s):
 1. Lowest dollar amount submitted by qualified responsible bidder on Base Bid for all work comprising project, combined any Owner accepted alternates. Alternates do not need to be chosen in order of their appearance on the Bid Form.
 2. County reserves right to reject all bids or any bid, to waive any informality in any bid, and to accept any bid that will best serve interests of County.
 3. Unit Prices and Informational Bids will not be considered in establishing low bidder.

11. SECURITY FOR PERFORMANCE AND PAYMENTS

- A. Simultaneous with delivery of signed Contract, Bidder shall be required to furnish Performance and Payment Bonds as specified in Article 29 of General Conditions of Contract, "Contract Security". Surety Company shall be licensed to do business in Wisconsin. Performance and Payment Bonds must be dated same date or subsequent to date of Contract. Performance and Payment Bonds must emulate information in Sample Performance and Payment Bonds in Construction Documents.
- B. Provide certified copy of power of attorney from Surety Company showing that agent who signs Bond has power of attorney to sign for Surety Company. Secretary or Assistant Secretary of company must sign this certification, not attorney-in-fact. Certification must bear same or later date as Bond. Power of Attorney must emulate model power of attorney information detailed in Sample Performance and Payment Bonds.
- C. If Bidder is partnership or joint venture, State certified list, providing names of individuals constituting partnership or joint venture must be furnished. Contract may be signed by one partner of partnership, or one partner of each firm comprising joint venture, but Performance and Payment Bonds must be signed by all partners.
- D. If Bidder is a corporation, it is necessary that current certified copy of resolution or other official act of directors of corporation be submitted showing that person who signs Contract is authorized to sign contracts for corporation. It is also necessary that corporate seal be affixed to resolution, contract, and performance and payment bonds. If your corporation has no seal, it is required that above documents include statement or notation to effect that corporation has no seal.

12. TAXES

- A. Bidder shall include in Bid, all Sales, Consumer, Use and other similar taxes required by law.

- B. In accordance with Wisconsin Statute 71.80(16)(a), successful nonresident bidder, whether incorporated or not, and not otherwise regularly engaged in business in this state, shall file surety bond with State of Wisconsin Department of Revenue payable to Department of Revenue, to guarantee payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. Amount of bond shall be three percent (3%) of Contract or subcontract price on all contracts of \$50,000 or more.

13. SUBMISSION OF BIDS

- A. All Bids shall be submitted on standard Bid Form bound herein and only Bids that are made on this Bid Form will be considered. Entire Bid Form and other supporting documents, if any, shall be removed or copied from Construction Documents, filled out, and submitted in manner specified hereinafter. Submit completed Bid Bond with Bid as well.
- B. No bids for any subdivision or any sub-classification of this Work, except as indicated, will be accepted. Any conditional Bid, amendment to Bid Form or appended item thereto, or inclusion of any correspondence, written or printed matter, or details of any nature other than that specifically called for, which would alter any essential provision of Construction Documents, or require consideration of unsolicited material or data in determining award of Contract, will disqualify Bid. Telecommunication alterations to Bid will not be accepted.
- C. Bidders must submit single Bid for all the Work.
- D. Bid amounts shall be inserted in words and in figures in spaces provided on Bid Form; in case of conflict, written word amounts will govern.
- E. Addenda issued after Bid Letting shall become part of Construction Documents. Bidders shall acknowledge receipt of such addenda in appropriate space provided on Bid Form. Bid will be rejected if receipt of any particular addendum applicable to award of Contract has not been acknowledged on Bid Form.
- F. All bidders are encouraged to submit their bids in special printed bid envelope available at Dane County Public Works, Highway & Transportation Department - Public Works Engineering Division. Bids submitted in any other type of envelope run risk of not being identified as bid and County shall not be liable therefore in any respect. Bids shall be signed, sealed and delivered at place and before time of closing designated in Invitation to Bid, and identified with project name, bid number, location, category of work being bid upon, Bid Opening date, name and address of bidder.
- G. Bidder shall be responsible for sealed Bid being delivered to place designated for Bid Opening on or before date and time specified. Bids received after time of closing will be rejected and returned to bidder unopened.
- H. Bid will be considered invalid and will be rejected if bidder has not signed it.
- I. Faxed Bids will not be accepted.

14. SUBCONTRACTOR LISTING

- A. Bidders shall be required to submit list of major subcontractors for General Construction, Plumbing, HVAC, and Electrical work proposed for this project to include committed prices

for each subcontractor. List shall be placed in separate sealed envelope that must be clearly identified as "Major Subcontractor List", for named project and name of Bidder submitting it. County must receive envelope no later than date by which successful Bidder is required to submit his or her signed Contract, as established in Construction Documents.

15. ALTERNATE BIDS

- A. Bidder shall carefully read requests for Alternate Bids, and thoroughly examine Drawings and Specifications to determine extent various changes and conditions will affect Bid.
- B. Space is provided in Bid Form for requested Alternate Bids. Failure to submit bid for any requested Alternate Bids may result in rejection of entire Bid.
- C. Bidder shall state amount to be added / subtracted to Base Bid for providing alternates, including all incidentals, omissions, additions, and adjustments as may be necessary or required by such changes. If there is no difference in price, Bidder shall state, "No Change".
- D. Descriptions of requested Alternate Bids are as set forth in Construction Documents.

16. INFORMATIONAL BIDS

- A. Bidder shall state amount that is included in Base Bid for all equipment, materials and labor required to complete the Work described. Informational bids are amounts requested for accounting purposes and for allocation of funds only. It is not intended to omit any of the Work described or related items from this project.
- B. Description of requested Informational Bids, if any, is as set forth in Construction Documents.

17. UNIT PRICES

- A. Provide unit prices where requested on Bid Form. Unit prices will include all costs for materials, labor, insurance, taxes, overhead and profit necessary to perform specified work. Estimated quantities are approximate only. Payment will be based upon actual quantities placed, provided or installed. Failure to provide requested unit prices may result in rejection of entire Bid.
- B. County reserves right to accept or reject any unit prices as given in Bid.
- C. Bidder shall refer to Bid Form and applicable specification section to determine basis of unit measure and detailed information related to each unit price item requested.

18. COMMENCEMENT AND COMPLETION

- A. Successful Bidder shall commence work when schedule and weather permit, but no later than stated in Bid Form. Contractor shall pursue the Work regularly and continuously at reasonable rate to insure completion of the Work within time stated in Bid.
- B. Should it be found impossible to complete the Work on or before time specified for completion, written request may be submitted for extension of time setting forth reasons believed to justify granting of such request.

19. WORK BY COUNTY

- A. Demolition work described in these Construction Documents will be accomplished by County and will not be included under this Contract.

20. SPECIAL HAZARDS COVERAGE

- A. Not Applicable.

FORM A

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION**

In accordance with General Conditions of Contract, submit this Emerging Small Business Report within ten (10) days after Bid Opening.

PROJECT NAME: _____

BID NO.: _____ BID OPENING DATE: _____

BIDDER INFORMATION

COMPANY NAME: _____

ADDRESS: _____

TELEPHONE NO.: _____

CONTACT PERSON: _____

FORM B

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - INVOLVEMENT**

Page ___ of ___
(Copy this Form as necessary to provide complete information)

COMPANY NAME: _____

PROJECT NAME: _____ BID NO.: _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

FORM C

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CONTACTS**

Page ___ of ___
(Copy this Form as necessary to provide complete information)

COMPANY NAME: _____

PROJECT NAME: _____ BID NO.: _____

	<u>ESB FIRM NAME CONTACTED</u>	<u>DATE</u>	<u>PERSON CONTACTED</u>	<u>DID ESB BID?</u>	<u>DID YOU ACCEPT BID?</u>	<u>REASON FOR REJECTION</u>
1)	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____	_____
6)	_____	_____	_____	_____	_____	_____
7)	_____	_____	_____	_____	_____	_____

FORM D

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION STATEMENT**

I, _____, _____ of
Name Title

_____ certify to best of my knowledge and
Company

belief that this business meets Emerging Small Business definition as indicated in Article 9 and
that information contained in this Emerging Small Business Report is true and correct.

Bidder's Signature

Date

BID FORM

BID NO. 309001

**PROJECT: TENANT IMPROVEMENTS FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING**

**TO: DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY &
TRANSPORTATION PROJECT ENGINEER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713**

BASE BID - LUMP SUM:

Work includes construction services for the tenant build-out of approximately 4,300 sq. ft. on the first floor and renovation of third floor meeting rooms, approximately 5,700 sq. ft., including drywall partitions, flooring, ceiling, HVAC, electrical and fire protection. The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Department of Public Works, Highway & Transportation hereby agrees to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price

The undersigned further agrees to add the alternate(s) portion of the Work as described, for the following addition(s) to or subtraction(s) from the Base Bid stipulated below. They further agree to honor the alternate(s) bid for 60 days from date of Award of Contract.

ALTERNATE BID 1 - LUMP SUM:

Conference Room 321 including manual shade.

Add: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price

ALTERNATE BID 2 - LUMP SUM:

Motorized Shades in lieu of Manual Shades Rooms 310 and 315.

Add: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 3 - LUMP SUM:

Motorized Shades in lieu of Manual Shade Room 321.

Add: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 4 - LUMP SUM:

First Floor Break Room.

Add: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 5 - LUMP SUM:

Solid Surface in lieu of Marble in Rooms 310 and 315.

Deduct: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 6 - LUMP SUM:

Heat exchanger.

Add: _____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

INFORMATIONAL BID 1 – LUMP SUM:

First Floor work.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

Dane County Department of Public Works, Highway & Transportation must have this project completed by **August 15, 2009**. Assuming a Notice to Proceed is issued by **May 8, 2009**, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

Name of Bidder: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Contact Person: _____

SIGNATURE: _____
(Bid is invalid without signature)

<p>BID CHECK LIST: These items must be included with Bid or completed before bidding</p> <p><input type="checkbox"/> Bid Form <input type="checkbox"/> Bid Bond <input type="checkbox"/> Fair Labor Practices Certification</p> <p><input type="checkbox"/> Best Value Qualified Contractor <input type="checkbox"/> Vendor Registration</p>

FAIR LABOR PRACTICES CERTIFICATION

The undersigned, for and on behalf of the BIDDER, APPLICANT or PROPOSER named herein, certifies as follows:

A. That he or she is an officer or duly authorized agent of the above-referenced BIDDER, APPLICANT or PROPOSER, which has a submitted a proposal, bid or application for a contract with the county of Dane.

B. That BIDDER, APPLICANT or PROPOSER has (check one):

_____ not been found by the National Labor Relations Board (“NLRB”) or the Wisconsin Employment Relations Commission (“WERC”) to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ been found by the National Labor Relations Board (“NLRB”) or the Wisconsin Employment Relations Commission (“WERC”) to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

Officer or Authorized Agent Signature

Date

Printed or Typed Name and Title

Printed or Typed Business Name

NOTE: You can find information regarding the violations described above at: www.nlrb.gov and werc.wi.gov.

For reference, Dane County Ordinance 25.11(28)(a) is as follows:

(28) BIDDER RESPONSIBILITY. (a) Any bid, application or proposal for any contract with the county, including public works contracts regulated under chapter 40, shall include a certification indicating whether the bidder has been found by the National Labor Relations Board (NLRB) or the Wisconsin Employment Relations Committee (WERC) to have violated any statute or regulation regarding labor standards or relations within the last seven years. The purchasing manager shall investigate any such finding and make a recommendation to the committee, which shall determine whether the conduct resulting in the finding affects the bidder’s responsibility to perform the contract.

If you indicated that the NLRB or WERC have found you to have such a violation, you must include copies of any relevant information regarding such violation with your proposal, bid or application.



DANE COUNTY DEPARTMENT of PUBLIC WORKS, HIGHWAY and TRANSPORTATION

County Executive
Kathleen M. Falk

1919 Alliant Energy Center Way ♦ Madison, Wisconsin 53713
Phone: (608) 266-4018 ♦ FAX: (608) 267-1533

Commissioner / Director
Gerald J. Mandli

BEST VALUE CONTRACTING APPLICATION

CONTRACTORS/LICENSURE APPLICANTS

The Dane County Department of Public Works requires all bidders to be prequalified with the County prior to bid opening. In addition, the County reviews potential contractors and sub-contractors who wish to work on County contracts. This document shall be completed, properly executed, along with the necessary attachments regarding information relating to financial ability, equipment, experience in the work prescribed in the public contract, and other matters that the County requires for the protection and welfare of the public in the performance of a County contract.

The Contractor shall notify the County within 15 days of any information regarding any material changes to its business or operations that are relevant to the prequalification application. Failure to do so could result in suspension, revocation of the contractor's prequalification, debarment from County contracts for up to three years or other sanctions available under the law.

Contractors or subcontractors of any tier who attain prequalification status will retain that status for a period of two years from the date of qualification. Subcontractors must become prequalified ten days prior to commencing work under any Dane County Public Works Contract. Potential subcontractors are urged to become prequalified as early as possible.

No contracts will be awarded for construction work performed on Dane County projects unless the contractor is currently approved as a Wisconsin Trade Trainer or has applied for approval as an Apprenticeship Trade Trainer to the Wisconsin Department of Workforce Development and agrees to an acceptable apprenticeship program. If you are not currently approved as a Wisconsin Trade Trainer, or have not applied for approval as an Apprenticeship Trade Trainer, please contact the Department of Workforce Development – Bureau of Apprenticeship Standards at (608)266-3133 or visit their web site at www.wisconsinapprenticeship.org.

EXEMPTIONS

- Contractors or subcontractors of any tier automatically attain prequalification status with Dane County if the contractor has current Executive Order 108 precertification status with the State of Wisconsin or prequalification status with the City of Madison.
- Contractors who employ less than five (5) craft workers are not required to prequalify.
- Contractors performing work that does not apply to an apprenticeable trade, as outlined in Appendix A.
- The contractor/subcontractor provides sufficient documentation to demonstrate one or more of the following:
 - apprentices are not available in a specific geographic area; or
 - the applicable apprenticeship program is unsuitable or unavailable; or
 - there is a documented depression of the local construction market which prevents compliance.

SEC.	PROOF OF RESPONSIBILITY	CHECK IF APPLICABLE
1	Does your firm possess all technical qualifications and resources, including equipment, personnel and financial resources, necessary to perform the work required for the project or obtain the same through the use of responsible, prequalified subcontractors?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
2	Does your firm possess all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, which are necessary for the type of work to be performed including, but not limited to, those for any type of trade work or specialty work?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
3	Does your firm meet all bonding requirements as required by applicable law or contract specifications?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
4	Does your firm meet all insurance requirements as required by applicable law or specifications, including general liability insurance, workers compensation insurance and unemployment insurance requirements?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
5	Does your firm maintain a substance abuse policy for employees hired for public works contracts that comply with Wis. Stats. Sec. 103.503?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
6	Does your firm acknowledge that it must pay all craft employees on public works projects the wage rates and benefits required under Section 66.0903 of the Wisconsin Statutes?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
7	Does your firm fully abide by the equal opportunity and affirmative action requirements of all applicable laws, including County ordinances?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
8	In the past three (3) years, has your firm had control or has another corporation, partnership or other business entity operating in the construction industry controlled it? If so, please attach a statement explaining the nature of the firm relationship?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
9	In the past three (3) years, has your firm had any type of business, contracting or trade license, certification or registration revoked or suspended?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
10	In the past three (3) years, has your firm been debarred by any federal, state or local government agency?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
11	In the past three (3) years, has your firm defaulted or failed to complete any contract?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
12	In the past three (3) years, has your firm committed a willful violation of federal, state or local government safety laws as determined by a final decision of a court or government agency authority.	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
13	In the past three (3) years, has your firm been in violation of any law relating to your contracting business where the penalty for such violation resulted in the imposition of a penalty greater than \$10,000?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
14	Is your firm Executive Order 108 precertified with the State of Wisconsin?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
15	Is your firm prequalified with the City of Madison?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
16	Is your firm an active Wisconsin Trade Trainer as determined by the Wisconsin Bureau of Apprenticeship Standards?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
17	Is your firm exempt from being prequalified with Dane County?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach reason for exemption.
18	Does your firm acknowledge that in doing work under any County Public Works Contract, it will be required to use as subcontractors only those contractors that are also prequalified with the County or become so ten days prior to commencing work?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>

SIGNATURE SECTION

Your firm's Officer, or the individual who would sign a bid and/or contract documents must sign this document.

I do hereby certify that all statements herein contained are true and correct to the best of my knowledge:

Signature

Date

Printed or Typed Name and Title

NAME AND ADDRESS OF CONTRACTOR	
Name of Firm	
Address	
City, State, Zip	
Telephone Number	
Fax Number	
E-mail Address	

REMEMBER!

Return all to forms and attachments, or questions to:

**JOHN SCHRAUFNAGEL
EMAIL: SCHRAUFNAGEL@CO.DANE.WI.US
OFFICE: (608)266-4798, CELL: (608)575-3374, FAX: (608)267-1533**

**ATTN: JOHN SCHRAUFNAGEL
DANE COUNTY DEPARTMENT OF PUBLIC WORKS
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713**

APPENDIX A

APPRENTICEABLE TRADES

Bricklayer
Carpenter
Cement Mason/Concrete Finisher
Cement Mason (Heavy Highway)
Construction Craft Laborer
Data Communications Installer
Electrician
Environmental Systems Technician/HVAC Service Technician/HVAC Install/Service
Glazier
Heavy Equipment Operator/Operating Engineer
Insulation Worker (Heat & Frost)
Iron Worker (Assembler, Metal Buildings)
Painter/Decorator
Plasterer
Plumber
Roofer/Waterproofer
Sheet Metal Worker
Sprinkler Fitter
Steamfitter (Service & Refrigeration)
Taper & Finisher
Telecommunications (Voice, Data & Video) Installer/Technician
Tile Setter

The Contractor hereby acknowledges that a condition of this Contract is to provide equal benefits as required by Dane County Code of Ordinances Chapter 25.016. Contractor hereby certifies that it will provide equal benefits as required by that ordinance to all required employees during the term of the Contract.

For more information: www.danepurchasing.com/partner_benefit.aspx

COUNTY OF DANE

PUBLIC WORKS CONTRACT

Contract No. _____ Bid No. 309001

Authority: Res. _____, 2008-09

THIS CONTRACT, made and entered into as of the date by which authorized representatives of both parties have affixed their signatures, by and between the County of Dane (hereafter referred to as "COUNTY") and _____ (hereafter, "CONTRACTOR"), and

WITNESSETH:

WHEREAS, COUNTY, whose address is c/o Associate Public Works Director, 1919 Alliant Energy Center Way, Madison, WI 53713, desires to have CONTRACTOR provide Tenant Improvements on the First and Third Floor, City-County Building [including Alternate Bid[s] 1,2,3,4, 5 and 6 (if applicable)] ("the Project"); and

WHEREAS, CONTRACTOR, whose address is _____ is able and willing to construct the Project, in accordance with the Construction Documents;

NOW, THEREFORE, in consideration of the above premises and the mutual covenants of the parties hereinafter set forth, the receipt and sufficiency of which is acknowledged by each party for itself, COUNTY and CONTRACTOR do agree as follows:

1. CONTRACTOR agrees to construct, for the price of \$_____ the Project and at the CONTRACTOR'S own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence labor, insurance, and other accessories and services necessary to complete the Project in accordance with the conditions and prices stated in the Bid Form, General Conditions of Contract, the drawings which include all maps, plats, plans, and other drawings and printed or written explanatory matter thereof, and the specifications therefore as prepared by Dorschner Associates, Inc. (hereinafter referred to as "the Architect / Engineer"), and as enumerated in the Project Manual Document Index, all of which are made a part hereof and collectively evidence and constitute the Contract.

2. COUNTY agrees to pay the CONTRACTOR in current funds for the performance of the Contract subject to additions and deductions, as provided in the General Conditions of Contract, and to make payments on account thereof as provided in Article entitled, "Payments to Contractor" of the General Conditions of Contract.

3. During the term of this Contract, CONTRACTOR agrees to take affirmative action to ensure equal employment opportunities. The CONTRACTOR agrees in accordance with Wisconsin Statute 111.321 and Chapter 19 of the Dane County Code of Ordinances not to discriminate on the basis of age, race, ethnicity, religion, color, gender, disability, marital status, sexual orientation, national origin, cultural differences, ancestry, physical appearance, arrest record or conviction record, military participation or membership in the national guard, state defense force or any other reserve component of the military forces of the United States, or political beliefs. Such equal opportunity shall include, but not be limited to, the following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation. CONTRACTOR agrees to post in conspicuous places, available to all employees and applicants for employment, notices setting forth the provisions of this paragraph.

4. CONTRACTOR shall file an Affirmative Action Plan with the Dane County Contract Compliance Officer in accord with Chapter 19 of the Dane County Code of Ordinances. CONTRACTOR must file such plan within fifteen (15) days of the effective date of this Contract. During the term of this Contract CONTRACTOR shall also provide copies of all announcements of employment opportunities to COUNTY'S Contract Compliance Office, and shall report annually the number of persons, by race, ethnicity, gender, and disability status, which apply for employment and, similarly classified, the number hired and number rejected.

5. During the term of this Contract, all solicitations for employment placed on CONTRACTOR'S behalf shall include a statement to the effect that CONTRACTOR is an "Equal Opportunity Employer."

6. CONTRACTOR agrees to comply with provisions of Chapter 25.016 of the Dane County Code of Ordinances, which pertains to domestic partnership benefits.

7. CONTRACTOR agrees to furnish all information and reports required by COUNTY'S Contract Compliance Officer as the same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and the provisions of this Contract.

8. CONTRACTOR agrees that all persons employed by CONTRACTOR or any subcontractor shall be paid no less than the minimum wage established under Chapter 40, Subchapter II, Dane County Code of Ordinances. CONTRACTOR agrees to abide by and comply with the provisions of Chapter 40, Subchapter II of the Dane County Code of Ordinances, and said Subchapter is fully incorporated herein by reference.

9. This Contract is intended to be a Contract solely between the parties hereto and for their benefit only. No part of this Contract shall be construed to add to, supplement, amend, abridge or repeal existing rights, benefits or privileges of any third party or parties including, but not limited to, employees of either of the parties.

10. The entire agreement of the parties is contained herein and this Contract supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof. The parties expressly agree that the express terms of this Contract shall not be amended in any fashion except in writing, executed by both parties.

IN WITNESS WHEREOF, COUNTY and CONTRACTOR, by their respective authorized agents, have caused this Contract and its Schedules to be executed, effective as of the date by which all parties hereto have affixed their respective signatures, as indicated below.

* * * * *

FOR CONTRACTOR:

Signature Date

Printed or Typed Name and Title

Signature Date

Printed or Typed Name and Title

NOTE: If CONTRACTOR is a corporation, Secretary should attest. In accordance with IRS Regulations, unincorporated entities are required to provide either their Social Security or Employer Number in order to receive payment for services rendered.

* * * * *

This Contract is not valid or effectual for any purpose until approved by the appropriate authority designated below, and no work is authorized until the CONTRACTOR has been given notice to proceed by COUNTY'S Associate Public Works Director.

FOR COUNTY:

Kathleen M. Falk, County Executive Date

Robert Ohlsen, County Clerk Date

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

Bond No.

KNOW ALL MEN BY THESE PRESENTS, that we (Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and (Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of WI as Surety, hereinafter called the Surety, are held and firmly bound unto (Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Obligee, in the sum of () Percent of total amount bid Dollars (\$) Percent of attached bid ().

For the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for Project No.: (Here insert full name, address, and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this day of , 20 .

(Principal) (Seal)

(Witness) (Title)

(Surety) (Seal)

(Witness) ATTORNEY-IN-FACT

THE AMERICAN INSTITUTE OF ARCHITECTS



Bond No.

AIA Document A312

Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description (Name and Location):

BOND

Date (Not earlier than Construction Contract Date):

Amount: \$

Modifications to this Bond:

[] None

[] See Page 3

CONTRACTOR AS PRINCIPAL COMPANY: (Corporate Seal)

SURETY COMPANY: (Corporate Seal)

Signature: _____
Name and Title:

Signature: _____
Name and Title: Attorney-in-Fact

(Any additional signatures appear on page 3)

FOR INFORMATION ONLY-Name, Address and Telephone AGENT OR BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

4.4 Waive its rights to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

2. Deny liability in whole or in part and notify the Owner citing reasons therefor.

5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and

6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available

to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12 DEFINITIONS

12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Con-

tractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

SAMPLE

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL
Company: _____ (Corporate Seal)

SURETY
Company: _____ (Corporate Seal)

Signature: _____
Name and Title:
Address:

Signature: _____
Name and Title:
Address:

THE AMERICAN INSTITUTE OF ARCHITECTS



Bond No.

AIA Document A312

Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

CONSTRUCTION CONTRACT

Date:
Amount: \$
Description (Name and Location):

SAMPLE

BOND

Date (Not earlier than Construction Contract Date):

Amount: \$

Modifications to this Bond: [] None [] See Page 6

CONTRACTOR AS PRINCIPAL COMPANY: (Corporate Seal)

SURETY COMPANY: (Corporate Seal)

Signature:
Name and Title:

Signature:
Name and Title:
Attorney-in-Fact

(Any additional signatures appear on page 6)

FOR INFORMATION ONLY-Name, Address and Telephone AGENT OR BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.

2. With respect to the Owner, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly, or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with the Contractor:

- .1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
- .2 Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
- .3 Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of

Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

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

6.2 Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall

be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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

15. DEFINITIONS

15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the

Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

SAMPLE

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL
Company: _____ (Corporate Seal)

SURETY Company: _____ (Corporate Seal)

Signature: _____
Name and Title:
Address:

Signature: _____
Name and Title:
Address:

GENERAL CONDITIONS OF CONTRACT

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1. CONSTRUCTION DOCUMENTS

- A. Construction Documents, listed in Table of Contents of this Specification volume shall form part of this Contract and provisions of Construction Documents shall be as binding upon parties as if they were fully set forth in Contract itself.
- B. These shall also be considered as part of Construction Documents: Addenda, including additions and modifications incorporated in such addenda before execution of Contract; requests for information; construction bulletins; change orders; and written interpretations by Architect / Engineer or Public Works Project Engineer that are made after execution of Contract.
- C. Construction Documents are complementary, and what is required by one shall be as binding as if required by all. Intent of Construction Documents is to include all labor, materials and equipment necessary for proper execution of the Work.

2. DEFINITIONS

- A. These terms as used in this Contract are respectively defined as follows:
 - 1. All uses of term "County" in Construction Documents shall mean Dane County.
 - 2. All uses of term "Department" in Construction Documents shall mean Department of Public Works, Highway & Transportation, which is a unit of Dane County government. Department is County agency overseeing Contract with Contractor.
 - 3. Public Works Project Engineer is appointed by and responsible to Department. Public Works Project Engineer has authority to act on behalf of Department and will sign change orders, payment requests and other administrative matters related to projects.
 - 4. Public Works Project Engineer is responsible for supervision, administration and management of field operations involved in construction phase of this Work.
 - 5. Term "Work" includes all labor, equipment and materials necessary to produce project required by Construction Documents.
 - 6. Term "Substantial Completion" is date when project or specified area of project is certified by Architect / Engineer that construction is sufficiently completed, in accordance with Construction Documents, and as modified by any subsequent changes agreed to by parties, so that County may occupy project or specified area of project for use for which it was intended subject to permit approval for occupancy.
 - 7. Contractor is person, firm, or corporation with whom County makes Contract. Though multiple contracts may be involved, Construction Documents treat them throughout as if each were of singular number.

3. ADDITIONAL INSTRUCTIONS AND DRAWINGS

- A. Contractor may be furnished additional instructions and detail drawings as necessary to carry out the Work included in Contract. Additional drawings and instructions thus supplied to Contractor will coordinate with Construction Documents and will be so prepared that they can be reasonably interpreted as part thereof. Contractor shall carry out the Work in accordance with additional detail drawings and instructions.

4. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Unless otherwise specified, Contractor shall submit three (3) copies of all Shop Drawings for each submission, until receiving final approval. After final approval, provide five (5) additional copies for distribution and such other copies as may be required.

- B. Contractor shall submit, on an on-going basis and as directed, Product Data such as brochures that shall contain catalog cuts and specifications of all furnished mechanical and electrical equipment. After Architect / Engineer's approval, one (1) copy shall remain in Architect / Engineer's file, one (1) kept at Department's office and one (1) kept at job site by Contractor for reference purposes.
- C. Samples shall consist of physical examples furnished by Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards to compare the Work.
 - 1. Submit Samples in sufficient quantity (minimum of two (2)) to permit Architect / Engineer to make all necessary tests and of adequate size showing quality, type, color range, finish, and texture. Label each Sample stating material, type, color, thickness, size, project name, and Contractor's name.
 - 2. Submit transmittal letter requesting approval, and prepay transportation charges to Architect / Engineer's office on samples forwarded.
 - 3. Materials installed shall match approved Samples.
- D. Contractor shall review Shop Drawings and place their dated stamp thereon to evidence their review and approval and shall submit with reasonable promptness and in orderly sequence to cause no delay in the Work or in work of any other contractor. At time of submission, Contractor shall inform Architect / Engineer in writing of any deviation in Shop Drawings or Samples from requirements of Construction Documents. Architect / Engineer will not consider partial lists.
- E. Architect / Engineer will review and approve or reject Shop Drawings with reasonable promptness to cause no delay. Architect / Engineer's approval shall not relieve Contractor from responsibility for errors or omission in Shop Drawings.
- F. Contractor shall not commence any work requiring Shop Drawing, Product Data or Sample submission until Architect / Engineer has approved submission. All such work shall be in accordance with approved Shop Drawings, Product Data and Samples.
- G. Contractor shall keep on site of the Work, approved or conformed copy of Shop Drawings and shall at all time give Department access thereto.
- H. By stamping and submitting Shop Drawings, Product Data and Samples, Contractor thereby represents that he or she has or will determine and verify all field measurements, field construction criteria, materials, catalog numbers, and similar data and that he or she has checked and coordinated each Shop Drawing, Product Data and Sample with requirements of the Work and of Construction Documents. Architect / Engineer shall return without examination, Shop Drawings, Product Data and Samples not so noted.
- I. All Shop Drawings from any one Contractor should be numbered consecutively and on cover sheet shall bear name and location of project, name of Contractor, date of submittal and date of each correction or revision and associated Specification section and page number.

5. CUTTING AND PATCHING

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

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

6. CLEANING UP

- A. Contractor shall keep premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under Contract. Contractor shall remove from and about the Work waste materials, rubbish, Contractor's tools, construction equipment, machinery, and surplus materials at completion of the Work. Contractor shall maintain streets and sidewalks around the Work site in clean condition. Contractor shall remove all spillage and prevent tracking of spillage arising from performance of the Work, into, out of, and within the Work site. Contractor shall establish regular maintenance program of sweeping, vacuuming and / or hosing to minimize accumulation of dirt and dust upon such areas.
- B. If Contractor fails to clean up as directed in Construction Documents, County may do so and shall charge Contractor cost thereof.
- C. Contractor shall be responsible for broken windows and glass, and at completion of the Work shall replace such damaged or broken windows and glass. After replacing damaged or broken windows and glass, Contractor shall remove all labels, wash and polish both sides of all windows and glass.
- D. In addition to general cleaning (sweeping, vacuuming and / or hosing, as is appropriate to work surface), Contractor shall perform following final cleaning for all trades at completion of the Work:
 - 1. Remove temporary protections;
 - 2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and finished woodwork and wall surfaces;
 - 3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
 - 4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
 - 5. Clean aluminum in accordance with recommendations of manufacturer; and
 - 6. Clean resilient floors thoroughly with well-rinsed mop containing only enough moisture to clean off any surface dirt or dust and buff dry by machine to bring surfaces to sheen.

7. USE OF SITE

- A. Contractor shall provide County and Architect / Engineer access to the Work under all circumstances.
- B. Contractor shall confine operations at site to areas permitted by County, law, ordinance, permits and Construction Documents and shall not unreasonably encumber site with materials or equipment. Contractor shall assure free, convenient, unencumbered, direct and safe access to all properties adjacent to the Work for County, its employees, invitees and guests.

8. MATERIALS AND WORKMANSHIP

- A. Contractor shall perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, necessary to complete the Work required by this Contract, within time specified, in accordance with provisions of Construction Documents.
- B. All equipment and materials incorporated in the Work covered by this Contract are to be new; use recycled and / or recovered materials to extent that such use is technically and economically feasible. Recovered materials are products recovered from solid waste in form identical to original form for use that is same as, or similar to original use. Recycled materials are products manufactured from solid waste.
- C. If requested, Contractor shall furnish satisfactory evidence as to kind and quality of construction materials proposed or used. Contractor shall furnish to Architect / Engineer, for approval, manufacturer name and model, performance capacities and other pertinent information of machinery, mechanical, electrical or other types of equipment, which Contractor plans to install.
- D. If not otherwise provided, materials and labor called for in this Contract shall be provided and performed in accordance with established practice and standards recognized by Architects, Engineers, Department, and construction industry.
- E. Reference to “Standard” specifications of any association or manufacturer, or codes of County authorities, intends most recent printed edition or catalog in effect on date that corresponds with date of Construction Documents.
- F. Whenever reference is made in Specifications that work shall be “performed”, “applied”, in accordance with “manufacturer’s directions or instructions”, Contractor to whom those instructions are directed shall furnish three (3) printed copies of such instructions to Architect / Engineer before execution of the Work.

9. CONTRACTOR’S TITLE TO MATERIALS

- A. Contractor or any subcontractor shall not purchase materials or supplies for the Work subject to any chattel mortgage or under conditional sale contract or other agreement by which seller retains interest. Contractor warrants that all materials and supplies used in the Work are free from all liens, claims or encumbrances and Contractor has good title to them.

10. “OR EQUAL” CLAUSE

- A. Whenever equipment or materials are identified on Drawings or in Specifications by reference to manufacturer’s or vendor’s name, trade name, catalog number, and other identifying information, it is intended to establish standards; and any equipment or material of other manufacturers and vendors which will perform adequately duties imposed by general design will be considered equally accepted provided equipment or material so proposed is, in opinion of Architect / Engineer, of equal substance and function. Architect / Engineer and Department shall provide written approval before Contractor may purchase or install it.
- B. Equipment or materials of manufacturers, other than those named, may be used only upon following conditions:
 - 1. That, in opinion of Architect / Engineer and Department, proposed material or equipment item is fully equal or superior (in design, materials, construction, workmanship,

- performance, finish, etc.) to named item. No compromise in quality level, however small, is acceptable.
2. That, in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution despite Architect / Engineer's and Department's approval, and all costs growing out of approval of "or equal" items shall be responsibility of Contractor. No extra costs resulting from such approval shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
 3. It shall be understood that use of materials or equipment other than those specified, or approved equal by Architect / Engineer and Department, shall constitute violation of Contract, and that Architect / Engineer and Department shall have right to require removal of such materials or equipment and their replacement with specified materials or equipment at Contractor's expense.
 4. Product and manufacturer named first in Specifications or on information shown on Drawings is basis of selection of manufactured items and equipment, particularly mechanical equipment. In using other than first named products or manufacturers, including those specified as additionally approved or acceptable, Contractor assumes responsibility for any changes in system and for modifications in any work required to accommodate them. Architect / Engineer's approval of such additionally acceptable products or manufacturers, either in Specifications or in Addendum, does not relieve Contractor from obligation to coordinate such optional products with other Contractors, whose work may be affected by them, and to pay all additional costs resulting from their inclusion into the Work. Contractor's liability shall include payment of Architect / Engineer's fees for any additional services made necessary by or directly connected to such product changes. No extra costs resulting from such changes shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
- C. No request for approval of "or equal" materials will be entertained except from Contractor. Identify any request for substitution as substitution on Contractor's letter of transmittal and give reasons for substitution. Department may in its sole discretion allow substitutions of materials.

11. PATENTS AND ROYALTIES

- A. If Contractor uses any design, device or material covered by letters, patent or copyright, it is mutually agreed and understood, that, without exception, contract prices shall include all royalties or costs arising from use of such design, device or materials, in any way involved in the Work.
- B. Contractor shall indemnify and save harmless County from any and all claims for infringement by reason of use of such patent or copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify County for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during prosecution of the Work or after completion of the Work.

12. SURVEYS, PERMITS, REGULATIONS AND TAXES

- A. Department will furnish to Contractor all site, topography and property surveys necessary for execution of the Work.
- B. Contractor shall procure all permits, licenses and approvals necessary for execution of this Contract.

- C. Contractor shall give all notices and comply with all State of Wisconsin, Federal and local laws, codes, rules and regulations relating to performance of the Work, protection of adjacent property, and maintenance of passageways, guard fences or other protective facilities.
- D. Contractor shall pay all Sales, Consumer, Use and other similar taxes required by law.
- E. Contractor shall promptly notify Architect / Engineer of any variances of Drawings or Specifications with that of any State of Wisconsin, federal or local law, code, rule or regulation. Upon such notification, Architect / Engineer will require correction of variance to comply with applicable law, code, rule or regulation at no additional cost to Contractor.
- F. Work under this Contract shall comply with all applicable State of Wisconsin, Federal and local laws, codes and regulations.
- G. Contractor shall pay charges for water, sewer and other utility connections made by municipalities where required by Specifications.

13. CONTRACTOR'S OBLIGATIONS AND SUPERINTENDENCE

- A. Contractor shall provide and pay for all materials, labor, tools, equipment, transportation and superintendence necessary to execute, complete and deliver the Work within specified time. Contractor agrees to secure at their own expense all personnel necessary to carry out the Work. Such personnel shall not be deemed County employees nor shall they have or be deemed to have any direct contractual relationship with County.
- B. Performance of any work necessary after regular working hours, on Sundays or Legal Holidays shall be without additional expense to County. Performance of any work at site at other than normal working hours must be coordinated with Public Works Project Engineer.
- C. Contractor shall furnish, erect, maintain and remove such temporary works as may be required.
- D. Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of Construction Documents.
- E. At the Work site, Contractor shall give personal superintendence to the Work or shall employ construction superintendent or foreman, experienced in character of work covered by Contract, who shall have full authority to act for Contractor. Understand that such superintendent or foreman shall be acceptable to Architect / Engineer and Department.
- F. Remove from project or take other corrective action upon notice from Architect / Engineer or Department for Contractor's employees whose work is considered by Architect / Engineer or Department to be unsatisfactory, careless, incompetent, unskilled or otherwise objectionable.
- G. Contractor and subcontractors shall be required to conform to Labor Laws of State of Wisconsin and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable to the Work.
- H. Presence and observation of the Work by Architect / Engineer or Public Works Project Engineer shall not relieve Contractor of any obligations.

14. WEATHER CONDITIONS

- A. In event of temporary suspension of work, or during inclement weather, or whenever Architect / Engineer shall direct, Contractor shall, and shall cause subcontractors to protect carefully all work and materials against damage or injury from weather. If, in opinion of Architect / Engineer or Department, any work or materials that have been damaged or injured due to failure on part of Contractor or any subcontractors so to protect the Work, such materials shall be removed and replaced at expense of Contractor.

15. PROTECTION OF WORK AND PROPERTY

- A. Contractor shall at all times safely guard County's property from injury or loss in connection with this Contract. Contractor shall at all times safely guard and protect the Work, and adjacent property, from damage. Contractor shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in Contract, or by County, or County's duly authorized representative.
- B. Contractor may act diligently, without previous instructions from Architect / Engineer and / or Department, in emergency that threatens loss or injury of property, or safety of life. Contractor shall notify Architect / Engineer and / or Department immediately thereafter. Promptly submit any claim for compensation by Contractor due to such extra work to Architect / Engineer and / or Department for approval as provided for in Article 18 herein.

16. INSPECTION AND TESTING OF MATERIALS

- A. Authorized representatives and agents of County government shall have access at all times to the Work wherever it is in preparation or progress and Contractor shall provide facilities for such access and for inspection.
- B. Should it be considered necessary or advisable at any time before final acceptance of the Work to make examination of work already completed, by removing or tearing out same, Contractor shall upon request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any aspect, due to fault of Contractor or subcontractors thereof, Contractor shall assume all expenses of such examination and of satisfactory reconstruction. Contractor will be reimbursed for such examination and replacement in accordance with Article 18 - A.3., of these General Conditions of Contract if such work is found to meet requirements of Contract.
- C. If Specifications, Architect / Engineer's, or Public Works Project Engineer's instructions require any work to be specially tested or approved, Contractor shall give Architect / Engineer and Public Works Project Engineer timely notice of its readiness for testing or inspection. Test all materials and equipment requiring testing in accordance with accepted or specified standards, as applicable. Architect / Engineer shall recommend laboratory or inspection agency and Department will select and pay for all initial laboratory inspection services. Should retesting be required, due to failure of initial testing, cost of such retesting shall be borne by Contractor.
- D. Cost of any testing performed by manufacturers or Contractor for substantiating acceptability of proposed substitution of materials and equipment, or necessary conformance testing in conjunction with manufacturing processes or factory assemblage, shall be borne by Contractor or manufacturer responsible.

17. REPORTS, RECORDS AND DATA

- A. Contractor shall submit to Architect / Engineer and Public Works Project Engineer such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, invoices, records and other data as either may request concerning work performed or to be performed under this Contract.

18. CHANGES IN THE WORK

- A. Make no changes, except in cases of emergency, in the Work covered by approved Construction Documents without having prior written approval of Department. Charges or credits for the Work covered by approved change shall be determined by one of these methods:
1. Unit bid prices previously approved.
 2. Agreed lump sum based on actual cost of:
 - a) Labor, including foremen, and all fringe benefits that are associated with their wages.
 - b) Materials entering permanently into the Work.
 - c) Ownership or rental cost of construction tools and equipment during time of use on extra work.
 - d) Power and consumable supplies for operation of power equipment.
 - e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
 - f) Social Security and old age and unemployment contributions.
 - g) Add to cost under (2), fixed fee to be agreed upon, but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit and any other general expense.
 - h) On that portion of the Work under (2) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit and any other general expense.
 - i) Department may require correct amount of costs with supporting vouchers; Contractor shall keep and present in such form as directed.
 3. Cost-plus work, with not-to-exceed dollar limit, based on actual cost of:
 - a) Labor, including foremen, and all fringe benefits that are associated with their wages.
 - b) Materials entering permanently into the Work.
 - c) Ownership or rental cost of construction tools and equipment during time of use on extra work. Rental cost cannot exceed fifty percent (50%) replacement value of rented equipment.
 - d) Power and consumable supplies for operation of power equipment.
 - e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
 - f) Social Security and old age and unemployment contributions.
 - g) To cost under (3), there shall be added fixed fee to be agreed upon but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit, and any other general expense.
 - h) On that portion of the Work under (3) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit, and any other general expense.
 - i) Contractor shall keep and present, in such form as directed, correct amount of cost together with such supporting vouchers as may be required by Department.

- B. If Contractor claims that by any instructions given by Architect / Engineer, Department, by drawings or otherwise, regarding performance of the Work or furnishing of material under Contract, involves extra cost, Contractor shall give Department written notice of cost thereof within two (2) weeks after receipt of such instructions and in any event before proceeding to execute work, unless delay in executing work would endanger life or property.
- C. No claim for extra work or cost shall be allowed unless it was done in pursuance of written Change Order from Architect / Engineer and approved by Department, as previously mentioned, and claim presented with payment request submitted after changed or extra work is completed.
- D. Negotiation of cost for change in the Work shall not be cause for Contractor to delay prosecution of the Work if Contractor has been authorized in writing by Public Works Project Engineer to proceed.

19. EXTRAS

- A. Without invalidating Contract, Department may order extra work or make changes by altering, adding to or deducting from the Work, contract sum being adjusted in accordance with Article 18 herein.

20. TIME FOR COMPLETION

- A. Contractor agrees that the Work shall be prosecuted regularly and diligently and complete the Work as stated in Construction Documents.

21. CORRECTION OF WORK

- A. All work, all materials whether incorporated in the Work or not, and all processes of manufacture shall at all times and places be subject to inspection of Architect / Engineer and Public Works Project Engineer who shall be judge of quality and suitability of the Work, materials, and processes of manufacture for purposes for which they are used. Should they fail to meet Architect / Engineer's and Public Works Project Engineer's approval they shall be reconstructed, made good, replaced or corrected, by Contractor at Contractor's expense. Immediately remove all rejected material from site.
- B. If Contractor defaults or neglects to carry out the Work in accordance with Construction Documents or fails to perform any provision of Contract, Department may, after ten (10) days' written notice to Contractor and without prejudice to any other remedy County may have, make good such deficiencies. In such case, appropriate Change Order shall be issued deducting from Contractor's payments then or thereafter, cost of correcting such deficiencies, including cost of Architect / Engineer's additional services made necessary by such default, neglect or failure.

22. SUBSURFACE CONDITIONS FOUND DIFFERENT

- A. If Contractor encounters subsurface or latent conditions at site materially differing from those shown on Drawings or indicated in Specifications, Contractor shall immediately give notice to Architect / Engineer and Public Works Project Engineer of such conditions before they are disturbed. Architect / Engineer will thereupon promptly investigate conditions, and if Architect / Engineer finds that they materially differ from those shown on Drawings or

indicated in Specifications, Architect / Engineer will at once make such changes as necessary, any increase or decrease of cost resulting from such changes to be adjusted in manner provided in above Article 18 entitled "Changes in the Work".

23. RIGHT OF DEPARTMENT TO TERMINATE CONTRACT

- A. In event that any provisions of this Contract are violated by Contractor or by any subcontractors, County may serve written notice upon Contractor and Surety of its intention to terminate Contract, such notice to contain reasons for such intention to terminate Contract, and unless within ten (10) days after serving of such notice upon Contractor, such violation or delay shall cease and satisfactory arrangement or correction be made, Contract shall, upon expiration of said ten (10) days, cease and terminate.
- B. In event of any such termination, County shall immediately serve notice thereof upon Surety and Contractor, and Surety shall have right to take over and perform Contract subject to County's approval; provided, however, that if Surety does not commence performance thereof within ten (10) days from date of mailing to such Surety of notice of termination, County may take over the Work and prosecute same to completion by contract, or by force account, at expense of Contractor; Contractor and Surety shall be liable to County for any excess cost occasioned County thereby, and in such event County may take possession of and utilize in completing the Work, such materials and equipment as may be on the Work site and therefore necessary.

24. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

- A. Contractor shall be responsible for Construction Schedule and coordination. Immediately after execution and delivery of Contract and before making first payment, Contractor shall notify all subcontractors to furnish all required information to develop Construction Schedule. Contractor and all subcontractors associated with the Work shall furnish following information from each Division of Specifications:
 - 1. List of construction activities;
 - 2. Start, finish and time required for completion of each activity;
 - 3. Sequential relationships between activities;
 - 4. Identify all long lead-time items, key events, meetings or activities such as required submittals, fabrication and delivery, procurement of materials, installation and testing;
 - 5. Weekly definition of extent of work and areas of activity for each trade or Subcontract; and
 - 6. Other information as determined by Public Works Project Engineer.
- B. In addition to above requested items, Contractor shall request delivery dates for all County-furnished equipment, materials or labor. This shall include any work handled by Department under separate contracts such as asbestos abatement, air and water balancing, etc. Indicate on Construction Schedule these associated delivery and installation dates.
- C. Progress Reporting:
 - 1. Contractor shall update and publish Construction Schedule on monthly basis. Revisions to Schedule shall be by Contractor and made in same detail as original Schedule and accompanied by explanation of reasons for revision; and shall be subject to approval by Department.
 - 2. Failure of Contractor to keep Schedule in updated format shall result in County hiring firm specializing in construction schedule development and deducting those costs associated with updating process from payments due Contractor.

3. Contractor shall submit show actual percentage of each activity completed, estimated future progress, and anticipated completion time.
- D. Responsibility for timely completion requires:
1. Contractor and subcontractors understand that performance of each is interdependent upon performance of others.
 2. Whenever it becomes apparent from current schedule, that phasing or progress completion dates will not be met, Contractor must take some or all following actions at no additional cost to County:
 - a) Increase construction manpower in such quantities and crafts as will eliminate backlog of work.
 - b) Increase number of working hours per shift, shifts per working day, working days per week, amount of construction equipment, or any combination of foregoing to eliminate backlog of work.
 - c) Reschedule work (yet remain in conformance with Drawings and Specifications).
 3. Prior to proceeding with any of above actions, Contractor shall notify Public Works Project Engineer.
- E. Maintain current Construction Schedule at all times. Revise Construction Schedule in same detail as original and accompany with explanation of reasons for revision. Schedule shall be subject to approval by Architect / Engineer and Public Works Project Engineer.

25. PAYMENTS TO CONTRACTOR

- A. Contractor shall provide:
1. Detailed estimate giving complete breakdown of contract price by Specification Division; and
 2. Periodic itemized estimates of work done for purpose of making partial payments thereon.
- Submit these estimates for approval first to Architect / Engineer, then to Public Works Project Engineer. Costs employed in making up any of these schedules are for determining basis of partial payments and not considered as fixing basis for additions to or deductions from Contract price.
- B. County will make partial payments to Contractor for value, proportionate to amount of Contract, of all labor and material incorporated in the Work during preceding calendar month upon receipt of Application and Certificate for Payment form from Architect / Engineer and approval of Department.
- C. Contractor shall submit for approval first to Architect / Engineer, and then to Public Works Project Engineer all Application and Certificate for Payment forms. If requested, Application and Certificate for Payment shall be supported by such additional evidence as may be required, showing Contractor's right to payment claimed.
- D. Application and Certificate for Payment for preparatory work and materials delivered and suitably stored at site to be incorporated into the Work at some future period, will be given due consideration. Requesting payment for materials stored off site, may be rejected, however, if deemed essential for reasons of job progress, protection, or other sufficient cause, requests will be considered, conditional upon submission by Contractor of bills of sale, photographs and such other procedures as will adequately protect County's interest such as storage in bonded warehouse with adequate coverage. If there is any error in payment, Contractor is obligated to notify Department immediately, but no longer than ten (10) days from receipt of payment.

- E. Payments by County will be due within forty-five (45) days after receipt by Department of Application and Certificate for Payment.
- F. County will retain five percent (5%) of each Application and Certificate for Payment until final completion and acceptance of all the Work covered by Contract. However, anytime after fifty percent (50%) of the Work has been furnished and installed at site, County will make remaining payments in full if Architect / Engineer and Public Works Project Engineer find that progress of the Work corresponds with Construction Schedule. If Architect / Engineer and Public Works Project Engineer find that progress of the Work does not correspond with Construction Schedule, County may retain up to ten percent (10%) of each Application and Certificate for Payment for the Work completed.
- G. All material and work covered by partial payments made shall become sole property of County, but this provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made, or restoration of any damaged work, or as waiver of right of County to require fulfillment of all of terms of Contract.
- H. County will make final payment within sixty (60) days after final completion of the Work, and will constitute acceptance thereof.
- I. County may make payment in full, including retained percentages and less authorized deductions, upon completion and acceptance of each Division where price is stated separately in Contract.
- J. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit to this Department, as requested and with final application for payment for work under said contract, affidavit(s) as required to prove that all debts and claims against this Work are paid in full or otherwise satisfied, and give final evidence of release of all liens against the Work and County. If Wisconsin Prevailing Wage Rate Determination is required for this Work, use "Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination" and "Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination" (if applicable). If Wisconsin Prevailing Wage Rate Determination is not required for this Work, use "Dane County, Wisconsin Contractor Wage Affidavit". Forms of such affidavits are included in Supplementary Conditions.

26. WITHHOLDING OF PAYMENTS

- A. County, after having served written notice on said Contractor, may either pay directly any unpaid bills of which Department has written notice, or withhold from Contractor's unpaid compensation sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged; whereupon, payment to Contractor shall be resumed in accordance with terms of this Contract, but in no event shall these provisions be construed to impose any obligations upon County to either Contractor or Contractor's Surety.
- B. In paying any unpaid bills of Contractor, County shall be deemed agent of Contractor, and any payment so made by County, shall be considered as payment made under Contract by County to Contractor and County shall not be liable to Contractor for any such payment made in good faith.

- C. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from all claims growing out of lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in performance of this Contract.
- D. At Department's request, Contractor shall furnish satisfactory evidence that all obligations of nature designated above have been paid, discharged or waived.

27. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

- A. Making of final payment shall constitute waiver of all claims by County except those arising from:
 - 1. Unsettled lien;
 - 2. Faulty or defective work appearing after substantial completion;
 - 3. Failure of the Work to comply with requirements of Construction Documents; or
 - 4. Terms of any special guarantees required by Construction Documents.
- B. Acceptance of final payment shall constitute waiver of all claims by Contractor.

28. PAYMENTS BY CONTRACTOR

- A. Contractor shall pay following not later than fifth (5th) day following each payment received from County:
 - 1. All transportation and utility services rendered;
 - 2. All materials, tools, and other expendable equipment that have been delivered at site of the Work to extent of ninety percent (90%) of cost thereof, and balance of cost thereof when said balance is paid to Contractor; and
 - 3. Each subcontractor, respective amount allowed Contractor because of work performed by subcontractor to extent of subcontractor's interest therein.

29. CONTRACT SECURITY

- A. Contractor shall furnish Performance and Payment Bonds in amount at least equal to one hundred percent (100%) of Contract price as security for faithful performance of this Contract and payment of all persons performing labor on project under this Contract and furnishing materials in connection with this Contract.
- B. Sample Performance and Payment Bonds that Contractor will be required to execute is bound into these Construction Documents. Before construction Contract is consummated, completed Performance and Payment Bonds must be approved by Department.

30. ASSIGNMENTS

- A. Contractor shall not assign whole or any part of this Contract or any moneys due or to become due hereunder without written consent of Department. In case Contractor assigns all or any part of any moneys due or to become due under this Contract, instrument of assignment shall contain clause substantially to effect that it is agreed that right of assignee in and to any moneys due or to become due to Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for performance of the Work called for in this Contract.

31. MUTUAL RESPONSIBILITY OF CONTRACTORS

- A. If, through acts of neglect on part of Contractor or any subcontractor shall suffer loss or damage on the Work, Contractor agrees to settle with such subcontractor by agreement or arbitration if such other subcontractor will so settle. If such subcontractor shall assert any claim against County on account of any damage alleged to have been sustained, Department shall notify Contractor, who shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives against any such claim.

32. SEPARATE CONTRACTS

- A. Department may award other contracts for the Work and all Contractors shall fully cooperate with each other and carefully adjust their work to that provided under other contracts as may be directed by Department. No Contractor shall commit or permit any act that will interfere with performance of the Work by any other Contractor.
- B. Contractor shall coordinate the Work with those of other Contractors. Cooperation will be required in arrangement for storage of materials and in detailed execution of the Work. Contractor, including subcontractors, shall keep informed of progress and detail work of others and shall notify Architect / Engineer or Department immediately of lack of progress or defective workmanship on part of others. Failure of Contractor to keep informed of the Work progressing on site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by Contractor of status of the Work as being satisfactory for proper coordination with Contractor's own work.

33. SUBCONTRACTS

- A. Contractor may use services of specialty subcontractors on those parts of the Work that, under normal contracting practices, are performed by specialty subcontractors.
- B. Contractor shall not award any work to any subcontractor without prior approval of Department. Qualifications of subcontractors shall be same as qualifications of Contractor. Request for subcontractor approval shall be submitted to Department fifteen (15) days before start of subcontractor's work. If subcontractors are changed or added, Contractor shall notify Department in writing.
- C. Contractor shall be as fully responsible to County for acts and omissions of subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for acts and omissions of persons directly employed by Contractor.
- D. Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by terms of General Conditions of Contract and other Construction Documents insofar as applicable to work of subcontractors and to give Contractor same power as regards terminating any subcontract that Department may exercise over Contractor under any provision of Construction Documents.
- E. Nothing contained in this Contract shall create any contractual relation between any subcontractor and County.

- F. Contractor shall insert in all subcontracts, Articles 26, 33, 43 and 45, respectively entitled: “Withholding of Payments”, “Subcontracts”, “Affirmative Action Provision and Minority / Women / Disadvantaged Business Enterprises”, and “Minimum Wages”, and shall further require all subcontractors to incorporate physically these same Articles in all subcontracts.

34. PUBLIC WORKS PROJECT ENGINEER’S AUTHORITY

- A. Public Works Project Engineer shall:
 - 1. Administer and ensure compliance with Construction Documents;
 - 2. Provide responsible on-site observations of construction and have authority to request work and to stop work whenever necessary to insure proper enforcement of Construction Documents;
 - 3. Convene and chair project meetings and foreman’s coordination meetings when necessary to coordinate resolution of conflicts between Contractors, Architects, Engineers, Consultants, and Department; and
 - 4. Check and inspect material, equipment and installation procedures of all trades for proper workmanship and for compliance with Drawings, Specifications and Shop Drawings, permit no material on project site that is not satisfactory and reject work not in compliance with Construction Documents.

35. ARCHITECT / ENGINEER’S AUTHORITY

- A. Architect / Engineer is retained by, and is responsible to Department acting for County.
- B. Architect / Engineer shall determine amount, quality, acceptability, and fitness of several kinds of work and materials that are provided under this Contract and shall decide all questions that may arise in relation to said work and construction thereof.
- C. Architect / Engineer shall decide meaning and intent of any portion of Specifications and of any Drawings where they may be found obscure or be in dispute.
- D. Architect / Engineer shall provide responsible observation of construction. Architect / Engineer has authority to stop the Work whenever such stoppage may be necessary to insure proper execution of Construction Documents.
- E. Architect / Engineer shall be interpreter of conditions of Construction Documents and judge of its performance.
- F. Within reasonable time, Architect / Engineer shall make decisions on all matters relating to progress of the Work or interpretation of Construction Documents.
- G. Architect / Engineer’s decisions are subject to review by Public Works Project Engineer.

36. STATED ALLOWANCES

- A. Stated allowances enumerated in Instructions to Bidders shall cover net cost of materials or equipment, and all applicable taxes. Contractor’s cost of delivery and unloading at site, handling costs on site, labor, installation costs, overhead, profit and any other incidental costs shall be included in Contractor’s bid, but not as part of cash allowance.
- B. Department will solicit at least two (2) bids on materials or equipment for which allowance is stated and select on basis of lowest qualified responsible bid. Contractor will then be

instructed to purchase "Allowed Materials". If actual price for purchasing "Allowed Materials", including taxes, is more or less than "Cash Allowance", Contract price shall be adjusted accordingly. Adjustment in Contract price shall not contain any cost items excluded from cash allowance.

37. ESTIMATES OF QUANTITIES

- A. Whenever estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of Construction Documents, they are given for use in comparing bids and right is especially reserved to increase or diminish them as they may be deemed reasonably necessary or desirable by Department to complete the Work included in this Contract, and cost for such increase or diminution shall be adjusted in manner provided for in General Conditions of Contract Article 18 entitled "Changes in the Work".

38. LANDS AND RIGHTS-OF-WAY

- A. Prior to start of construction, County shall furnish all land and rights-of-way necessary for carrying out and completion of the Work to be performed under this Contract.

39. GENERAL GUARANTEE

- A. Neither final certificate of payment nor any provision in Construction Documents nor partial or entire occupancy of premises by County shall constitute acceptance of work not done in accordance with Construction Documents or relieve Contractor of liability in respect to any expressed warranties or responsibility for faulty materials or workmanship.
 - 1. In no event shall making of any payment required by Contract constitute or be construed as waiver by County of any breach of covenants of Contract or waiver of any default of Contractor and making of any such payment by County while any such default or breach shall exist shall in no way impair or prejudice right of County with respect to recovery of damages or other remedy as result of such breach or default.
- B. Contractor shall remedy and make good all defective workmanship and materials and pay for any damage to other work resulting there from, which appear within period of one (1) year from date of substantial completion, providing such defects are not clearly due to abuse or misuse by County. Department will give notice of observed defects with reasonable promptness.
- C. Guarantee on work executed after certified date of substantial completion will begin on date when such work is inspected and approved by Architect / Engineer and Public Works Project Engineer.
- D. Where guarantees or warranties are required in sections of Specifications for periods in excess of one (1) year, such longer terms shall apply; however, Contractor's Performance and Payment Bonds shall not apply to any guarantee or warranty period in excess of one (1) year.

40. CONFLICTING CONDITIONS

- A. Any provision in any of Construction Documents which may be in conflict or inconsistent with any Articles in these General Conditions of Contract or Supplementary Conditions shall be void to extent of such conflict or inconsistency.

- B. In case of ambiguity or conflict between Drawings and Specifications, Specifications shall govern.
- C. Printed dimensions shall be followed in preference to measurements by scale. Large-scale drawings take precedence over small-scale drawings. Dimensions on Drawings and details are subject to field measurements of adjacent work.

41. NOTICE AND SERVICE THEREOF

- A. Any notice to Contractor from Department relative to any part of this Contract shall be in writing and considered delivered and service thereof completed, when said notice is posted, by certified or registered mail, to Contractor at Contractor's last given address, or delivered in person to said Contractor, or Contractor's authorized representative on the Work.

42. PROTECTION OF LIVES AND HEALTH

- A. In order to protect lives and health of Contractor's employees under Contract, Contractor shall comply with all pertinent provisions of Wisconsin Administrative Code, Rules of Department of Commerce, relating to Safety and Health.
- B. Contractor alone shall be responsible for safety, efficiency and adequacy of Contractor's tools, equipment and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

43. AFFIRMATIVE ACTION PROVISION AND MINORITY / WOMEN / DISADVANTAGED BUSINESS ENTERPRISES

- A. Affirmative Action Provisions.
 - 1. During term of their Contract, Contractor agrees not to discriminate on basis of race, religion, color, sex, handicap, age, sexual preference, marital status, physical appearance, or national origin against any person, whether recipient of services (actual or potential), employee, or applicant for employment. Such equal opportunity shall include but not be limited to following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation or level of service(s). Contractor agrees to post in conspicuous places, these affirmative action standards so as to be visible to all employees, service recipients and applicants for this paragraph. Listing of prohibited bases for discrimination shall not be construed to amend in any fashion state or federal law setting forth additional bases and exceptions shall be permitted only to extent allowable in state or federal law.
 - 2. Contractor is subject to this Article only if Contractor has ten (10) or more employees and receives \$10,000.00 or more in annual aggregate contracts with County. Contractor shall file and Affirmative Action Plan with Dane County Contract Compliance Officer in accord with Chapter 19 of Dane County Code of Ordinances. Such plan must be filed within fifteen (15) days of effective date of this Contract and failure to do so by said date shall constitute ground for immediate termination of Contract by County. Contractor shall also, during term of this Contract, provide copies of all announcements of employment opportunities to County's Contract Compliance Office, and shall report annually number of persons, by race, sex and handicap status, who apply for employment and, similarly classified, number hired and number rejected.
 - 3. Contact Dane County Contract Compliance Officer at Dane County Contract Compliance Office, 210 Martin Luther King, Jr. Blvd., Room 421, Madison, WI 53703, 608/266-4114.

4. In all solicitations for employment placed on Contractor's behalf during term of this Contract, Contractor shall include statement to effect Contractor is "Equal Opportunity Employer". Contractor agrees to furnish all information and reports required by County's Contract Compliance Officer as same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and provision of this Contract.

B. Minority / Women / Disadvantaged / Emerging Small Business Enterprises.

1. Chapter 19.508 of Dane County Code of Ordinances is official policy of Dane County regarding utilization of, to fullest extent of, Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs) Disadvantage Business Enterprises (DBEs) and Emerging Small Business Enterprises (ESBEs).
2. Contractor may utilize MBEs / WBEs / DBEs / ESBEs as subcontractors or suppliers. List of subcontractors will be required of low bidder as stated in this Contract. List shall indicate which are MBEs / WBEs / DBEs / ESBEs and percentage of subcontract awarded, shown as percentage of total dollar amount of bid.

44. COMPLIANCE WITH FAIR LABOR STANDARDS

- A. During term of this Contract, Contractor shall report to County Contract Compliance Officer, within ten (10) days, any allegations to, or findings by National Labor Relations Board (NLRB) or Wisconsin Employment Relations Commission (WERC) that Contractor has violated statute or regulation regarding labor standards or relations. If investigation by Contract Compliance Officer results in final determination that matter adversely affects Contractor's responsibilities under this Contract, and which recommends termination, suspension or cancellation of this Contract, County may take such action.
- B. Contractor may appeal any adverse finding by Contract Compliance Officer as set forth in Dane County Ordinance 25.015(11)(c) through (e).
- C. Contractor shall post this statement in prominent place visible to employees: "As condition of receiving and maintaining contract with Dane County, this employer shall comply with federal, state and all other applicable laws prohibiting retaliation or union organizing."

45. DOMESTIC PARTNERSHIP BENEFITS

- A. Contractor agrees to provide same economic benefits to all of its employees with domestic partners as it does to employees with spouses, or cash equivalent if such benefit cannot reasonably be provided. Contractor agrees to make available for County inspection Contractor's payroll records relating to employees providing services on or under this Contract or subcontract. If any payroll records of Contractor contain any false, misleading or fraudulent information, or if Contractor fails to comply with provisions of Chapter 25.016, Dane County Ordinances, contract compliance officer may withhold payments on Contract; terminate, cancel or suspend Contract in whole or in part; or, after due process hearing, deny Contractor right to participate in bidding on future County contracts for period of one year after first violation is found and for period of three years after second or subsequent violation is found.

46. USE AND OCCUPANCY PRIOR TO ACCEPTANCE

- A. Contractor agrees to use and occupancy of portion or unit of the Work before formal acceptance by Department, provided Department:
 - 1. Secures written consent of Contractor; except when in opinion of Public Works Project Engineer, Contractor is chargeable with unwarranted delay in final cleanup of punch list items or other Contract requirements.
 - 2. Secures endorsement from insurance carrier and consent of Surety permitting occupancy of building or use of the Work during remaining period of construction, or, secures consent of Surety.
 - 3. Assumes all costs and maintenance of heat, electricity and water.
 - 4. Accepts all work completed within that portion or unit of the Work to be occupied, at time of occupancy.

47. MINIMUM WAGES

- A. Contractor shall post, at appropriate conspicuous point on site of project, schedule showing all determined minimum wage rates for various classes of laborers and mechanics to be engaged in the Work under this Contract and all deductions, if any, required by law to be made from unpaid wages actually earned by laborers and mechanics so engaged.
- B. Supplementary Conditions section in Construction Documents lists wage determinations required by State Law.
- C. If, after award of Contract, it becomes necessary to employ any person in trade or occupation not classified in wage determinations, such person shall be paid at not less than such rate as shall be determined by Wisconsin Department of Workforce Development. Such approved minimum rate shall be retroactive to time of initial employment of such person in such trade or occupation. Contractor shall notify Department of Contractor's intention to employ persons in trades or occupations not so classified in sufficient time for Department to obtain approved rates for such trades or occupations.
- D. Specified wage rates are minimum rates only, and Department will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of applicable rate contained in this Contract. Contractor shall adjust any disputes in regard to payment of wages in excess of those specified in this Contract.
- E. Submit required affidavit(s) to Department of Public Works, Highway & Transportation, as requested and with final application for payment for work under said contract. Affidavit(s) shall clearly indicate name, trade or occupation, and paid wages of every laborer, workman or mechanic employed by Contractor and all subcontractors during billing period including accurate record of number of hours worked by each employee and actual wages paid as stipulated in Wisconsin Statute 66.0903. If Wisconsin Prevailing Wage Rate Determination is required for this Work, use "Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination" and "Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination" (if applicable). If Wisconsin Prevailing Wage Rate Determination is not required for this Work, use "Dane County, Wisconsin Contractor Wage Affidavit". Forms of such affidavits are included in Supplementary Conditions.

48. CLAIMS

- A. No claim may be made until Department's Associate Public Works Director has reviewed Architect / Engineer's decision as provided for in Article 35 of General Conditions of Contract. If any claim remains unresolved after such review by Department's Associate

Public Works Director, claim may be filed under Wisconsin Statute 893.80. Work shall progress during period of any dispute or claim. Unless specifically agreed between parties, venue will be in Dane County, Wisconsin.

49. ANTITRUST AGREEMENT

- A. Contractor and County recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by County. Therefore, Contractor hereby assigns to County any and all claims for such overcharges as to goods and materials purchased in connection with this Contract, except as to overcharges which result from antitrust violations commencing after price is established under this Contract and any change order thereto.

50. INSURANCE

A. Contractor Carried Insurance:

1. Contractor shall not commence work under this Contract until Contractor has obtained all insurance required under this Article and has provided evidence of such insurance to Risk Manager, 425 City-County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53703. Contractor shall not allow any subcontractor to commence work until insurance required of subcontractor has been so obtained and approved. Company providing insurance must be licensed to do business in Wisconsin.
2. Worker's Compensation Insurance:
 - a) Contractor shall procure and shall maintain during life of this Contract, Worker's Compensation Insurance as required by statute for all of Contractor's employees engaged in work at site of project under this Contract and, in case of any such work sublet, Contractor shall require subcontractor similarly to provide Worker's Compensation Insurance for all of latter's employees to be engaged in such work unless such employees are covered by protection afforded by Contractor's Worker's Compensation Insurance.
 - b) If any claim of employees engaged in hazardous work on project under this Contract is not protected under Worker's Compensation Statute, Contractor shall provide and shall cause each subcontractor to provide adequate Employer's Liability Insurance for protection of such of Contractor's employees as are not otherwise protected.
3. Contractor's Public Liability and Property Damage Insurance:
 - a) Contractor shall procure and maintain during life of this Contract, Contractor's Public Liability Insurance and Contractor's Property Damage Insurance in amount not less than \$1,000,000 bodily injury, including accidental death, to any one person, and subject to same limit for each person, in amount not less than \$1,000,000 on account of one accident, and Contractor's Property Damage Insurance in amount not less than \$1,000,000 or combined single limit of at least \$1,000,000 with excess coverage over and above general liability in amount not less than \$5,000,000. Contractor shall add "Dane County" as additional insured for each project.
 - b) Contractor's Public Liability and Property Damage Insurance shall include Products, Completed Operation, and Contractual Liability under Insurance Contract. "Contractor shall in all instances save, defend, indemnify and hold harmless County and Architect / Engineer against all claims, demands, liabilities, damages or any other costs which may accrue in prosecution of the Work and that Contractor will save, defend, indemnify and hold harmless County and Architect / Engineer from all damages caused by or as result of Contractor's operations" and each shall be listed as additional insured on Contractor's and sub-contractors' insurance policies.
 - c) Obligations of Contractor under Article 48.A.2)b) shall not extend to liability of Architect / Engineer, agents or employees thereof, arising out of:

- 1) Preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications; or
- 2) giving of or failure to give directions or instructions by Architect / Engineer, agents or employees thereof provided such giving or failure to give is primary cause of injury or damage.
- d) Contractor shall procure and shall maintain during life of this Contract, Comprehensive Automobile Liability Insurance covering owned, non-owned and hired automobiles for limits of not less than \$1,000,000 each accident single limit, bodily injury and property damage combined with excess coverage over and above general liability in amount not less than \$5,000,000.
- e) Contractor shall either:
 - 1) Require each subcontractor to procure and to maintain during life of subcontract, subcontractor's Public Liability Property Damage Insurance, and Comprehensive Automobile Liability Insurance of type and in same amount specified in preceding paragraphs; or
 - 2) Insure activities of subcontractors in Contractor's own policy.
4. Scope of Insurance and Special Hazards: Insurance required under Article 48.A.2 hereof shall provide adequate protection for Contractor and subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operation be by insured or by anyone directly or indirectly employed by insured and also against any of special hazards which may be encountered in performance of this Contract as enumerated in Supplementary Conditions.
5. Proof of Carriage of Insurance: Contractor shall furnish Risk Manager with certificates showing type, amount, class of operations covered, effective dates, dates of expiration of policies and "Dane County" listed as additional insured. Such certificates shall also contain (substantially) following statement: "Insurance covered by this certificate will not be canceled or materially altered, except after ten (10) days written notice has been received by Risk Manager."

B. Builder's Risk:

1. County shall provide Builder's Risk policy. Terms of this policy will be made available by County's Risk Manager, upon Contractor's request. By executing this Contract, Contractor warrants it is familiar with terms of said policy.

C. Indemnification / Hold Harmless:

1. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from performance of the Work, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, and is caused in whole or in part by any act or omission of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by part indemnified hereunder.
2. In any and all claims against Dane County, its boards, commissions, agencies, officers, employees and representatives or by any employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, indemnification obligation under this Contract shall not be limited in any way by any limitation on amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker's compensation acts, disability benefits or other employee benefit acts.

3. Obligations of Contractor under this Contract shall not extend to liability of Architect / Engineer, its agents or employees arising out of:
 - a) Preparation or approval of maps, drawings, opinion, reports, surveys, change orders, designs or specifications; or
 - b) Giving of or failure to give directions or instruction by Architect / Engineer, its agents or employees provided such giving or failure to give is primary cause of injury or damage.
4. Dane County shall not be liable to Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties.


51. WISCONSIN LAW CONTROLLING

- A. It is expressly understood and agreed to by parties hereto that in event of any disagreement or controversy between parties, Wisconsin law shall be controlling.

SUPPLEMENTARY CONDITIONS

1. APPLICATION & CERTIFICATE FOR PAYMENT

- A. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit partial and final Application & Certificate for Payment for work under said contract. Form shall provide similar information as shown on AIA G702™ and G703™ forms (samples shown below). Forms shall be submitted to project Architect / Engineer for review. After review, Architect / Engineer will forward these forms to Public Works Project Engineer for final approval.


AIA Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO:	Distribution to:
		PERIOD TO:	OWNER <input type="checkbox"/>
		CONTRACT FOR:	ARCHITECT <input type="checkbox"/>
FROM CONTRACTOR:	VIA ARCHITECT:	CONTRACT DATE:	CONTRACTOR <input type="checkbox"/>
		PROJECT NOS:	FIELD <input type="checkbox"/>
			OTHER <input type="checkbox"/>

CONTRACTOR'S APPLICATION FOR PAYMENT
 Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM \$ _____

2. Net change by Change Orders \$ _____

3. CONTRACT SUM TO DATE (Line 1 + 2) \$ _____

4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ _____

5. RETAINAGE:

a. % of Completed Work (Column D + E on G703) \$ _____

b. % of Stored Material (Column F on G703) \$ _____

Total Retainage (Lines 5a + 5b or Total in Column I of G703) \$ _____

6. TOTAL EARNED LESS RETAINAGE \$ _____

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$ _____

8. CURRENT PAYMENT DUE \$ _____

9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6) \$ _____

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
 By: _____ Date: _____
 State of _____
 County of _____
 Subscribed and sworn to before me this _____ day of _____
 Notary Public:
 My Commission expires: _____

CHANGE ORDER SUMMARY

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$
Total approved this Month	\$	\$
TOTALS	\$	\$
NET CHANGES by Change Order	\$	\$

ARCHITECT'S CERTIFICATE FOR PAYMENT
 In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ _____
 (Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:
 By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Retainage, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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Continuation Sheet

AIA Document G703. APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.
 In tabulations below, amounts are stated in the nearest dollar.
 Use Column E on Contracts where variable retainage for line items may apply.

APPLICATION NO:
 APPLICATION DATE:
 PERIOD TO:
 ARCHITECT'S PROJECT NO.:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		F MATERIALS PRESENTLY STORED (NET-GROSS) (DOLLAR)	G TOTAL COMPLETED AND STORED TO DATE (DOLLAR)	H % (G ÷ C)	I BALANCE TO PAY (C - I)	J RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD					

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.
 AIA Document G703™ – 1992. Copyright © 1963, 1965, 1966, 1967, 1970, 1976, 1982 and 1992 by The American Institute of Architects. All rights reserved. (WARNING) This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. Purchasers are permitted to reproduce for their own use copies of this document when completed. To report copyright violations of AIA Contract Documents, e-mail The American Institute of Architects legal counsel, copyright@aia.org.

2. PREVAILING WAGE RATE DETERMINATION

- A. These supplements shall modify, delete, and / or add to General Conditions of Contract. Where any article, paragraph, or subparagraph in General Conditions of Contract is supplemented by one of these paragraphs, provisions of such article, paragraph, or subparagraph shall remain in effect and supplementary provisions shall be considered as added thereto. Where any article, paragraph, or subparagraph in General Conditions of Contract is amended, voided, or superseded by any of these paragraphs, provisions of such article, paragraph, or subparagraph not so amended, voided, or superseded shall remain in effect.
 - 1. General Conditions of Contract Article 45, “Minimum Wages”, paragraph B. Following Prevailing Wage Rate Determination No. 200800417 is added to General Conditions of Contract.

- B. These State of Wisconsin forms, hereinafter set forth in this section, shall be filled out and submitted to Department of Public Works, Highway & Transportation:
 - 1. Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination (ERD-5724)
 - 2. Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination (ERD-10584)
 - 3. Disclosure of Ownership (ERD-7777)
 - 4. Request To Employ Subjourneyperson (ERD-10880)

Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination

NOTICE REQUIRED UNDER Section 15.04(1)(m), Wisconsin Statutes. Authorization for this form is provided under Sections, 66.0903(9)(b) and 103.49(4r)(9b) Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personally identifiable information may be used for secondary purposes.

This form must **ONLY** be filed with the **Awarding Agency** indicated below.

State Of))SS County Of)	Project Name		
	Project Number	Determination Number	
	Date Determination Issued	Date of Contract	
	Awarding Agency		
	Date Work Completed		

After being duly sworn, the person whose name and signature appears below hereby states under penalty of perjury that

- **I am** the duly authorized officer of the corporation, partnership, sole proprietorship or business indicated below and have recently completed all of the work required under the terms and conditions of a contract with the above-named awarding agency and make this affidavit in accordance with the requirements set forth in Section 66.0903(9)(c) or 103.49(4r)(c), Wisconsin Statutes and Chapter DWD 290 of the Wisconsin Administrative Code in order to obtain FINAL PAYMENT from such awarding agency.
- **I have** fully complied with all of the wage and hour requirements applicable to this project, including all of the requirements set forth in the prevailing wage rate determination indicated above which was issued for such project by the Department of Workforce Development on the date indicated above.
- **I have** received the required affidavit of compliance from each of my agents and subcontractors that performed work on this project and have listed each of their names and addresses on page 2 of this affidavit.
- **I have** full and accurate records that clearly indicate the name and trade or occupation of every worker(s) that I employed on this project, including an accurate record of the hours worked and actual wages paid to such worker(s).
- **I will** retain the records and affidavit(s) described above and make them available for inspection for a period of at least three (3) years from the completion date indicated above at the address indicated below and shall not remove such records or affidavit(s) without prior notification to the awarding agency indicated above.

Name of Corporation, Partnership, Sole Proprietorship or Business				
Street Address or P O Box	City	State	Zip Code	Telephone Number () -
Print Name of Authorized Officer			Date Signed	
Signature of Authorized Officer				

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		

If you have any questions call (608) 266-0028

Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination

NOTICE REQUIRED UNDER Section 15.04(1)(m), Wisconsin Statutes. Authorization for this form is provided under Sections, 66.0903(9)(b) and 103.49(4r)(9b) Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personally identifiable information may be used for secondary purposes.

This form must **ONLY** be filed with the **Awarding Contractor** indicated below.

State Of))SS County Of)	Project Name		
	Project Number		Determination Number
	Date Determination Issued		Date of Subcontract
	Awarding Contractor		
	Date Work Completed		

After being duly sworn, the person whose name and signature appears below hereby states under penalty of perjury that

- **I am** the duly authorized officer of the corporation, partnership, sole proprietorship or business indicated below. We have recently completed all of the work required under the terms and conditions of a subcontract with the above-named awarding contractor. We make this affidavit in accordance with the requirements set forth in Section 66.0903(9)(b) or 103.49(4r)(b), Wisconsin Statutes and Chapter DWD 290 of the Wisconsin Administrative Code in order to obtain FINAL PAYMENT from such awarding contractor.
- **I have** fully complied with all of the wage and hour requirements applicable to this project, including all of the requirements set forth in the prevailing wage rate determination indicated above which was issued for such project by the Department of Workforce Development on the date indicated above.
- **I have** received the required affidavit of compliance from each of my agents and subcontractors that performed work on this project and have listed each of their names and addresses on page 2 of this affidavit.
- **I have** full and accurate records that clearly indicate the name and trade or occupation of every worker(s) that I employed on this project, including an accurate record of the hours worked and actual wages paid to such worker(s).
- **I will** retain the records and affidavit(s) described above and make them available for inspection for a period of at least three (3) years from the completion date indicated above at the address indicated below and shall not remove such records or affidavit(s) without prior notification to the awarding contractor.

Name of Corporation, Partnership, Sole Proprietorship or Business				
Street Address	City	State	Zip Code	Telephone Number () -
Print Name of Authorized Officer			Date Signed	
Signature of Authorized Officer				

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
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Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number () -			Telephone Number () -		

If you have any questions call (608) 266-0028

Disclosure of Ownership

Notice required under Section 15.04(1)(m), Wisconsin Statutes. The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(d) and 103.49(7)(d), Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personal information you provide may be used for secondary purposes.

- (1) On the date a contractor submits a bid to or completes negotiations with a state agency or local governmental unit, on a project subject to Section 66.0903 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency or local governmental unit the name of any "other construction business", which the contractor, or a shareholder, officer or partner of the contractor, owns or has owned within the preceding three (3) years.
- (2) The term "other construction business" means any business engaged in the erection, construction, remodeling, repairing, demolition, altering or painting and decorating of buildings, structures or facilities. It also means any business engaged in supplying mineral aggregate, or hauling excavated material or spoil as provided by Sections 66.0903(3), 103.49(2) and 103.50(2), Wisconsin Statutes.
- (3) This form must **ONLY** be filed, with the state agency or local governmental unit that will be awarding the contract, if **both (A) and (B) are met.**
 - (A) The contractor, or a shareholder, officer or partner of the contractor:
 - (1) Owns at least a 25% interest in the "other construction business", indicated below, on the date the contractor submits a bid or completes negotiations.
 - (2) Or has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.
 - (B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for hours worked in excess of the prevailing hours of labor, to any employee at any time within the preceding three (3) years.

Other Construction Business

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

I hereby state under penalty of perjury that the information, contained in this document, is true and accurate according to my knowledge and belief.

Print the Name of Authorized Officer

Signature of Authorized Officer

Date Signed

Name of Corporation, Partnership or Sole Proprietorship

Street Address or P O Box

City

State

Zip Code

If you have any questions call (608) 266-0028

Request To Employ Subjourneyperson

Personal information you provide may be used for secondary purposes. [See Section 15.04(1)(m), Wisconsin Statutes for details.] The use of this form is mandatory. The authority for the use of this form is prescribed in Section DWD 290.025, Wisconsin Administrative Code. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.

The employer indicated below requests that the Department of Workforce Development (DWD) determine the prevailing wage rate(s) and related qualifications to enable such employer to utilize a subjourneyperson(s) on the following public works project, in accordance with the provisions of Section DWD 290.025, Wisconsin Administrative Code.

1. Name of Public Works Project	
County	City, Village or Township
Determination Number	Project Number

2. Name of Employee (Last, First and Initial)	P.O. Box or Street Address	City	State	Zip Code	Date of Birth	Journey Classification

3. Name of Employer (Print)	Name of Person Making Request (Print)		
P O Box or Street Address	City	State	Zip Code
Telephone Number () -	Title of Requestor		

READ CAREFULLY: I fully understand that this request is ONLY applicable to the project and employee(s) listed above and that such employee(s) will ONLY work under the direction of and directly assist a skilled trades employee by frequently using the tools of a skilled trades employee and will NOT regularly perform the duties of a general laborer, heavy equipment operator or truck driver. If the employee(s) indicated above regularly perform(s) the work of a different trade or occupation, he/she will be compensated for such work at the applicable journeypersons prevailing wage rate. I agree not to employ any employee as a subjourneyperson on this project until I receive written confirmation from the DWD. After such confirmation is received, I will compensate the employee(s) indicated above in strict accordance with the directions received from the DWD.

Signature of Requestor _____ Date Signed _____

MAIL COMPLETED REQUEST TO Equal Rights Division, Labor Standards Bureau, P. O. Box 8928 Madison WI 53708.

You may call (608) 266-6860 if you need assistance in completing your request

Jim Doyle
Governor
Roberta Gassman
Secretary
Jennifer A. Ortiz
Division Administrator



EQUAL RIGHTS DIVISION
201 East Washington Avenue, Room A300
P.O. Box 8928
Madison, WI 53708
Telephone: (608) 266-6860
Fax: (608) 267-4592
TTY: (608) 264-8752
<http://www.dwd.state.wi.us/>

State of Wisconsin
Department of Workforce Development

DEPARTMENTAL ORDER

ROBERT J NEBEL, ASSOCIATE PUBLIC WORKS DIRECTOR
DANE COUNTY PUBLIC WORKS
1919 ALIANT ENERGY CENTER WAY
MADISON, WI 53713

RE: 3RD FL MTG RM RENOVATION - CCB
CITY OF MADISON, DANE CO, WI
Determination No. 200801486 Project No. 06013.03

The application which you filed or was filed on your behalf, by the person copied below, for a prevailing wage rate determination applicable to the above-referenced project has been received.

A survey was conducted to determine the prevailing wage rate for the trade(s) or occupation(s) needed to complete the project. The findings of the survey are set forth in the enclosed determination.

If you believe that the wage rate for any trade or occupation does not accurately reflect the prevailing wage rate in the city, village or town in which the project is located, you have the right to request the department to conduct an administrative review regarding such wage rate.

Your request must be made, in writing, within 30 days from the date indicated below and at least 10 days before the date a construction contract(s) is to be awarded or negotiated. Your request must also include wage rate information on at least three (3) similar projects located in the city, village or town where the proposed project is located on which some work was performed by the contested trade(s) or occupation(s) during the current survey period and which was previously considered by the department in issuing the enclosed determination. See s. DWD 290.10 of the Wisconsin Administrative Code and either s. 66.0903 (3)(br) or s. 103.49 (3)(c), Stats. for a complete explanation of the administrative review process.

Now, therefore, it is hereby ORDERED that the prevailing wage rates set forth in the enclosed determination shall only be applicable to the above referenced project. This ORDER shall be deemed a FINAL ORDER of this department unless a timely request for an administrative review is filed with the department or a construction contract(s) is not awarded or negotiated before the determination's expiration date.

DATED

12/12/2008

Enclosures

FOR THE DEPARTMENT

A handwritten signature in black ink, appearing to read 'Rita Ruona', is written over a horizontal line.

Rita Ruona, Investigator
Labor Standards Bureau
Construction Wage Standards Section
(608) 266-1898

cc: DAWN WEBER, ARCHITECT
DORSCHMER ASSOCIATES
849 E WASHINGTON AVE
MADISON, WI 53703

PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin
 Department of Workforce Development
 Pursuant to s. 66.0903, Stats.
 Issued On: 12/12/2008

DETERMINATION NUMBER: 200801486

EXPIRATION DATE: Prime Contracts MUST Be Awarded Or Negotiated On Or Before 6/09/2009. If NOT, You MUST Reapply.

DESCRIPTION OF PROJECT: 3RD FL MTG RM RENOVATION - CCB
 PROJECT NO: 06013.03

LOCATION OF PROJECT: CITY OF MADISON, DANE CO, WI

CONTRACTING AGENCY: DANE COUNTY PUBLIC WORKS

CLASSIFICATION: Contractors are required to call the Department of Workforce Development if there are any questions regarding the proper trade or classification to be used for any worker on a public works project.

OVERTIME: Time and one-half must be paid for all hours worked over 10 hours per day and 40 hours per calendar week and for all hours worked on Saturday, Sunday and the following six (6) holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; the day before if January 1, July 4 or December 25 falls on a Saturday; the day following if January 1, July 4 or December 25 falls on a Sunday.

FUTURE INCREASE: If indicated for a specific trade or occupation, the full amount of such increase MUST be added to the "TOTAL" indicated for such trade or occupation on the date(s) such increase(s) becomes effective.

PREMIUM PAY: If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.

SUBJOURNEY: Wage rates may be available for some of the classifications indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer that desires to use any subjourney classification on this project MUST request the applicable wage rate from this department PRIOR to the date such classification is used on this project. Form ERD-10880 is available for this purpose.

BUILDING OR HEAVY CONSTRUCTION

Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

Fringe Benefits Must Be Paid On All Hours Worked

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Acoustic Ceiling Tile Installer	25.51	12.11	37.62
Boilermaker	29.44	16.37	45.81
Bricklayer, Blocklayer or Stonemason	29.46	13.41	42.87
Cabinet Installer	48.00	0.00	48.00
Carpenter	26.11	12.86	38.97
Carpet Layer or Soft Floor Coverer	25.51	12.11	37.62
Cement Finisher	28.43	12.94	41.37
Drywall Taper or Finisher	24.30	11.60	35.90
Future Increase(s): Add \$1.55/hr on 6/1/08; Add \$1.60/hr on 6/1/09			

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked			
<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Electrician	30.00	16.05	46.05
Elevator Constructor	40.94	18.34	59.28
Fence Erector	21.50	3.00	24.50
Fire Sprinkler Fitter	35.69	13.35	49.04
Glazier	33.68	6.47	40.15
Heat or Frost Insulator	30.63	16.60	47.23
Future Increase(s): Add \$2.60/hr on 6/1/08; Add \$2.85/hr on 6/1/09; Add \$3.05/hr on 6/1/2010.			
Insulator (Batt or Blown)	21.97	10.65	32.62
Ironworker	29.30	14.71	44.01
Lather	25.51	12.11	37.62
Line Constructor (Electrical)	31.99	13.94	45.93
Marble Finisher	24.60	13.00	37.60
Marble Mason	30.75	13.00	43.75
Metal Building Erector	19.23	1.61	20.84
Millwright	27.11	12.07	39.18
Overhead Door Installer	24.60	11.99	36.59
Painter	24.00	11.60	35.60
Future Increase(s): Add \$1.55 on 6/1/08; Add \$1.60 on 6/1/09			
Premium Pay: Add \$.25/hr. sandblasting; Add \$.40/hr. paperhanging; Add \$1.00/hr. spray/structural steel.			
Pavement Marking Operator	23.46	9.45	32.91
Piledriver	26.61	12.86	39.47
Pipeline Fuser or Welder (Gas or Utility)	27.11	12.19	39.30
Plasterer	25.28	12.95	38.23
Plumber	33.50	11.84	45.34
Future Increase(s): Add \$2.20/hr on 6/1/08			
Refrigeration Mechanic	33.11	14.84	47.95
Future Increase(s): Add \$2.60 6/2/2008; Add \$2.85 6/1/2009			
Roofer or Waterproofer	26.70	3.62	30.32
Sheet Metal Worker	30.68	16.62	47.30
Future Increase(s): Add \$2.50 6/1/2008			
Steamfitter	35.25	12.11	47.36
Future Increase(s): Add \$2.60 6/02/2008; Add \$2.85 6/01/2009			
Teledata Technician or Installer	20.69	10.23	30.92
Future Increase(s): Add \$.85 on 6/1/08; Add \$.90 on 6/1/09			
Temperature Control Installer	34.10	10.89	44.99
Terrazzo Finisher	26.62	10.63	37.25
Terrazzo Mechanic	26.62	10.63	37.25
Tile Finisher	14.00	1.35	15.35
Tile Setter	26.62	10.63	37.25
Tuckpointer, Caulker or Cleaner	20.98	6.02	27.00
Underwater Diver (Except on Great Lakes)	31.90	11.44	43.34
Well Driller or Pump Installer	22.52	7.14	29.66
Siding Installer	28.56	15.24	43.80
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	24.06	15.52	39.58

Fringe Benefits Must Be Paid On All Hours Worked

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	28.12	15.40	43.52
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	16.00	8.00	24.00
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	20.58	10.71	31.29
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	17.41	9.80	27.21

TRUCK DRIVERS

Single Axle or Two Axle	24.55	16.08	40.63
Three or More Axle	16.40	11.17	27.57
Articulated, Euclid, Dumptor, Off Road Material Hauler	27.87	15.40	43.27
Pavement Marking Vehicle	20.85	11.10	31.95
Truck Mechanic	12.50	0.00	12.50

LABORERS

General Laborer	21.69	11.15	32.84
Premium Pay: Add \$1.00/hr for certified welder; Add \$.25/hr for mason tender			
Asbestos Abatement Worker	21.06	11.13	32.19
Landscaper	12.36	14.53	26.89
Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	18.25	3.33	21.58
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	40.00	1.81	41.81
Railroad Track Laborer	12.00	0.00	12.00

**HEAVY EQUIPMENT OPERATORS
SITE PREPARATION, UTILITY AND LANDSCAPING WORK ONLY**

Crane; Backhoe (Track Type); Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5cu yards or more capacity; Power Subgrader; Asphalt Milling Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Trencher; Post Hole Digger or Driver; Tug or Launch (not performing work on the Great Lakes)	28.12	15.73	43.85
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Broom or Sweeper; Environmental Burner	28.59	16.00	44.59
Crusher, Screening or Wash Plant; Air Compressor (400 CFM or Over); Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Skid Steer Loader (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	27.59	14.88	42.47

**HEAVY EQUIPMENT OPERATORS
EXCLUDING SITE PREPARATION, UTILITY, PAVING AND LANDSCAPING WORK**

Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Feet or Over	30.62	16.00	46.62
Premium Pay: Add \$.50/hr for cranes with lifting capacity over 200 ton; Add \$1.00/hr. at 300 ton; Add \$1.50/hr at 400 ton; Add \$2.00/hr at 500 ton.			

Fringe Benefits Must Be Paid On All Hours Worked

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Crane, Tower Crane or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Crane, Tower Crane or Derrick, With Boom, Leads and/or Jib Lengths Measuring 175 Feet or Under; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Traveling Crane (Bridge Type); Caisson Rig; Pile Driver; Dredge (Not Performing Work on the Great Lakes) Future Increase(s): Premium Pay: Add \$.25/hr for cranes with lifting capacity of 45 ton or over	29.62	16.00	45.62
Crane (Go-Devil Type) or Truck Mounted Hydraulic Crane (10 Tons or Under); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs.; Tractor or Truck Mounted Hydraulic Backhoe; Gradall (Cruz-Aire Type); Mechanic or Welder; Bulldozer or Endloader; Grader or Motor Patrol; Scraper (Self Propelled or Tractor Drawn) 5 cu yards or more capacity; Concrete Pump, Grout Pump or Concrete Conveyor (Rotec or Bidwell Type); Concrete Breaker (Manual or Remote); Concrete Batch Plant; Power Subgrader; Concrete Spreader; Concrete Paver; Concrete Grinder or Planing Machine; Concrete Conveyor System; Concrete Slipform Placer; Curb and Gutter Machine; Roller (Over 5 Ton); Shouldering Machine; Boring Machine (Horizontal, Vertical or Directional); Air Track, Rotary or Percussion Drilling Machine; Straddle Carrier or Travel Lift; Forklift (Machinery Moving or Steel Erection); Manhoist or Elevator; Material or Stack Hoist; Trencher; Sideboom; Hydro-Blaster (10,000 PSI or Over); Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment Future Increase(s):	29.12	16.00	45.12
Farm or Industrial Type Tractor; Greaser; Compactor (Self-Propelled); Concrete Saw (Vermeer Type); Concrete Bump Cutter or Grooving Machine; Tining or Curing Machine; Roller (5 Tons or Under); Broom or Sweeper; Hoist (Tugger); Environmental Burner	22.98	6.02	29.00
Crusher, Screening or Wash Plant; Air, Electric or Hydraulic Jacking System; Air Compressor (400 CFM or Over); Generator (150 KW or Over); Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Skid Steer Loader (With or Without Attachments); Robotic Tool Carrier (With or Without Attachments); Skid Rig; Stump Chipper; Mulcher; Vibratory Hammer or Extractor	28.87	14.90	43.77
Oilcr; Forklift	25.89	16.00	41.89
Gas or Utility Pipeline, Except Sewer and Water (Primary Equipment)	31.57	17.23	48.80
Gas or Utility Pipeline, Except Sewer and Water (Secondary Equipment)	28.12	15.40	43.52
Fiber Optic Cable Equipment	25.33	12.35	37.68

This document **MUST BE POSTED** by the **CONTRACTING AGENCY** in at least one conspicuous and easily accessible place **on the site of the project**. A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document **MUST** remain posted during the entire time any worker is employed on the project and **MUST** be physically incorporated into the specifications and all contracts and most subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-1898.

Consolidated List of Debarred Contractors
Prepared and Issued By
State of Wisconsin
Department of Workforce Development

February 1, 2007

This list has been prepared in accordance with the provisions of s. 66.0903(12) and s. 103.49(7), Stats. and Chapter DWD 294 of the Wisconsin Administrative Code. All contractors on this list were found to have committed a "debarable offense" related to certain labor standard provisions determined or established for a state or local public works project. No state agency or local governmental unit may knowingly solicit bids from, negotiate with or award any contracts to or approve or allow any subcontracts with a debarred contractor, including all divisions, affiliates or other organizational elements of such contractor that are engaged in construction business activities, until the debarment is terminated. The name of each debarred contractor must remain on this list for a period of three (3) years from the termination date indicated below. The contractor is, however, only "debarred" from the "effective date" through the "termination date" indicated for that contractor. Questions regarding this list should be addressed to Mike Dixon, Equal Rights Division, P. O. Box 8928, Madison, WI 53708 or call (608) 266-0028. Deaf, hearing or speech-impaired callers may contact the department by calling its TDD number (608) 264-8752.

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
Bay Asphalt, Inc.	1792 Scray Hill Road De Pere, WI 54115	1/1/03	12/31/05	1, 2 and 4	1997- 1999	None
Bechitsao, Joel	See Tri-State Traffic Services, Inc.					
B.P. Phillips Construction, Inc.	1570 Fire Lane Drive Green Bay, WI 54311	9/19/01	9/18/04	1, 2 and 4	4/7/97 to 3/7/98	None
Custom Heating & Air LLC	283 Tony Lane, Green Bay, WI 54304	12/1/06	11/30/09	1, 2 and 4	2003 to 2004	None
D. C. Nevels Trucking, Inc. or D. C. Nevels Trucking	3246 North Sherman Blvd., Milwaukee, WI 53216	6/1/05	5/31/08	1, 2 and 4	2000- 2002	None
Gibraltar Construction LLC	N60 W15080 Bobolink Ave., Menomonee Falls, WI 53051	12/1/06	4/30/07	1	2005	None
HGI Painting	P. O. Box 3481, Janesville, WI 53545	11/1/04	10/31/07	1, 2 and 4	2001, 2002 and 2003	None
Haim, James	See Haim Painting, Inc.					

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
Haim Painting, Inc.	N15 W22120 Jerico Drive, #8 Waukesha, WI 53186	4/1/01	3/31/04	1, 2 and 4	7/6/97 to 10/30/98	None
Hedding, Matt	C/O HGI Painting, P. O. Box 3481, Janesville, WI 53545	11/1/04	10/31/07	1, 2 and 4	2001, 2002 and 2003	None
Jacobi, Sandi	See Wisconsin Detention Systems, Inc.					
Jacobi Sr., Michael A.	See Wisconsin Detention Systems, Inc.					
Joseph Stoller Company	N8426 Hwy 42	2/1/2007	1/31/2010	1, 2	2004 and 2005	None
J. R. Electric	2391 233 rd St., P. O. Box 491, Cushing, WI 54006	1/1/03	12/31/05	1 and 2	1999	None
J. R. Electric, Inc.	2391 233 rd St., P. O. Box 491, Cushing, WI 54006	1/1/03	12/31/05	1 and 2	1999	None
Keiver, David	See Custom Heating & Air LLC	12/1/06	11/30/09	1, 2 and 4	2003 and 2004	None
Kletschka, Richard	See J. R. Electric and J. R. Electric, Inc.					
Kletschka, Tristan	See J. R. Electric, Inc.					
Kruczek Construction, Inc.	3636 Kewaunee Road, Green Bay, WI 54311	6/1/05	11/30/05	1 and 2	1998 and 1999	None
Kruczek, John	See Kruczek Construction, Inc.					
LaCosse, Todd	See Midwest Contractors, Inc.					

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
Maria, Steve	See Gibraltar Construction LLC					
Mellendez, Odillion	See Amigo Painting					
Midwest Contractors, Inc.	2100 Depot St., Holt, MI 48842	6/21/02	6/20/05	1	6/11/99 to 12/31/99	None
Nevels, Betty	See D. C. Nevels Truckng, Inc.					
Nevels, Donald	See D. C. Nevels Trucking, Inc.					
Phillips, Bruce P.	See B.P. Phillips Construction					
Rick's Painting & Drywall	P. O. Box 2316, Eagle River, WI 54521	3/1/03	2/28/06	1	5/8/00 to 4/30/01	None
Scandia Heating and Air Conditioning, Inc.	P. O. Box 7 Scandia, MN. 55703	5/1/2003	4/30/2004	1 and 2	2001	None
Stoller Enterprises LLC	N8426 Hwy 42, Algoma, WI 54201-9552	2/1/2007	1/31/2010	1 and 2	2005 to 2006	None
Stoller, Joseph	See Joseph Stoller Company					
Stoller, Patrick J.	See Stoller Enterprises LLC					
Strobel Construction, Inc..	P. O. Box 2316, Eagle River, WI 54521	3/1/03	2/28/06	1	5/8/00 to 4/30/01	None
Strobel, Diane	See Strobel Construction, Inc.					
Strobel, Rick	See Strobel Construction, Inc.					
Tri-State Traffic Services, Inc.	12555 West Burleigh Road #3, Brookfield, WI 53005	12/1/06	11/30/07	1, 2 and 4	2003- 2004	None

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
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Wanta, Daniel	See Bay Asphalt, Inc.					
Wisconsin Detention Systems, Inc	.W204 N16635 Jackson Drive Jackson, Wisconsin 53037	1/1/03	12/31/05	1	9/2000 to 3/2001	None
West, James F.	See Scandia Heating and Air Conditioning, Inc.					
Zinke, Stacy	See Talex Contractors, Inc.					

Cause Code: 1 = Failure to Pay Straight Time 2 = Failure to Pay Overtime 3 = Kickback 4 = Payroll Records.

SECTION 01000
BASIC REQUIREMENTS

PART 1 GENERAL

1.01 SECTION SUMMARY

- A. Section Includes:
1. Section Summary
 2. Summary of the Work
 3. Contractor Use of Premises
 4. Applications for Payment
 5. Alternates
 6. Coordination
 7. Cutting and Patching
 8. Conferences
 9. Progress Meetings
 10. Submittal Procedures
 11. Proposed Products List
 12. Shop Drawings
 13. Product Data
 14. Samples
 15. Manufacturers' Instructions
 16. Manufacturers' Certificates
 17. Quality Assurance / Quality Control of Installation
 18. References
 19. Interior Enclosures
 20. Protection of Installed Work
 21. Parking
 22. Progress Cleaning
 23. Products
 24. Transportation, Handling, Storage and Protection
 25. Product Options
 26. Substitutions
 27. Starting Systems
 28. Demonstration and Instructions
 29. Contract Closeout Procedures
 30. Final Cleaning
 31. Adjusting
 32. Operation and Maintenance Data
 33. Spare Parts and Maintenance Materials
 34. As-Built Drawings and Specifications

1.02 SUMMARY OF THE WORK

- A. Project Description: Perform the Work as specified and detailed in Construction Documents package. Work includes construction services for the tenant build-out of approximately 4,300 sq. ft. on the first floor and renovation of third floor meeting rooms, approximately 5,700 sq. ft., including drywall partitions, flooring, ceiling, HVAC, electrical and fire protection.
- B. Work by Owner: Demolition work by Owner described in these Construction Documents will be accomplished by County and will not be included under this Contract.
- ~~D.C.~~ Permits: Prior to commencement of the Work, Contractor to secure any and all necessary permits for completion of the Work and facility occupancy.

1.03 CONTRACTOR USE OF PREMISES

- A. Limit use of premises to allow work by Contractors or Subcontractors, work by Owner, and access by Owner. Note that the space below this Work will be occupied during all Work.

1.41.04 APPLICATIONS FOR PAYMENT

- A. Submit two (2) copies of each application on AIA G702™ and G703™ forms or approved contractors invoice form.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Bi-weekly.

1.51.05 ALTERNATES

- A. Alternates quoted on Bid Form shall be reviewed and accepted or rejected at the Owner's option.
- B. Coordinate related work and modify surrounding work as required.

~~D.C.~~ Schedule of Alternates:

- 1. Alternate Bid 1
 - a. Conference Room 321 ~~HVAC Modifications~~ including manual shade.
- 2. Alternate Bid 2
 - ~~2.a.~~ Motorized Shades in lieu of Manual Shades in Rooms 310 and 315.
- ~~2.3.~~ Alternate Bid 3
 - ~~2.a.~~ Motorized Shade in lieu of Manual Shade in Room 321.
- ~~2.4.~~ Alternate Bid 4
 - ~~2.a.~~ First Floor Break Room.
- ~~2.5.~~ Alternate Bid 5
 - a. Solid Surface in lieu of Marble in Rooms 310 and 315.
- ~~2.6.~~ Alternate Bid 6

~~2.a.~~ Heat Exchanger.

~~2.7.~~

~~2.~~

~~a. Motorized Shades in lieu of Manual Shades.~~

1.61.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of various sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
- C. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagrammatically on Drawings.

1.71.07 CUTTING AND PATCHING

- A. Employ a skilled and experienced installer to perform cutting and patching new work; restore work with new Products.
- B. Submit written request in advance of cutting or altering structural or building enclosure elements.
- C. Fit work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- D. Refinish surfaces to match adjacent finishes.

1.81.08 CONFERENCES

- A. Dane County Department Public Works, Highway & Transportation will schedule a preconstruction conference after Award of Contract for all affected parties.
- B. When required in individual Specification section, convene a pre-installation conference at project site prior to commencing work of the section.

1.09 PROGRESS MEETINGS

~~C.A.~~ Owner shall schedule and administer meetings throughout progress of the Work at minimum of one (2) per month.

~~D.B.~~ Owner shall preside at meetings, record minutes, and distribute copies within two (2) days to those affected by decisions made.

~~1.101.010~~ SUBMITTAL PROCEDURES

- A. Submittal form to identify Project, Contractor, Subcontractor or supplier; and pertinent Construction Documents references.
- B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with requirements of the Work and Construction Documents.
- C. Identify variations from Construction Documents and Product or system limitations that may be detrimental to successful performance of completing the Work.
- D. Revise and resubmit submittals as required; identify all changes made since previous submittal.

~~1.111.011~~ PROPOSED PRODUCTS LIST

- A. Within fifteen (15) days after date of Award of Contract, submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

~~1.121.012~~ SHOP DRAWINGS

- A. Submit number of copies that Contractor requires, plus two (2) copies that shall be retained by Public Works Project Engineer.

~~1.131.013~~ PRODUCT DATA

- A. Submit number of copies that Contractor requires, plus two (2) copies that shall be retained by Public Works Project Engineer.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

~~1.141.014~~ SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Public Works Project Engineer's selection.

~~1.151.015~~ MANUFACTURERS' INSTRUCTIONS

- A. When specified in individual Specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.161.016 MANUFACTURERS' CERTIFICATES

- A. When specified in individual Specification sections, submit manufacturers' certificate to Public Works Project Engineer for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.171.017 QUALITY ASSURANCE / QUALITY CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply fully with manufacturers' instructions.
- C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.181.018 REFERENCES

- A. Conform to reference standard by date of issue current as of date for receiving bids.
- B. Should specified reference standard conflict with Construction Documents, request clarification from Public Works Project Engineer before proceeding.

1.191.019 INTERIOR ENCLOSURES

- A. Provide temporary partitions as required to separate work areas from Owner occupied areas, to prevent distribution of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

1.201.020 PROTECTION OF INSTALLED WORK

- A. Protect installed work and provide special protection where specified in individual Specification sections.

1.021 PARKING

- A. One (1) parking stall for the general contractor shall be available in the City-County Building underground parking garage.
- B. An additional three (3) parking stalls shall be available in the Courthouse driveway. These stalls shall be available as follows:
 - 1. One (1) stall for the HVAC subcontractor.
 - 2. One (1) stall for the plumbing subcontractor.
 - 3. One (1) stall for the electrical subcontractor.
- C. Arrange for any additional parking to accommodate construction personnel.

~~1.221.022~~ PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

~~1.231.023~~ PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by Construction Documents.

~~1.241.024~~ TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

- A. Transport, handle, store and protect Products in accordance with manufacturer's instructions.

~~1.251.025~~ PRODUCT OPTIONS

- A. Where definite material is specified, it is not intention to discriminate against "equal" product made by another manufacturer. Intention is to set definite standard of material quality. Should bidder choose to bid materials other than those specified, bidder shall submit said materials specifications to Project Engineer for approval at least seven (7) days prior to Bid Opening. Public Works Project Engineer shall consider requests for Substitutions up to seven (7) days prior to date of Bid Opening.
- B. Products and materials that are not specified, but have been approved for use by Public Works Project Engineer shall be identified in addenda to all bidding contractors.
- C. Requests for material or product substitutions submitted up to fifteen (15) days after Bid Opening may be considered, but Project Engineer is not required to consider them. Dane County reserves right to approve or reject substitutions based on Specification requirements and intended use.

1.026 REQUESTS FOR SUBSTITUTIONS

- ~~C.A.~~ Document each request with complete data substantiating compliance of proposed Substitution with Construction Documents.
- B. Submit three (3) copies of requests for Substitution for consideration. Limit each request to one (1) proposed Substitution.
- C. Substitutions shall not change contract price established at Bid Opening.

1.027 STARTING SYSTEMS

- A. Provide written notification prior to start-up of each equipment item or system.
- B. Ensure that each piece of equipment or system is ready for operation.
- C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.
- D. Submit written report that equipment or system has been properly installed and is functioning correctly.

~~1.281.028~~ DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of final inspection.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.

~~1.291.029~~ CONTRACT CLOSEOUT PROCEDURES

- A. Submit written certification that Construction Documents have been reviewed, the Work has been inspected, and the Work is complete in accordance with Construction Documents and ready for Public Works Project Engineer's inspection.
- B. Submit final Application for Payment identifying total adjusted Contract Sum / Price, previous payments, and amount remaining due.

~~1.301.030~~ FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view.
- C. Remove waste and surplus materials, rubbish, and construction facilities from site.

~~1.311.031~~ ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

~~1.321.032~~ OPERATION AND MAINTENANCE DATA

- A. Provide operation and maintenance data for all mechanical and electrical equipment supplied and installed in project.

~~1.331.033~~ SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections.
- B. Deliver to the Work site and place in location as directed.

~~1.341.034~~ AS-BUILT DRAWINGS AND SPECIFICATIONS

- A. Contractor-produced Drawings and Specifications shall remain property of Contractor whether Project for which they are made is executed or not. Contractor shall furnish Public Works Project Engineer with original tracings of drawings and prints of specifications in reproducible format, one set of Drawings and Specifications and one set of as-builts drawings in AutoCAD 2007 (or lower) format on CD.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01058

RECYCLING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Waste Management Goals
 - 2. Waste Management Plan
 - 3. Reuse
 - 4. Recycling
 - 5. Materials Sorting and Storage On Site
 - 6. Lists of Recycling Facilities Processors and Haulers
 - 7. Waste Management Plan Form

1.02 WASTE MANAGEMENT GOALS

- A. Dane County requires that as many waste materials as possible produced as result of this project be salvaged, reused or recycled in order to minimize impact of construction waste on landfills and to minimize expenditure of energy and cost in fabricating new materials. Additional information may be found in The Dane County Green Building Policy, Resolution 299, 1999-2000.
- B. Contractor shall develop, with assistance of Public Works Project Engineer and Architect / Engineer, Waste Management Plan (WMP) for this project. Outlined in RECYCLING section of this specification are examples of materials that can be recycled or reused as well as recommendations for waste sorting methods.

1.03 WASTE MANAGEMENT PLAN

- A. Contractor shall complete WMP and include cost of recycling / reuse in Bid. WMP will be submitted to Public Works Project Engineer within fifteen (15) days of Notice to Proceed date. Copy of blank WMP form is in this Section. Submittal shall include cover letter and WMP form with:
 - 1. Information on:
 - a. Types of waste materials produced as result of work performed on site;
 - b. Estimated quantities of waste produced;
 - c. Identification of materials with potential to be recycled or reused;
 - d. How materials will be recycled or reused;
 - e. On-site storage and separation requirements (on site containers);
 - f. Transportation methods; and
 - g. Destinations.

1.04 REUSE

- A. Contractors and subcontractors are encouraged to reuse as many waste materials as possible. Salvage should be investigated for materials not reusable on site.

1.05 RECYCLING

- A. These materials can be recycled in Dane County area:
1. Wood.
 2. Wood Pallets.
 3. Fluorescent Lamps.
 4. Foam Insulation & Packaging (extruded and expanded).
 5. PVC Plastic (pipe, siding, etc.).
 6. Concrete.
 7. Corrugated Cardboard.
 8. Metal.
 9. Carpet Padding.
 10. Gypsum Drywall.
 11. Barrels & Drums.
 12. Solvents.

1.06 MATERIALS SORTING AND STORAGE ON SITE

- A. Contractor shall provide separate containers for recyclable materials. Number of containers will be dependent upon project and site conditions.
- B. Contractor shall provide on-site locations for subcontractors supplied recycling containers to help facilitate recycling.

1.07 LISTS OF RECYCLING FACILITIES PROCESSORS AND HAULERS

- A. Web site www.countyofdane.com has recycling symbol (link) near top of page that lists current information for Dane County Recycling Markets. Contractors can also contact Dane County's Recycling Manager at 608/267-8815, or local city, village, town recycling staff listed in above referenced web site. Statewide listings of recycling / reuse markets at available from Wisconsin Department of Natural Resources, www.dnr.state.wi.us/org/aw/wm/markets.

1.08 WASTE MANAGEMENT PLAN FORM

A. Contractor Information:

Name: _____

Address: _____

Phone No.: _____ Recycling Coordinator: _____

MATERIAL	ESTIMATED QUANTITY	DISPOSAL METHOD (CHECK ONE)		RECYCLING / REUSE COMPANY OR DISPOSAL SITE
Salvaged & reused building materials	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Glass	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Wood	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Wood Pallets	_____ units	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Fluorescent Lamps	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Foam Insulation	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Asphalt & Concrete	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
PVC Plastic	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Corrugated Cardboard	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Metals	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Carpet Padding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Gypsum / Drywall	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Barrels & Drums	_____ units	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____

Solvents	_____ gallons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02070

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the demolition of such features as required in these specifications and on the drawings. Included are the following:
 1. Demolish partitions, ceilings, flooring, finishes, hollow metal frames, doors and other items as indicated.
 2. Protect portions of building adjacent to or affected by selective demolition. Take appropriate measures to protect existing facilities operations against dust contamination. Materials shall be removed from the existing building without disruption to the Owner or facility operations.
 3. Remove and legally dispose of demolished materials off-site.
 4. Demolish and salvage for reuse those items noted on the drawings.
 5. Recycle construction and demolition waste including metals and cardboard. Recycle carpet and ceiling tiles if practicable.
 6. Salvage items for reuse as indicated on drawings.

1.03 RELATED WORK

- A. Minor interior demolition of walls, ceilings, etc.

1.04 SUBMITTALS

- A. For utilities or other services requiring removal or abandonment in-place, submit materials documenting completion of such work.
- B. Submit copies of records documenting recycling of demolition materials from the site.

1.05 DEFINITIONS

- A. "Remove": Remove and legally dispose of items, except those indicated to be reinstalled.
- B. "Remove and Reinstall": Remove items indicated; clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall in the same location or in locations indicated.
- C. "Existing to Remain": Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the A/E, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.06 QUALITY ASSURANCE

- A. Comply with governing codes and regulations.

1.07 RECORD DRAWINGS

- A. Maintain record drawings showing actual locations of utilities and other features encountered, and any deviations from the original design. Show actual limits of removal and demolition.

1.08 SAFETY

- A. Verify that all gas and electrical utilities have been abandoned or disconnected and associated hazards mitigated, prior to beginning any demolition.
- B. Take all necessary precautions while dismantling piping containing gas, gasoline, oil or other explosive or toxic fluids or gases. Purge lines and contain materials in accordance with all applicable regulations. Store such piping outdoors until fumes are removed.
- C. Maintain a clean and orderly site. Remove debris at end of each workday.
- D. If hazardous materials are not anticipated, but encountered, terminate operations and contact the Owner immediately. Follow all applicable local, state and federal regulations pertaining to hazardous materials.

1.09 PERMITS

- A. Unless otherwise noted, Contractor shall be responsible for obtaining and paying for all permits necessary to complete demolition work.
- B. If necessary, file and maintain Notification of Demolition and/or Renovation and Application for Permit Exemption (WDNR Form 4500-113) in accordance with the Wisconsin Administrative Code Chapter NR447.

1.010 DISCONNECTION OF SERVICES

- A. Prior to starting removal and/or demolition operations be responsible and coordinate disconnection with owner of all existing utilities, communication systems, alarm systems and other services.
- B. Disconnect all services in manner which insures continued operation in facilities not scheduled for demolition.
- C. Disconnect all services in manner which allows for future connection to that service.
- D. Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.

1.011 REMOVAL/SALVAGING OF ITEMS

- A. Carefully remove all items that are scheduled to be salvaged.
- B. Secure salvaged items to allow for future movement; provide pallets, skids and other devices as necessary. Secure all loose parts.
- C. Provide crates, padding, tarps and other measures necessary to protect salvaged items during storage. Store items in secure location, safe from vandalism, weather, dust and other adverse elements.
- D. Where salvaged items are indicated to be turned over to Owner, deliver to location on property where designated by Owner.

- E. Where indicated to be incorporated into new work, store the salvaged item in secure location until trade responsible for re-installation mobilizes his equipment and storage facilities to the site, or otherwise accepts responsibility for the salvaged item.
- F. Items of salvage value that are not to be returned to the Owner or the A/E shall be removed from the structure. Storage or sale of such salvage items at project site is prohibited.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Use Contractor's normal equipment for demolition purposes and which meets all safety requirements imposed on such equipment.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine all areas of work, verify all existing conditions, and report any unsatisfactory conditions.

3.02 PROTECTION OF EXISTING WORK AND FACILITIES

- A. Verify the locations of, and protect, any building elements, utilities, and all other such facilities that are intended to remain or be salvaged.
- B. Make such explorations and probes as necessary to ascertain any required protection measures that shall be used before proceeding with demolition.
- C. Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the work.
- D. Furnish and install temporary enclosures or other barriers as shown on the plans or as otherwise necessary to protect existing features.
- E. Protect adjacent interior areas from collection of dust and noxious fumes. Seal HVAC system ductwork and grilles to prevent contamination of building or mechanical systems.
- F. Provide protection for workers, public, adjacent construction and occupants of existing building(s).
- G. Report damage of any facilities or items scheduled for salvaging to the Owner.
- H. Repair or replace any damaged facilities that are not scheduled for demolition.
- I. Do not damage building elements and improvements indicated to remain.
- J. Do not close or obstruct walks, drives, other occupied or used spaces, or facilities without the written permission from the owner, A/E and the authorities having jurisdiction.
- K. Do not interrupt utilities serving occupied facilities without permission from the owner, A/E and authorities having jurisdiction. If necessary, provide temporary utilities.
- L. Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.

- M. If necessary, provide additional materials to protect existing building components that are to remain.
- N. Where necessary to prevent collapse of any construction, install temporary shores, struts or bracing. Do not commence demolition work until all temporary construction is complete.
- O. Take precautions to guard against movement, settlement or collapse of any surrounding construction designated to remain and be liable for any such movement, settlement or collapse.

3.03 DEMOLITION

- A. Remove all equipment, fixtures and other materials scheduled for salvage prior to beginning demolition operations.
- B. Abandon gas, electric and communication utilities in accordance with local utility company requirements, or applicable substantive requirements if considered private.
- C. Remove all sealant, fasteners and damaged or rotten blocking from existing construction to remain where demolition occurs.

3.04 TRANSPORTATION AND DISPOSAL OF DEMOLITION WASTE

- A. Transport and dispose all demolition waste in accordance with local, state, and federal guidelines.
 - 1. Recycle fluorescent lamps and other lamps containing heavy metals with a company engaged in the proper handling and recycling of these materials.
 - 2. Properly dispose of any lamp ballasts containing PCB's.
- B. Whenever possible, or otherwise required by the Contract Documents, recycle demolition waste.
- C. Demolition waste that cannot be recycled shall be disposed of at a landfill or dumpsite designed and approved to accept the given waste.
- D. Maintain records documenting recycling of demolition waste. Record description of material, date removed, quantity removed and recycling destination.
 - 1. Provide copies of records to A/E at completion of project.

3.05 SCHEDULE

- A. Items to be removed shall be as indicated on the Drawings.
 - 1. Items to be stored and reinstalled.
 - 2. Items to be removed from site by Contractor.
- B. Items to remain (if clarification required).

3.06 CLEANING

- A. All adjacent areas shall be broom cleaned and ready to receive new construction.
- B. Remove from the site all debris resulting from the Work of this Section.

END OF SECTION 02070

SECTION 04400

STONE MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Marble wall panels and reinstallation of salvaged marble base.

1.03 RELATED WORK

- A. Selective Demolition Section 02070
- B. Rough Carpentry, Section 06100
- C. Metal Fabrications, Section 05500

1.04 QUALITY ASSURANCE

- A. Manufacturer / installer / quarry shall have a minimum of five years production experience in work of quality and scope required on this project.
- B. Each color, grade, finish, type, and variety of stone shall be from a single quarry with sufficient resources to furnish materials of consistent quality, appearance, and physical properties.
- C. All units and placement thereof shall be in accord with Marble Institute of America and Building Stone Institute standards.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
- B. Shop Drawings:
 - 1. Shop drawings shall be complete and shall include a layout plan, fabrication details, connection and anchorage details, location of lifting devices, and member identification marks. The identification marks shall appear on the manufactured units to facilitate correct field placement. Manufacturer's standard hardware will be clearly described.
- C. Samples:
 - 1. Submit two 12 inch x 12 inch samples representative of finished units of Negro Marquina to match existing color and texture. Panels to be book matched at installation.
 - 2. Submit samples of all fasteners, anchors, and adhesives being used in the installation of the marble and salvaged stone with a full description of their uses.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Transport and handle with proper equipment to protect units from dirt and damage. Place non-staining resilient spacers of even thickness between each unit. Units shall be palletized.

- B. Store to protect units from contact with soil or ground. Store units on firm surfaces to avoid warping and cracking. Place stored units so that the identification marks are visible.

PART 2 - PRODUCTS

2.01 MARBLE

- A. Negro Marquina, free of cracks/seams/starts which may impair its structural integrity or function.
- B. Polished finish on face and all exposed edges to match existing, book match adjacent panels.

2.03 ANCHORS

- A. AISI Type 304/316 Stainless Steel. Provide strap anchors, dowels, clips, and bolt/nut anchors as required by various conditions.

2.04 SEALANTS

- A. Sealant for Locations Except as Specified in the Subsequent Paragraphs: Pecora Dynatroll, Sonolastic NP-1, Tremco Dymonic, or equal one part urethane.
 - 1. Equal means both quality and color options.
- B. Primer, when required, as recommended by the Sealant Manufacturer.
- C. Backer Rod, closed cell: "Green – Rod", Nomanco "HBR" or "Sonofoam".

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Each unit: Checked at fabrication site just prior to loading for transportation to the project site. Accept no broken, cracked, spalled, warped, or otherwise defective units.

3.02 PREPARATION

- A. Coordinate delivery, erection, of units.
- B. Protect the work and material of other trades during installation of units.

3.03 INSTALLATION

- A. Transportation, Site Handling, Erection: Performed with acceptable equipment methods, by qualified personnel acceptable to manufacturer.
- B. Place and align the member in final position in the structure on the final bearing surfaces. All panels dry installed using anchors.
- C. Natural stones conventionally anchored to back-up structure or to masonry.
 - 1. Anchoring devices are installed to resist lateral and gravity loads.
 - 2. Anchoring components shall be designed as simply as possible, with the fewest components and types to be adjustable, and with careful prevention of galvanic and chemical corrosion meeting Building Stone Institute guidelines.

END OF SECTION 04400

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Powder coated chair rail/display rail, and map rail.
- B. Metal accessories.
- C. Wall supports.

1.03 RELATED WORK

- A. Painting, Section: 09900
- B. Stone Masonry, Section: 04400
- C. Rough Carpentry, Section: 06600
- D. Finish Carpentry, Section: 06700

1.04 SUBMITTALS:

- A. Shop Drawings:
 - 1. Shop drawings required for all items. Show all work to be fabricated with all construction details shown in appropriate scale, methods of attachments to other materials, finished dimensions, shop welds and grinding of welds, field assembly joints, etc.
- B. Coordinate work with other suppliers and subcontractors; obtain their approved shop drawing where necessary, or obtain any necessary additional detail information regarding mounting conditions or other aspects of related work.

1.05 QUALITY ASSURANCE:

- A. Take field measurements prior to shop drawing preparation and fabrication.
- B. Comply with the provisions of the following except as otherwise indicated;
 - 1. AWS D1.1 Welding
- C. Qualify welding process and welding operators in accordance with the AWS "Standard Qualification Procedure". Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous twelve months. If recertification of welders is required, retesting will be the Contractor's responsibility.

- D. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.06 DELIVERY AND STORAGE:

- A. Package, handle, and store at the jobsite in a manner that will avoid damage or deformation. Damaged material will be rejected.

1.07 PROJECT CONDITIONS

- A. Verify dimensions in field for pre-cut or prefabricated items.
- B. Examine job conditions and adjoining construction which may affect the acceptability of the work.

PART 2 - PRODUCTS

2.01 MATERIALS FOR FABRICATIONS:

- A. Flat rolled steel bar stock 1/8th inch thick, 2 inches wide.
- B. Flat rolled steel bar stock 1/8th inch thick, 4 inches wide.
- C. 3 inch schedule 40 steel pipe and steel plate as shown on drawings.
- D. ¼" Plate steel.
- E. 1/4 inch diameter x 1 ½ inch threaded steel studs.
 - 1. ASTM A283 Specification for Low and Intermediate Tensile Strength. Carbon Steel Plates; Shapes and Bars.
- F. Miscellaneous metals.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Electrodes for Welding: E70XX, comply with AWS code.

2.01 FABRICATIONS

- A. Flat rolled steel bar stock 1/8th inch thick, 2 inches wide.
- B. Flat stock to have headless ¼ inch threaded studs welded 16 inches on center and 2 inches from each end, centered on the width of the flat stock, one side only.
- C. Weld permanent connections wherever possible; use continuous welds where exposed and grind smooth; straighten members after welding.
- D. Do shop cutting, drilling, fitting wherever possible. Field measure before fabrication when necessary or required.
- E. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions on shop drawings, using

proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

- F. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work
- G. Butt joints typical in the installation of the powder coated metal chair rail, display rail, or map rail. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, security (countersunk) screws or bolts.

2.02 ACCESSORIES

- A. Epoxy bolt anchorage: HILTI (HY-10 or equal)
- B. Concrete Inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A 47 or cast steel ASTM A 27. Provide bolts, washers and shims as require, hot-dipped galvanized, ASTM A 153.
- C. Non-shrink Grout: Master Builders "Masterflow 928" or L&M Construction Chemicals "Crystex".
- D. Provide zinc-coated fasteners for exterior use where built into exterior walls or where shown on drawings. Select fasteners for the type, grade and class required.
- E. Provide hot-dipped galvanized coating for fasteners less than 1/2" diameter that are in contact with pressure-treated wood.
- F. Bolts and Nuts: Regular hex head type, ASTM A 307, Grade A or Type 304 stainless steel, ASTM A 320. High Strength bolts and nuts, ASTM A 325.
- G. Lag Bolts: Square head type, FS FF-B-561.
- H. Machine Screws: Cadmium plated steel, FS FF-S-92, Security Screws.
- I. Wood Screws: Flat head carbon steel, FS FF-S-111.
- J. Plain Washers: Round, carbon steel, FS FF-W-92.
- K. Concrete Anchorage Devices: Wedge-type expansion bolts, FS FF-S-325, Group II, Type 4, Class 1, zinc coated or stainless steel as shown on the drawings and installed in accordance with manufacturer's recommendations.
 - 1. Kwik-bolt", Hilti Corporation
 - 2. "Wej-it", Wej-it Corporation.
- L. Masonry: Sleeve anchors zinc coated or stainless as shown on the drawings.
 - 1. Rawl Lok/Bolt.
 - 2. HILTI - Sleeve anchor.
- M. Toggle Bolts: Spring-wing type, FS FF-B-558, Type I, Class I and Style 1 zinc coated or stainless steel as shown on the drawings.
- N. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.03 FINISHES

- A. Powder-coat where noted.
 - 1. Provide polyester, powder-coat finish of completed fabrication.
 - 2. Manufacturer: Tiger Drylac or equal.
 - 3. Color: Selected by Architect from manufacturer's standard, RAL colors.
 - 4. Texture/sheen: Smooth texture, sheen to be determined from manufacturer's full range.

PART 2 - EXECUTION

3.01 INSTALLATION

- A. Anchor powder coated flat stock to plaster wall by drilling holes for ¼ inch studs and anchoring with epoxy.
- B. Work to be installed per plans and shop drawings.
- C. Immediately following installation, touch up any minor flaws, scratches, or defects with matching texture and paint. Replace any materials damaged beyond an acceptable touch-up.

END OF SECTION 05500

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Blocking.
- B. Backing for Solid Surface.

1.03 RELATED WORK

- A. Finish Carpentry: Section 06200.

1.04 QUALITY ASSURANCE

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. Lumber: WPA - Western Wood Products Association.
 - 2. Plywood: American Plywood Association "Plywood Commercial/Industrial Construction Guide".

1.05 DELIVERY, STORAGE AND HANDLING

- A. Immediately upon delivery to job site, place materials in area protected from weather.
- B. Store materials a minimum of 6-inches above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation or ventilation.
- C. Do not store seasoned material in wet or damp portions of building.
- D. While unloading, protect sheet materials from corners breaking and damaging surfaces.

1.06 PROJECT CONDITIONS

- A. Examine the substrates and supporting structures and the conditions under which the carpentry work is to be installed. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Coordinate location of nailers, blocking, and similar supports to allow proper attachment of work. Also coordinate with Owner Furnished Owner Installed items.

PART 2 - PRODUCTS

2.01 ROUGH HARDWARE

- A. Nails, spikes, screws, bolts, and similar items of size and types to rigidly secure members in place or as otherwise indicated.

2.02 LUMBER

- A. Framing, Blocking: Douglas Fir-Larch, Southern Pine No. 2 or better, S4S, moisture content not to exceed 19%.
 - 1. Horizontal Framing: Construction grade.
 - 2. End jointed lumber not allowed.

2.03 PLYWOOD

- A. Plywood wall sheathing shall be 3/4 inch thick, 5-ply, CDX APA Rated, unsanded with a minimum 16/0 span rating.
- B. Or as noted on plan.

2.04 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.01 GENERAL

- A. Discard units of material with defects which might impair quality of work, and units which are too small to fabricate the work with minimum joints or the optimum joint arrangement.
- B. Set carpentry work to required levels and lines, with members plumb and true and accurately cut and fitted.
- C. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3.02 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work.

END OF SECTION 06100

SECTION 06200
FINISH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Carpentry work which is exposed to view, non-structural, and not specified as part of other sections.
- B. The types of finish carpentry include, but are not necessarily limited to the following:
 - 1. Wood trim.
 - 2. Wood chair rail.
 - 3. Wood base.

1.03 RELATED WORK

- A. Related Sections: The following sections contain requirements that relate to this section:
- B. Rough Carpentry: Section 06100.
- C. Joint Sealants: Section 07900.
- D. Painting: Section 09900.

1.04 SUBMITTALS

- A. General: Submit each item in this article according to the General Conditions of the Contract.
 - 1. Shop drawings for all millwork; receive approval prior to fabrication; draw in related or dimensional position with sections shown either full size or 3-inch scale
 - 2. Samples:
 - a. One 8-inch- long section of wood for each profile and use with.
 - b. Two 8-inch by 8-inch wood panel samples with final finish.
- B. Product Data: For each type of component required. Include the following:
 - 1. Manufacturer's data on hardware, accessories, and finishes.

1.05 QUALITY ASSURANCE

- A. Quality Standards: Architectural Woodwork Quality Standards, Guide Specification and Quality Control Program as set forth by the Architectural Woodwork Institute (AWI).
- B. Architectural Woodwork Manufacturer: Experienced in this type of work; successfully completed comparable work.

- C. Deviations from quality, grade, species, and finish specified under AWI Interior Woodwork for Transparent Finish and Interior Woodwork for Paint Finish will be allowed for individual items or components only if specified under separate headings covering such items.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver finish carpentry materials until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed.
- C. If finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.
 - 1. Conditioning: Installer shall advise Contractor of temperature and humidity requirements for finish carpentry installation areas. Do not install finish carpentry until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
 - 2. Maintain temperature and humidity in installation area as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Lumber standards: Comply with DOC PS 20, "American Softwood Lumber Standard," for lumber and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. NELMA – Northeastern Lumber Manufacturers Association.
 - 2. NHLA – National Hardwood Lumber Association.
 - 3. NLGA – National Lumber Grades Authority.
 - 4. SPIB - Southern Pine Inspection Bureau.
 - 5. WCLIB – West Coast Lumber Inspection Bureau.
 - 6. WWPA – Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- D. For exposed lumber, furnish pieces with grade stamps applied to ends of back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

2.02 INTERIOR TRIM

- A. Interior: AWI 300 Custom Grade.
 - 1. Species: Plain sawn, kiln-dried Red Oak.
 - 2. Grade: AWI Lumber Grade III.
 - 3. Texture: Surfaces (smooth).
 - 4. Sight exposed, stain finish to be selected by AE.

5. Thickness: 3/4 inch, unless noted otherwise.

2.03 ACCESSORIES

- A. Provide nails, screws and other anchoring devices of the proper type, size, material and finish for application to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.
 1. Nails, Wire, Brads and Staples: FS FF-N-105.
 2. Power-Driven Fasteners: CABO NER-272.
- B. Where interior finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153 or No. 304 stainless steel.
- C. Glue: Aliphatic- or phenolic-resin wood glue recommended by manufacturer for general carpentry use.
- D. Sealants: Comply with requirements of Division 7 Section "Joint Sealants" for materials required for sealing work.

2.04 FABRICATION

- A. Wood Moisture Content: Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of finish carpentry on relative humidity conditions existing during time of fabrication and in installation areas.
- B. Field Dimensions
 1. Millwork Manufacturer: Responsible for details, dimensions not controlled by job conditions; show on shop drawing all field measurements beyond his control. Contractor, Woodwork Manufacturer: Cooperate to establish, maintain these field dimensions.
- C. Leave all surfaces clean and true and all exposed wood surfaces sanded parallel with grain, free of discernible marks and ready for work under Division 9 Section "Painting".
- D. Cutouts: Make those required for mechanical and electrical items.
- E. Back out or kerf backs of the following members, except members with ends exposed in finished work:
 1. Standing and running trim wider than 5 inches.
- F. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius.
- G. Ease edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.
- H. Fabricate handrails to match existing handrail sizes and profiles and as indicated on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.
- B. Examine substrate before installation. Verify that substrate is sound and plumb/level. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Wood frame walls shall be dry, clean, sound, well-nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces.
- D. Coordinate woodwork installation with wall flashings and other built-in components.

3.03 INSTALLATION

- A. Do not use finish carpentry materials that are unsound, warped, improperly treaded or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes or patterns.
- B. Install finish carpentry plumb, level, true and aligned with adjacent materials. Use concealed shims where required for alignment.
- C. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 1. Countersink nails; fill surface flush and sand where face nailing is unavoidable.
- D. Install to tolerance of 1/8 inch in 96 inches for plumb and level. Install adjoining finish carpentry with 1/32-inch maximum offset for lush installation and 1/16-inch maximum offset for reveal installation.
- E. Coordinate finish carpentry with materials and systems in or adjacent to standing and running trim and rails.
 - 1. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.
- F. Finish according to specified requirements.
 - 1. Refer to Division 9 Sections for final finishing of finish carpentry.

3.04 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary.
 - 1. Stagger joints in adjacent and related standing and running trim.
 - a. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 - b. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints, if required.
- B. Match color and grain pattern across joints.
- C. Drill pilot holes in wood before fastening as required to prevent splitting.
 - 1. Fasten to prevent movement or warping.
 - a. Countersink fastener heads on exposed carpentry work and fill holes.
 - b. Stagger nails along the length of long pieces of trim.

3.05 ADJUSTING

- A. Repair damaged or defective work as directed.
- B. Adjust and lubricate hardware for proper operation.

3.06 CLEANING

- A. Clean exposed surfaces.
- B. Clean shop-finished woodwork, touch-up finish as required and remove and refinish damaged or soiled areas of finish.
- C. Protect finish carpentry and maintain conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION 06200

SECTION 06600

PLASTIC FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Solid Surface Countertops, wall caps, corner guards, mail boxes, and misc. similar fabrications.

1.03 RELATED WORK

- A. Rough Carpentry: Section 06100.
- B. Finish Carpentry: Section 06200.
- C. Plastic Laminate Casework: Section 12304.

1.04 SUBMITTALS

- A. Submit in accord with the General Conditions of the Contract.
 - 1. Product Data: Manufacturer's catalog information edited to indicate products to be provided.
 - 2. Samples.

1.05 QUALITY ASSURANCE

- A. Fabrication and installation shall be performed by a certified solid surfacing fabricator.

1.06 WARRANTY

- A. Provide manufacturer's standard 10 year warranty against defects in workmanship.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Manufacturers.
 - 1. WilsonArt, Solid Surfacing.
 - 2. Or approved equal by:
 - a. Dupont, Corian.
 - b. Formica, Solid Surfacing.
 - c. Avonite.
 - d. Samsung, Staron.
- B. Countertops: 3/4 inch thick with nosing as indicated.
 - 1. Include steel mounting angles, bolts and anchors for complete installation.
- C. On site Fabrications:

1. Mail boxes.
2. Wall caps, vertical and horizontal.
3. Cornerguards.
4. Misc. similar fabrications.
 - i. Include steel mounting angles, bolts and anchors for complete installation.

D. Colors:

1. Solid Surface Color 1 to be selected by Architect from manufacturer's full range.
2. Solid Surface Color 2 to be selected by Architect from manufacturer's full range.
3. Solid Surface Color 3 to be selected by Architect from manufacturer's full range.

E. Acrylic:

1. ¼ inch clear acrylic, polished edges.

D. No cracked, chipped, broken, stained, or defective material will be accepted.

E. Color Match Differences: Minimal.

F. Joint Adhesive: Manufacturer's recommended adhesive, color matched.

G. Setting Adhesive: As recommended by manufacturer.

H. Steel Brackets: A&M Hardware or approved equal

1. Color: To be selected by Architect from full line of powder coat finishes.

2.02 FABRICATION

A. Field verify measurements.

B. Finished Surfaces: Uniform gloss with all edges eased and sanded smooth.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install fabricated items according to material manufacturers printed instructions.

B. Set all items square and true with edges of face joints smooth, even, neat and tight against other materials.

1. Where countertops meet wall surfaces, set with uniform space not to exceed 1/8-inch. Seal all joints with silicone sealant to a slightly concave joint, using backer rod where required. Apply sealant in accord with Section 07900.
2. Where solid surface is to be joined to solid surface, used color matched, manufacturer approved joint adhesive. Finish smooth to match surrounding surfaces with minimal visible joint.

3.02 PROTECTION, REPAIRING AND CLEANING

A. Replace damaged and defective work.

B. Clean according to manufacturer's directions. Use no acids or harsh abrasives.

END OF SECTION 06600

SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Miscellaneous Joints.

1.03 RELATED WORK

- A. Stone Masonry Section 04400.
- B. Steel Doors and Frames Section 08110.

1.04 SUBMITTALS

- A. Submit in accord with the General Conditions of the Contract.
 - 1. Samples: Color range of material for selection.
 - 2. Manufacturer's Recommendations including performance requirements, recommendations and application instructions for approval of materials used.

1.05 PROJECT CONDITIONS

- A. Examine the joint surfaces and backing, and their anchorage to the structure, and the conditions under which the joint sealer work is to be performed. Do not proceed with the joint sealer work until unsatisfactory conditions have been corrected.
- B. Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Wherever joint width is affected by ambient temperature variations, install sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range.

PART 2 - PRODUCTS

2.01 SEALANT

- A. Sealant for Locations Except as Specified in the Subsequent Paragraphs: PECORA Dynatrol I-XL, Degussa Sonneborn Sonolastic NP-1, TREMCO Dymonic, or other acceptable, one part polyurethane.
 - 1. Comparable means both quality and color options.
 - 2. VOC content limit: 100 g/L, less water and less exempt compounds.
- B. Horizontal Joint Sealant: PECORA NR-200 Urexpan, Sonolastic SL2, TREMCO THC-900, or other acceptable 2-part self-leveling polyurethane.
 - 1. Comparable means both quality and color options.

2.02 SEALANT ACCESSORIES

- A. Primer: When required, as recommended by the Sealant Manufacturer.
- B. Closed Cell Back-up (Backer Rod): Tremco "Closed Cell Backer Rod", Sonneborne "Sonofoam" or W.R. Meadows "Kool-Rod".

PART 3 - EXECUTION

3.01 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous or glazed joint surfaces as recommended by sealant manufacturer.
- B. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

3.02 SEALANT APPLICATION, GENERAL

- A. Set joint filler units at proper depth or position in the joint to coordinate with other work, including the installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.
- B. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- C. Apply compound with a gun having proper size nozzle or with a knife, as required. Use sufficient pressure to fill all voids and joints solid. Remove excess sealant and leave surfaces smooth, neat and clean. Upon completion sealant shall have a smooth, even finish and all joints shall be weathertight. All work shall be in accordance with manufacturer's printed instructions.
- D. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

3.03 PROTECTION

- A. Cure sealants in compliance with manufacturer's instructions and recommendations. Advise the Contractor of procedures required for the cure and protection of joint sealers during the construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at the time of Substantial Completion.

END OF SECTION 07900

SECTION 08110
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Steel Frames.

1.03 RELATED WORK

- A. Joint Sealers: Section 07900.
- B. Door Hardware: Section 08710.
- C. Painting: Section 09900.

1.04 REFERENCES

- A. Comply with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
- B. ANSI A250.3 Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
- C. ANSI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
- D. ANSI A250.5 Accelerated Physical Endurance Test Procedure for Steel Doors, Frames, and Frame Anchors.
- E. ANSI A250.8 Nomenclature for Standard Steel Doors and Steel Door Frames.
- F. ANSI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- G. ANSI/DHI A115 Specifications for Hardware Preparations in Standard Steel Doors and Frames.
- H. ANSI/DHI A115.1G Installation Guide for Doors and Hardware.
- I. SDI-105-92 Recommended Erection Instructions for Steel Frames.
- J. SDI-106 Recommended Standard Door Type Nomenclature.
- K. SDI-111 Recommended Standard Details Steel Doors and Frames.
- L. SDI-117-93 Manufacturing Tolerances Standard Steel Doors and Frames.

- M. SDI-122-90 Installation and Troubleshooting Guide for Standard Doors and Frames.
- N. ASTM A240/A240M Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel.
- O. ASTM A366 Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
- P. ASTM A568 Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements.
- Q. ASTM A569 Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- R. ASTM A620 Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Drawing Quality, Special Killed.
- S. NFPA-101-94: Life Safety Code.

1.05 SUBMITTALS

- A. Submit in accordance with the General Requirements of the Contract.
 - 1. Manufacturer's technical product data substantiating that products comply with requirements.
 - 2. Shop Drawings for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - a. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
 - b. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of Steel Door Institute Standard SDI-100, "Recommended Specifications for Standard Steel Door and Frames", U.S. Department of Commerce Standard PS4-66, relative to manufacture of 1-3/4 inch thick flush steel doors, and applicable requirements of ANSI A115.
- B. Factory machine frames for hardware requiring routing and mortising.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work in cartons or crates to provide protection during transit and job storage.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to AE; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4 inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4 inch spaces between stacked doors to promote air circulation.

1.08 PROJECT CONDITIONS

- A. Examine the openings and conditions under which hollow metal work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Amweld Building Products
- B. Benchmark Commercial Doors
- C. Ceco Door Products
- D. Curries Company
- E. Deansteel Manufacturing Co.
- F. Fenestra, Inc.
- G. Kewaunee Corporation
- H. Krieger Steel Products
- I. Mesker Door , Inc.
- J. Pioneer Industries, Inc.
- K. Precision Metals, Inc.
- L. Republic Builder Products
- M. Security Metal Products Corp.
- N. Steelcraft
- O. Trussbuilt, Inc.
- P. Williamsburg Steel Products Co
- Q. Or approved equal.

2.02 MATERIALS

- A. Steel: Commercial quality, level, cold-rolled steel conforming to ASTM A366, free of scale and surface defects. Commercial quality hot rolled and pickled steel conforming to ASTM A569 may be used as option for interior frames. Gauges are as follows:
 - 1. Interior Frames: 16-gage.
 - 2. Rough Bucks and Stiffeners: 12-gage.
 - 3. Miscellaneous Trim: 16 gage.

2.03 FABRICATION, GENERAL

- A. Make hardware mortises and reinforcements according to templates. Provide hinge, lock, door holder and closer hardware reinforcements. Mortise, drill tap for hardware; fabricate grooves, rabbets as necessary for weatherstripping.
- B. Clearances
 - 1. Edge clearances shall be provided as follows:
 - a. Between doors and frame, at head and jambs - 1/8 inch.
 - b. At door sills:
 - 1) Where no threshold is used - 3/8 minimum.
 - 2) Where threshold is used - 1/4 inch maximum between door & threshold.

2.04 METAL FRAME FABRICATION

- A. Provide metal frames of the types and styles indicated on the drawings or schedules and complying with SDI 100 for materials and construction requirements.
- B. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, as shown on drawings.
- C. All frames shall have mitered corners, be internally welded and ground smooth and provided with floor anchors.
- D. Provide one removable and one fixed stop at perimeter of openings for glazed frames. Removable stop on secure side.
- E. Provide closed metal covers over all hardware cutouts to protect against mortar.
- F. Provide integral channel frames, sub-frames and stiffeners to structure where indicated or required for fastening and stiffening frames.
- G. Provide steel spreader temporarily attached to feet of both jambs for welded frames.
- H. Provide three factory installed silencers on single door frames at strike jamb.
- I. Completely clean all frames by degreasing process, followed by one coat rust inhibitive primer equal to withstand a salt spray test (5% solution) of 70 hours. Thoroughly prime all surfaces without runs, smears, or bare spots, and under and inside all removable stops.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install steel frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.
 - 1. Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

2. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with self-tapping screws.
3. Fill heads of fasteners with body putty, grind smooth and touch-up prime.

3.02 ADJUSTING

- A. Immediately after erection sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Check and readjust operating finish hardware items, leaving steel frames undamaged and in complete and proper operating condition.

END OF SECTION 08110

SECTION 08210

WOOD DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Wood Doors.
- B. Re-use of Existing Wood Doors.

1.03 RELATED WORK

- A. Finish Carpentry: Section 06200.
- B. Steel Doors and Frames: Section 08110.
- C. Door Hardware: Section 08710.
- D. Glass and Glazing: Section 08800.
- E. Painting: Section 09900, for re-finishing of planed and cut surfaces.

1.04 REFERENCES

- A. Reference Standards: Section 1300 of the Architectural Woodwork Institute (AWI). Door types specified in Part 2 below are AWI reference designations.
- B. Doors: Obtained from a single manufacturer.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract
 1. Manufacturer's product data, specifications and installation instructions for each type of wood door.
 - a. Including information on recycled content.
 2. Color charts of wood finishes for initial selection.
 3. (2) 10" x 10" wood samples with finish for final selection.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the "on-site care" recommendations of National Wood Window and Door Association (WDMA) pamphlet "Care and Finishing Wood Doors" and with manufacturer's instructions.
 1. Provide protective coverings for doors at the factory prior to shipping. Use heavy paper cartons or poly bags and mark with identification required for proper installation.

- B. Deliver and store within enclosed building only after humidity contributing work is completed and relative humidity is less than 50%. Stack doors laid flat, level and off floor, in dry, clean, well ventilated space.
- C. Do not drag doors across one another.

1.07 WARRANTY

- A. Submit in duplicate manufacturer's written warranty per NWWDA Standard Door warranty but extending for life of installation for interior solid core doors, including refinishing and re-hanging costs for replacement doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Algoma Hardwoods, Inc.; Algoma, Wisconsin; (920) 487-5221.
- B. Eggers Industries; Two Rivers, Wisconsin: (920) 793-1351.
- C. Graham Division, Assa Abloy Door Group LLC; Mason City, Iowa: (641) 423-2444.
- D. Mohawk Flush Doors, Inc.; South Bend, Indiana: (574) 288-4464.
- E. Marshfield Door Systems; Marshfield, Wisconsin: (800) 869-3667.
- F. Oshkosh Architectural Door Company; Oshkosh, Wisconsin: (920) 233-6161.
- G. VT Industries; Holstein, Iowa; (800) 827-1615.

2.02 MANUFACTURED UNITS

- A. Non-labeled Interior Wood Veneer Solid Core Doors: AWI type PC-5/7, Custom Grade.
 - 1. Core: Particleboard or agri-fiber with minimum 40% post-industrial, recycled content as certified by an independent, third party certification agency.
 - 2. Veneer: Book matched, Red Oak, plain sliced.
 - 3. Species of stiles to match face veneer.
 - 4. Transparent Finish: Factory finish to AWI section 1500, Custom standards.
 - a. Water-based stain with ultra-violet (UV) cured topcoats.
 - b. Sheen: Satin.
 - 5. Color: Finish to match stain finish of existing wood doors, as approved by A/E.
- B. Labeled Interior Wood Veneer Solid Core Doors: AWI FD.
 - 1. Edge Banding: Laminated.
 - 2. Veneer: Same as non-labeled doors.
 - 3. Species of stiles to match face veneer.
 - 4. Transparent Finish: Factory finish to AWI section 1500, Custom standards.
 - a. Water-based stain with ultra-violet (UV) cured topcoats.
 - b. Sheen: Satin.
 - 5. Color: Finish to match stain finish of existing wood doors, as approved by A/E.
 - 6. Provide mineral core blocking at closers.
- C. Hardware location per manufacturer's recommendations to meet ADA requirements.

- D. Glazed Openings
 - 1. Provide factory glazed units.
 - 2. Cut openings.
 - 3. At non-labeled doors, provide detailed stops of same species as wood veneer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that door frames are of type required for door and are installed as required for proper installation of doors.
- B. Do not install doors in frames which would hinder the operation of the doors.

3.02 INSTALLATION

- A. Do not install in improperly installed frames.
- B. Fit for width by planing. For height, saw, first from bottom, then not over 1/2 inch from top. Bevel lock and hinges edge 1/8 inch in 2 inches.
- C. Provide 3/32 inch clearance between door and frame and 3/8 inch clearance between bottom of door and finish flooring.
- D. Seal all job site cut surfaces with stain to match existing and two coats of varnish.

3.03 ADJUST AND CLEAN

- A. Replace or re-hang doors which are hingebound and do not swing or operate properly.
- B. Refinish or replace job finished doors damaged prior to Substantial Completion.

END OF SECTION 08210

SECTION 08310

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Applicable provisions of Division 1 shall govern the work of this Section.

1.02 WORK INCLUDED

- A. This Section includes the following:
 - 1. Ceiling access doors and frames.

1.03 RELATED WORK

- A. Section 09250: Gypsum Board.
- B. Division 15: Mechanical.

1.04 SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
 - 1. Method of attaching door frames to surrounding construction.
 - 2. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Security Access Doors:
 - a. Bar-Co, Inc. Div.; Alfab, Inc.
 - b. Cesco, Cierra/Babcock-Davis.
 - c. J. L. Industries, Inc.
 - d. Karp Associates, Inc.
 - e. Milcor Limited Partnership.

2.02 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, and surface defects; pickled and oiled; with minimum thickness indicated representing specified nominal thickness according to ASTM A 568/A 568M.

- B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified nominal thickness according to ASTM A 568/A 568M. Electrolytic zinc-coated steel sheet, complying with ASTM A 591/A 591M, Class C coating, may be substituted at fabricator's option.
- C. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), with Class C coating and phosphate treatment to prepare surface for painting; with minimum thickness indicated representing specified nominal thickness according to ASTM A 568/A 568M for uncoated base metal.
- D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with A60 zinc-iron-alloy (galvannealed); stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.
- E. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.03 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."
- B. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- C. Shop Primer for Metallic-Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

2.04 ACCESS DOORS AND FRAMES

- A. Access Doors and Flush Frames: Fabricated from metallic-coated steel sheet.
 1. Locations: Gypsum board ceiling surfaces.
 2. Door: Minimum 0.060-inch- thick sheet metal, set flush with surrounding finish surfaces.
 3. Frame: Minimum 0.060-inch- thick sheet metal with drywall bead.
 4. Hinges: Spring-loaded concealed pin type.
 5. Latch: Mortise deadbolt lock, cylinder flush with panel face, factory installed.
 - a. (2) latches per door for doors 18" x 18".
 6. Size: 18" x 18", unless noted otherwise.

2.05 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Steel Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. For trimless frames with drywall bead for installation in gypsum board assembly, provide edge trim for gypsum board securely attached to perimeter of frames.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
- 2.06 FINISHES, GENERAL
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - B. Finish metal fabrications after assembly.
- 2.07 METALLIC-COATED STEEL FINISHES
- A. Galvanizing of Steel Shapes and Plates: Hot-dip galvanize items indicated to comply with applicable standard listed below:
 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
 - B. Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. For galvanized surfaces, apply, after cleaning, a conversion coating suited to the organic coating to be applied over it. For metallic-coated surfaces, clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 1. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.
 - C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after cleaning and pretreating.
- 2.08 STEEL FINISHES
- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 1. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
 - B. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.02 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

- C. Install access doors with trimless frames flush with adjacent finish surfaces or recessed to receive finish material.

3.03 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08310

SECTION 08710

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Door Hardware.

1.03 RELATED SECTIONS

- A. Finish Carpentry: Section 06200.
- B. Steel Doors and Frames: Section 08110.

1.04 REFERENCES

- A. Federal Specifications (FS)
 - 1. FF-H-106a Hardware, Builders'; Locks and Door Trim-Standard Finishes for Builders Hardware.
- B. National Fire Protection Association, Inc. (NFPA), Battery March Park, Quincy, MA 02269.
 - 1. NFPA 80 - Standard for fire doors and windows.
 - 2. NFPA 101 - Code for safety to life from fire in buildings and structures.
- C. Underwriter's Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062.
 - 1. Building Materials Directory.
- D. Hardware shall be in strict accord with Wisconsin Administrative Code Chapter Comm. 69 - "Barrier Free Design".

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Five (5) copies of a detailed, vertical type hardware schedule for approval.
 - a. List and describe each opening separately. Include doors with identical hardware, except hand, in a single heading. Include door number, room designations, degree of swing, and hand.
 - b. List related details. Include dimensions, door and frame material, and other conditions affecting hardware.
 - c. List all hardware items. Include manufacturer's name, quantity, product name, catalog number, size, finish, attachments, and related details.
 - d. Resubmit four (4) copies of the corrected schedule when required.
 - e. Determine keying requirements, as directed by the Owner's Representative and submit five (5) copies of a detailed keying schedule for approval; resubmit four copies (4) of the corrected schedule when required.
 - 2. Samples of hardware items as may be required. Identify each sample and indicate the location of subsequent installation in the project.

3. A copy of the approved hardware schedule and all pertinent templates or template information to each fabricator of material factory-prepared for the installation of hardware.

1.06 QUALITY ASSURANCE

- A. Manufacturers and product numbers listed herein establish a standard of quality. Similar items by other manufacturers may be accepted by prior approval in accord with the General Conditions of the Contract. Except where specified in the hardware schedule, furnish products of only one manufacturer for each type of hardware.
- B. Supplier: Company specializing in the builders' hardware industry.
- C. Items of hardware not definitely specified herein but necessary for completion of the Work shall be provided. Such items shall be of type and quality suitable to the service required and comparable to the adjacent hardware. Where size and shape of members is such as to prevent the use of types specified, hardware shall be furnished of suitable types having as nearly as practicable the same operation and quality as the type specified. Sizes shall be adequate for the service required. Include such nuances as strike type, strike lip, raised barrel hinges, mounting brackets, fasteners, shims, and coordination between conflicting products. All doors shall be provided with a stop.

1.07 REGULATORY REQUIREMENTS

- A. Furnish UL listed hardware for all UL labeled openings in conformance with requirements for the class of opening scheduled.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver hardware to the job site in the manufacturer's original containers marked to correspond with the approved hardware schedule for installation location.
- B. Store hardware in dry surroundings and protect against loss and damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Refer to the Hardware Schedule at the end of this Section.

2.02 ACCESSORIES

- A. Furnish all necessary hardware accessories such as wood or machine screws, bolts, nuts, anchors, toggle bolts, and other fasteners, each of the type, size, material and finish for its intended purpose and each according to the material to which the hardware is being applied.
- B. Keying system will be determined by the Owner's Representative.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install hardware in accordance with manufacturer's recommendations and instructions.

- B. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the fire rating.
- C. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.
- D. Remove, cover or protect hardware after fitting until paint or other finish is applied. Permanently install hardware after finishing operations are complete.
- E. Install closers on the room side of corridor doors, stair side of stairways, and interior side of exterior doors.
- F. Deliver one complete set of installation and adjustment instructions, and tools with the hardware.
- G. Coordinate security system electrical requirements at doors indicated to have such system.
- H. Coordinate all Owner Furnished Contractor Installed hardware.

3.02 ADJUSTING

- A. At final completion, adjust and test all hardware for function and performance and leave in good operating condition.

3.03 CLEANING

- A. Clean all hardware to restore the original finish.

3.04 PROTECTION

- A. Protect the finished installation until acceptance of the project.

3.05 HARDWARE SCHEDULE

A. Manufacturers

1. Hinges	Hager Hinge Co.	HAG
a. Approved Equals:	Stanley McKinney	
2. Lockset	Best Access Systems	BES
a. Approved Equals:	No substitutions. Provide 7-pin cylinders to match existing. Coordinate with Best Access Systems for keying of project.	
3. Door Closers	LCN	LCN
a. Approved Equals:	Norton	
4. Kickplate	Rockwood Mfg. Co	ROC
5. Biometric Hand Readers	Schlage Recognition Systems	SCH
6. Electric Strikes	Von Duprin	VON
a. Approved Equals:	HES Folger Adams	
7. Door Position Switch	Locknetics	LCK
8. Clothes Hook	Bobrick	BBK

B. Hardware Sets:

SET 01

Opening(s): 1004, 1006, 102, 119, 3007D, 3007e, 3007f

	EA	HINGES	BB1279 NRP	652	HAG
1	EA	STOREROOM LOCK	93K D x 14D	626	BES
1	EA	CLOSER	4010	689	LCN
1	EA	WALL STOP	WS407	630	IVE
1	EA	ELECTRIC STRIKE	6211	630	VON.
1	EA	DOOR POS SWITCH	1076W		WHT GE
1	EA	CARD READER			

SET 02

Opening(s): 3010

1	EA	ELECTRIC STRIKE	6211	630	VON
1	EA	DOOR POS SWITCH	7766		WHT SCH
1	EA	CARD READER			

-Remainder of hardware existing.

-Existing frame to be prepared to receive electric strike.

SET 03

Opening(s): 3007a

1	EA	PASSAGE SET	93K N x 14D	626	BES
1	EA	MAG LOCK	390+	630	SCH
1	EA	POWER SUPPLY	PS873-2		GRY VON
1	EA	REQ. TO EXIT	SCAN II		WHT SCH
1	EA	OVER RIDE BUTTON	621 AL EX	630	SCH
1	EA	DOOR POS SWITCH	7766		WHT SCH
1	EA	CARD READER			

-Remainder of hardware existing.

-Existing lock to be replaced with passage set.

SET 04

Opening(s): 321a

1	EA	FLOOR STOP	FS438	626	IVE
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-Remainder of hardware existing.

SET 05

Opening(s): 110, 111, 112, 113, 114

	EA	HINGES	BB1279	652	HAG
1	EA	ENTRANCE LOCK	93K AB x 14D	626	BES
1	EA	WALL STOP	WS407	630	IVE
1	EA	CLOTHES HOOK	B-6727	SS	BBK

SET 06

Opening(s): 108b, 115, 117

	EA	HINGES	BB1279	652	HAG
1	EA	PASSAGE SET	93K N x 14D	626	BES
1	EA	WALL STOP	WS407	630	IVE

SET 07

Opening(s): 1003a, 1003b, 108a

	EA	HINGES	BB1279	652	HAG
1	EA	STOREROOM LOCK	93K D x 14D	626	BES
1	EA	CLOSER	4010	689	LCN

1 EA WALL STOP	WS407	630 IVE
1 SET SEALS	5050	BLK NGP

SET 08

Opening(s): 1001

1 EA MAG LOCK	390+	630 SCH
1 EA POWER SUPPLY	PS873-2	GRY VON
1 EA REQ. TO EXIT	SCAN II	WHT SCH
1 EA OVER RIDE BUTTON	621 AL EX	630 SCH
1 EA DOOR POS SWITCH	7766	WHT SCH
1 EA CARD READER		

-Remainder of hardware existing.

SET 09

Opening(s): 310a, 3006, 3007

Install Owner Furnished Lockset, Hinges, Closers (openings 3006 and 3007) and Stops

END OF SECTION 08710

SECTION 08800
GLASS AND GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Glass in Hollow Metal Frames.
- B. Glass in Wood Doors.

1.03 RELATED WORK

- A. Finish Carpentry: Section 06200.
- B. Joint Sealers: Section 07900.
- C. Wood Doors: Section 08210.

1.04 REFERENCES

- A. Reference Specification: "Glazing Manual", by Flat Glass Marketing Association.
- B. Materials: Conform in all respects to the "Safety Standard for Architectural Glazing Materials", 16CFR 1201, issued by the Consumer Product Safety Commission.

1.05 QUALITY ASSURANCE

- A. All materials used for this project shall be from the same batch run and manufacturer.
- B. Sound Transmission Resistance; Sound Transmission Class (STC) for typical application to be minimum of 32; AS tested by ASTM E4134.
- C. All performance testing must be conducted by an independent, impartial, third party, AAMA certified testing laboratory.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Manufacturer's recommended installation instructions.
 - 2. Two samples of each type of glass specified.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Package, handle, deliver and store to avoid damage. Scratched glass will be rejected.

1.07 PROJECT CONDITIONS

- A. Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers/Suppliers:

1. ACH Glass Operations
2. AFG Industries, Inc.
3. Altuglas International
4. Cyro Industries
5. Guardian Industries
6. Interpane
7. Misco
8. Oldcastle
9. Pilkington
10. Plaskolite, Inc.
11. PPG Industries
12. Saint-Gobain Glass
13. Solutia Inc.
14. Viracon

2.02 GLASS

- A. Some of the glass products indicated below are based on proprietary products. Products from any of the above listed manufacturers that meet the design criteria of the glass specified below are acceptable.
 1. GLT 4: 1/4" tempered, clear, FS DD-G-451, Grade B, Style 1, Type I, class 1, quality q3, free of tong marks, ANSI Z97.1.
 2. GLT 4A: 3/8" laminated, clear, FS DD-G-451, Grade B, Style 1, Type I, class 1, quality q3, free of tong marks, ANSI Z97.1: 3/16" glass, 0.030" thick, translucent PVB interlayer, 3/16" glass.
 - a. Interlayer color selected by AE from manufacturer's full range of colors.

2.03 GLAZING ACCESSORIES

- A. Glazing Sealant: One-part silicone equal to Pecora 860, Sonneborn Omniplus or Tremco Spectrum 2.
 1. Equal means both quality and color options.
- B. Setting Blocks: 70-90 Shore "A" durometer, sized to accommodate size of glass used, compatible with glazing sealant.
- C. Spacers: Compatible with sealant used.
- D. Primer, Sealers, Glazing Tape, Cleaners: As recommended by glass manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Check that glazing channels are free of burrs, irregularities, and debris.
- B. Check that glass is free of edge damage or face imperfections.
- C. Do not proceed with installation until conditions are satisfactory.

3.02 PREPARATION

- A. Field Measurement.
 - 1. Measure size of frame to receive glass.
 - 2. Compute actual glass size, allowing for edge clearances.
- B. Preparation of surfaces.
 - 1. Remove protective coatings from surfaces to be glazed.
 - 2. Clean glass and glazing surfaces to remove dust, oil and contaminants.

3.03 INSTALLATION

- A. Install glass in accordance with glass manufacturer's recommended instructions.

3.04 CLEANING

- A. Remove excess glazing compound from installed glass.
- B. Remove labels from glass surface as soon as installed.
- C. Wash and polish both faces of glass.
- D. Remove debris from work site.

3.05 PROTECTION

- A. Attach crossed streamers away from glass face.
- B. Do not apply markers to glass surface.
- C. Replace damaged glass.

END OF SECTION 08800

SECTION 09250

GYP SUM BOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Metal Studs.
- B. Gypsum Board.
- C. Gypsum Base and Veneer Plaster.
- D. Patching Existing Plaster.
- E. Trim and Accessories.
- F. Acoustical Batt Insulation.
- G. Cementious Backer Board.

1.03 RELATED WORK

- A. Dry Erase Wallcoverings: Section 09720.

1.04 REFERENCES

- A. Referenced Specifications: The more stringent requirement of this section or referenced specification applies.
 - 1. "Using Gypsum Board for Walls and Ceilings", The Gypsum Association - GA-201-85.
 - 2. "Recommended Specifications for the Application and Finishing Gypsum Boards", The Gypsum Association - GA-216.
- B. Fire Rated Assemblies: Provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including UL, or tested in accordance with ASTM E119 for type of construction shown.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Manufacturer's product data.
 - 2. Texture finish sample.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site with manufacturer's labels intact and legible.
- B. Handle materials with care to prevent damage.

- C. Deliver fire-rated material bearing testing agency label and required fire classification numbers.
- D. Storage
 - 1. Store materials inside under cover, stack flat, off floor.
 - 2. Stack wallboard so that long lengths are not over short lengths.
 - 3. Avoid overloading floor system.
 - 4. Store adhesives in dry area, provide protection against freezing at all times.

1.07 PROJECT CONDITIONS

- A. During cold weather, maintain temperature range between 55 degrees F. to 70 degrees F. for 24 hours before, during, and after gypsum board and joint treatment applications.
- B. Ventilation
 - 1. Provide ventilation during and following adhesive and joint treatment applications.
 - 2. Use temporary air circulators in enclosed areas lacking natural ventilation.
 - 3. Protect installed materials from drafts during hot, dry weather.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Georgia Pacific.
- B. LaFarge.
- C. National Gypsum Company, Gold Bond.
- D. United States Gypsum Company.
- E. BPB America, Inc.
- F. Chicago Metallic.
- G. Dietrich Industries.
- H. Or approved equal.

2.02 MATERIALS

- A. Gypsum Board: ASTM C 36, long edges tapered; in lengths as long as practical to keep number of end joints to absolute minimum.
 - 1. Regular Gypsum Board.
 - 2. Water Resistant Wallboard: 5/8-inch thick.
 - 3. Cementitious Backer Board: Aggregated, Portland cement board with woven, glass fiber, mesh facing; complying with ANSI A118.9.
 - a. Manufacturer: USG, Durock Interior Tile Backer Board or approved equal.
 - b. Thickness: 1/2 inch.
 - 4. Veneer Plaster Base: USG Imperial Gypsum Base, 5/8-inch thick.
 - 5. Fire Rated 1 Inch thick gypsum wall board panels, supplied in nominal 24 inch widths type SLX.
 - 6. Fire Rated Face Layer: 5/8 inch Gypsum Board:
 - a. American Gypsum; Types AGX-1, AG-C

- b. Certaineed Gypsum; ProRoc Type C
- c. Georgia Pacific Gypsum; Type S
- d. USG; Type C, FRX-G, IP-X2, IPC-AR, SCX, or WRC.
- e. Or approved equal.

B. Accessories

- 1. Metal Trim: USG No. 200-A.
- 2. L-shaped Metal Trim for Veneer Plaster: USG No. 801-B.
- 3. Metal Reveal Molding: Fry Reglet DRM-625-75.
- 4. Metal 'Z' Reveal Molding, 1/4" wide: Fry Reglet DRMZ-625-25.
- 5. Metal 'Z' Reveal Molding, 1" wide: Fry Reglet DRMZ-100-100.
- 6. Expansion Joints: USG No. 093.
- 7. Drywall Screws for Metal Framing: 1" Type S-12 or Type S bugle head.
- 8. Outside Corner Reinforcement: USG No. 104, 1-1/8" x 1-1/8" corner bead.
- 9. Acoustical Sealant: Equal to Tremco "Tremflex 834" or Pecora "Acoustic and Insulation Sealant", low VOC formulation.
 - a. VOC content less than 50 g/l.
- 10. Tie Wire: No. 18 SWG, steel wire.
- 11. Steel runner channel brackets: 25 MSG galvanized steel.
- 12. Corner angles: 25 MSG galvanized steel.
- 13. Sound Attenuation Blanket: U.S. Gypsum Thermafiber, or approved equal.

C. Metal Studs/Resilient Furring Channels.

- 1. Unless indicated otherwise, use 25-gage for partitions up to 12'-0" high, use 20-gage for partitions over 12'-0" high.
- 2. Unless indicated otherwise, use 20-gage studs at door jambs, head.
- 3. Track gauge shall be same gauge as nested studs.
- 4. 2 1/2 inch wide by 1 1/2 inches deep C-H studs 24 inch on center. Fabricated from minimum 25 MSG galvanized steel.

D. Suspension System

- 1. Chicago Metallic 640 system
 - a. Hanger Wire: 8-gage, annealed.
 - b. Carrying Channels: 1-1/2 inch cold rolled steel.
 - c. Screws: USG 1-inch type S.
 - d. Furring Channels: USG metal furring channel, attached with USG furring channel clips.
- 2. Chicago Metallic 650 System complying with UL Design No. D502.
 - a. Hanger clips: 18 gauge galvanized steel.
 - b. Hanger wire: No. 12 SWG galvanized steel.
 - c. Carrying Channels: 16 gauge 1 1/2 inch cold rolled.
 - d. Furring Cross Channel: 16 gauge 7/8 inch where required.
 - e. Wall Molding: 26 gauge steel channel 1 11/16 inch deep with 15/16 inch flanges.
- 3. Or approved equal.

E. Drywall Finishing Accessories

- 1. Joint Compounds: Ready mixed type.
- 2. Joint Reinforcement: USG Perf-A-Tape or approved equivalent.

F. Patching Materials at Plaster

- 1. Setting-Type Joint Compounds, Base Coat: USG Sheetrock, "Durabond" or approved equal.
 - a. Low shrinkage, chemically setting compounds rated for interior and exterior use.
 - b. Suitable for heavy fills and areas of high humidity.
 - c. Compatible for use over Portland cement plaster.

2. Setting-Type Joint Compounds, Finish Coat: USG Sheetrock, Lightweight "Easy Sand" or approved equal.
 - a. Low shrinkage, chemically setting compounds rated for interior and exterior use.
 - b. Suitable for heavy fills and areas of high humidity.
 - c. Compatible for use over Portland cement plaster.

- G. Texture Finish Materials
 1. Ceilings: USG Spray Fine Sand Texture Finish or approved equal.
 2. Walls (Painted Only): USG Spray Fine Sand Texture Finish, or approved equal.
 - a. To match existing, adjacent plaster texture.
 3. Walls, Patching at Existing Plaster: USG Spray Fine Sand Texture Finish, or approved equal.
 - a. To match existing, adjacent plaster texture.

- H. Veneer Plaster Finishes
 1. One Coat System: USG Imperial Finish Plaster or approved equal.

PART 3 - EXECUTION

3.01 GYPSUM BOARD

- A. Follow Gypsum Association's recommendations for installation procedures.
- B. Cut wallboards by scoring and breaking or sawing; scribe neatly at wall projections.
- C. Apply first to ceilings then to walls.
- D. Locate wallboard joints at openings so that no end joint aligns with edge of opening.
- E. Set fasteners with heads slightly below surface of wallboard. Avoid breaking face paper.
- F. Provide water resistant wallboard at rooms/areas with high humidity.

3.02 METAL STUDS

- A. Attach metal runners at floor and at ceiling or structural elements above with suitable fasteners located 2 inches from each end, spaced 16 inches on center.
- B. Position studs vertically, engaging floor and ceiling runners. Splice studs with 8-inch nested lap, one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners, existing construction elements.
- C. Provide double studs at jambs and head of each door frame. Securely anchor studs to jamb and head anchor clips at metal door frames by bolt or screw attachment. Over metal frames, place a cut-to-length section of runner horizontally with web-flange bent at each end; secure with one positive attachment per flange. Position a cut-to length stud (extend to ceiling runner) at vertical board joints over door frame header. Place an additional track-to-track stud 6 inches from double jamb studs on both sides of framed openings.
- D. At curved surfaces, space studs and framing members 8 inches on center maximum.

3.03 ONE HOUR RATED ASSEMBLY

- A. Base layer: 1 inch thick gypsum board

1. Vertical edges inserted into "H" section of C-H studs. Free edge of end panels attached to long leg of "J" runners with 1 5/8 inch long Type S heads steel screws spaced not greater than 12 inches on center.
- B. Steel C-H Stud:
 1. 24 inch on center, floor to deck. Top and bottom, free edge at adjoining surface, in "J" channel.
- C. Face layer: 5/8 inch Gypsum Board
 1. Applied vertically and attached to studs with 1 inch Type S steel screws spaced 12 inches on center along edges and in the field of the boards.

3.04 CEILING SUSPENSION SYSTEM

- A. Suspend carrying channels with 8-gage hanger wires spaced 48 inches on center, within 6 inches of ends.
- B. Install carrying channels 48 inches on center and within 6 inches of walls. Provide 1 inch clearance between channel ends and abutting walls, partitions.
- C. At splices, interlock flanges, overlap ends 12 inches, and secure with 16-gage double standard tie wire at each end.
- D. Erect furring channels at right angles to carrying channels, spaced 24 inches on center and within 6 inches of walls. Provide 1-inch clearance between channel ends and abutting walls, partitions.
- E. Secure to carrying channels with clips, or, saddle tie with 16-gage double standard tie wire. At splices nest channels at least 8 inches, securely wire tie at each end.
- F. Install additional cross reinforcing to restore lateral stability of suspension system at openings that interrupt carrying or furring channels.
- G. Apply wallboard of maximum practical length with long dimension at right angles to furring channels. Position and stagger end joints over channel web. Fit ends and edges closely, but not forced together.
- H. Fasten board to channels with 1-inch Type S screws spaced 12 inches on center in field of board, along abutting ends, edges.
- I. Comply with UL Design No. D502 requirements at fire rated assembly.

3.05 EXPANSION JOINTS

- A. At Ceilings: 50'-0" on center each way maximum.
- B. At Walls: 30'-0" on center maximum.
- C. Provide at intersections with exposed masonry construction.

3.06 SINGLE LAYER/ERECTION

- A. Position all ends, edges over framing members, except when edge joints are at right angles to framing members, or when end joints are back-blocked. Apply wallboard horizontally or vertically on walls to minimize the number of joints.

- B. Attach wallboard to metal framing supports by power driven screws. For vertical application space screws 12 inches on center in field of board, 8 inches on center staggered along vertical abutting edges. For horizontal application space screws 12 inches on center in field, along abutting end joints.

3.07 MULTI-LAYER WALLBOARD ERECTION

- A. Base Layer: Erected as specified for "Single Layer Erection".
- B. Joints in face layer to fall at least 10 inches from parallel joints in base layer.
- C. Apply face layers with adhesive in accordance with wallboard manufacturer's printed instructions. Provide sufficient number and spacing of fasteners to hold top layer tight with bottom layer until adhesive dries.

3.08 JOINT TREATMENT APPLICATION

- A. Mix joint compound in accordance with manufacturer's recommendations.
- B. Apply compound in thin uniform layer to all joints, angles to be reinforced. Apply reinforcing tape centered over joint, seated into compound. Follow immediately with thin skim coat or embed tape. Fold and embed tape in interior angles to provide true angle.
- C. When embedding coat is thoroughly dry, apply second coat of compound, filling board taper flush with surface. Cover tape, feather out slightly beyond tape.
- D. On joints with no taper, cover tape, feather out at least 4 inches on either side of tape.
- E. No second coat is required on interior angles.
- F. When second coat is thoroughly dry, spread finish coat evenly over and extend slightly beyond second coat. Feather to a smooth, uniform finish.
- G. Over taped edges, do not allow finish coat to protrude beyond plane of surface. Apply finish coat to cover tape, taping compound at taped angles to provide true angle. When necessary, sand between coats and follow with final coat to provide smooth surface ready for decoration.
- H. Do not abrade adjacent face-paper surfaces.
- I. Gypsum substrate where located behind dry erase wallcoverings must meet level 4 requirements: All joints and interior angles have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free from tool marks and ridges.

3.09 FINISHING FASTENERS

- A. Apply compound to fastener depressions. Follow with minimum of two additional coats leaving depressions level with surface.
- B. Do not abrade adjacent face-paper surfaces.

3.010 FINISHING BEAD AND TRIM

- A. Apply first coat to beads, trim. Properly feather out from ground to plane of surface. Embed flanges of corner reinforcement with compound.
- B. When embedding coat is thoroughly dry, apply second coat in same manner as first-coat, extending compound slightly beyond onto face of board.
- C. When second coat is thoroughly dry, apply finish coat extending compound slightly beyond second coat, properly feathering from ground to plane of surface. Sand finish coat as necessary to provide flat smooth surface, ready for decoration.
- D. Do not abrade adjacent face-paper surfaces.

3.011 PATCHING AT PLASTER

- A. Mix setting-type compound in accordance with manufacturer's recommendations.
- B. Remove unsound and loose plaster.
 - 1. Enlarge cracks and fill with initial application of base coat.
- C. Apply patching compounds in thin uniform layers to all existing plaster damaged by selective demolition.
- D. Apply base coat over existing substrates. Substrates to be free of dust, residue and other contaminants.
- E. When base coat is thoroughly dry, apply second coat of compound, filling area to within 1/8" of adjacent surfaces.
- F. When second coat is thoroughly dry, spread finish coat evenly over and extend slightly beyond second coat and sides of patch.
- G. Do not allow finish coat to protrude beyond plane of existing surfaces. Feather out at sides of patch area.
 - 1. Apply finish coat to completely cover base coat and to provide true angles and smooth surface.
 - 2. When necessary, sand between coats and follow with additional final coats to provide smooth surface.
 - 3. Sand surface smooth and ready for decoration.

3.012 VENEER PLASTER

- A. Apply veneer plaster finish in accord with manufacturer's printed instructions.

3.013 ACOUSTIC SEALANT

- A. Apply sealant at intersections of wallboard and adjacent materials to form a complete seal to air and noise.

3.014 TEXTURE FINISH

- A. Apply texture finish in accord with manufacturer's printed instructions.
- B. Provide uniform texture over entire surface.
- C. Match textures of existing plaster.

3.015 ADJUST AND CLEAN

- A. Ridging

1. Sand ridges to reinforcing tape without cutting through tape.
 2. Fill concave areas on both sides of ridge with topping compound.
 3. After fill is dry, blend in topping compound over repaired area.
- B. Fill cracks with compound and finish smooth and flush.

END OF SECTION 09250

SECTION 09300

TILING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Wall Tile.

1.03 RELATED WORK

- A. Gypsum Board: Section 09250, for tile backer board.

1.04 REFERENCES

- A. The following specifications and standards are incorporated by reference:
 - 1. Tile Council of America, Inc. - "Handbook for Ceramic Tile Installation".

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Samples for colors on 12 inch by 12 inch panels in duplicate for tile specified.
 - 2. Samples in duplicate for each different trim piece required.
 - 3. Grout samples in duplicate indicating color range anticipated, texture.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, handle, deliver and store at the job site in original unbroken containers in a manner that will avoid damage or contamination.
- B. All containers shall bear grade seals, manufacturer's name, size, color and quantities.

1.07 PROJECT CONDITIONS

- A. Set and grout tile when ambient temperature is at least 50 degrees F. and rising.

1.08 EXTRA MATERIALS

- A. Deliver stock of extra materials to Owner. Furnish extra materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Furnish one box for each type, color, pattern and size installed.

PART 2 - PRODUCTS

2.01 TILE

- A. Wall backsplash tile.

1. Product: Ceramic porcelain tile, Dal-Tile “Semi-Gloss” color to be selected by Architect from manufacturer’s full line, or approved equal product by American Olean, Crossville, Interceramics, Terra Green Ceramics, United States Ceramic Tile Company, or approved equal.
 - a. Architect to select product from manufacturer’s full line, all price groups.
2. Wall Tile Type 1: Size 4.5 inches by 4.5 inches.

2.02 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
 1. Prepackaged dry-mortar mix containing dry, re-dispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
 2. Prepackaged dry-mortar mix combined with acrylic resin liquid-latex additive.
 - a. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

2.03 ACCESSORIES

- A. Portland Cement: ASTM C 150, type 1.
- B. Sand: ASTM C-144.
- C. Water: Clean and potable.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout: Non-sanded .
 1. Color: To be selected by AE from manufacturer’s full range of colors.
- F. Acrylic Additive: LATICRETE “1776 Grout Admix Plus”; Chargar Corporation “Acryl 60” or approved equal.
- G. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- H. Provide other materials not specifically described but required for a complete and proper installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces where tile is to be applied and notify the Contractor of any defects.

3.02 INSTALLATION

- A. General
 1. Installation and workmanship shall be in accordance with ANSI A108.1 and as specified herein. The printed instructions of the tile manufacturer and the manufacturer of proprietary mortars and grouts shall be followed where applicable.
 2. Before commencing work, establish field pattern and border line locations.
 3. Center the work symmetrically so that no tile need be cut to less than half size.

4. Joints in wall tile shall be aligned vertically and horizontally; staggered joints will not be accepted.
 5. Align joints when adjoining tiles on floor, base and trim are the same size.
 6. Rub exposed edges smooth.
- B. Interior Wall Tile Setting Bed: TCA W202/Tile backer board substrates - acrylic modified latex-cement mortar.
- C. Handle, store, mix and apply proprietary setting and grouting materials in compliance with the manufacturer's instructions.
- D. Extend tile work into recesses and under equipment and fixtures to form a complete covering without interruptions, except as otherwise shown.
- E. Terminate work neatly at obstructions, edges, and corners without disruption of pattern or joint alignments.
- F. Comply with manufacturer's instructions for mixing and installation of proprietary materials.
- G. Neutralize and seal substrates in accordance with setting bed manufacturer's instructions, where required.
- H. Jointing Pattern: Grid pattern.
- I. Expansion, Control Joints
1. Extend completely through tile mortar bed. Insert preformed back-up material to provide correct cavity depth for sealant.
 2. Width of expansion, control joints: Same as tile joints.
 3. Prior to grouting, keep expansion and control joints open and clean.
 4. After tile is grouted and completely dry, remove temporary filler material. Brush joints clean, fill expansion and control joints.
- 3.03 CLEANING
- A. After completion, clean all work, point open joints and replace defective work.
- 3.04 PROTECTION
- A. Close off work spaces to traffic during installation and at least 48 hours after completion of work.
- B. Tiled vertical outside corners shall be protected with board corner strips in areas used as passageways.

END OF SECTION 09300

SECTION 09510
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Acoustical Board.
- B. Suspension Systems.

1.03 RELATED WORK

- A. Mechanical (Air Supply and Return Devices): Division 15.
- B. Electrical (Light Fixtures): Division 16.

1.04 SUBMITTALS

- A. Submit in accord with the General Conditions of the Contract.
 - 1. Manufacturer's product specifications and installation instructions for each acoustical ceiling material and suspension system required, including certified laboratory test reports.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size and thickness as applicable, legible and intact.
- B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.
- C. Store cartons open at each end to stabilize moisture content and temperature.

1.06 PROJECT CONDITIONS

- A. Do not install interior acoustical ceilings until space is enclosed and weatherproof. Complete installation of damp materials before beginning work.
- B. Maintain humidity of 65 - 75 percent in areas where acoustical materials are to be installed 24 hours before, during, and after installation.
- C. Maintain a uniform temperature in the range of 55 to 70 degrees F. prior to and during installation of materials.

1.07 EXTRA MATERIALS

- A. In accord with General Conditions of the Contract, deliver extra materials equal to a minimum of 50 square feet of each type of acoustical material supplied.

- B. All cartons shall be new, unopened, packaged with protective covering for storage, and identified with appropriate labels.

PART 2 - PRODUCTS

2.01 BOARD TYPE 1

- A. Lightly textured nodular lay-in panels, 3/4" thick x 2' x 2', Reveal edge (tegular), White. UL Classified Noise Reduction Coefficient (NRC) .60, Ceiling Attenuation Class (CAC) 35, Light Reflection Coefficient .82, "BioShield", 15 year warranty against sag, 82% recycled content.
- B. Celotex Brand, "Cashmere".
- C. Or approved equal by Armstrong World Industries, Ecophon Certainteed, or USG.

2.03 INTERMEDIATE DUTY SUSPENSION SYSTEM TYPE 1

- A. Armstrong, "Prelude ML, 15/16" Exposed Tee".
 - 1. Material: Hot-dipped, galvanized steel.
 - 2. Surface Finish: Baked polyester paint.
- B. Or approved equal by Chicago Metallic, National Rolling Mills, Donn/USG.
- E. Conform to all requirements of ASTM C-635 intermediate structural classification.
- F. Provide flat white finish, 15/16" face.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Do not begin installation until sufficient materials to complete a room are received.
- B. Install materials in accordance with manufacturer's printed instructions, governing regulations, fire resistance rating requirements, and industry standards applicable to work.
- C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.
- D. Symmetrically locate grid layout in each space. Coordinate work with other trades so that lighting fixtures, grilles, and other ceiling fixtures work with grid layout.
- E. Do not use universal splices or other splices which would obstruct passage of recessed lighting fixtures through grid openings or limit fixture relocation upon flanges of ceiling grids.
- F. Support suspension system from structure above, not from ductwork, metal deck, equipment or piping.

- G. Space hangers not more than 6 inches from ends and not more than 4 feet on center.
- H. Install edge moldings at the perimeter of each acoustical ceiling area and at locations where edge of units would otherwise be exposed.
 - 1. Secure moldings to building construction by fastening with screw anchors into the substrate, through holes drilled in vertical leg. Space holes not more than 3 inches from each end and not more than 16 inches on center along each molding.
 - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8 inch in 12 feet.
 - 3. Miter corners of moldings accurately to provide hairline joints, securely connected to prevent dislocation. Cope exposed flanges of intersecting suspension system members, so that flange faces will be flush.
 - 4. Furnish additional tees for supporting grilles, diffusers and light fixtures. Refer to the reflected ceiling, HVAC and electrical plans for locations.
 - 5. Provide tegular edge at walls, other abutting vertical surfaces.
 - 6. Field paint cut edges to match surface color and sheen.
- I. Arrange acoustical units and orient directionally-patterned units, if any, in manner shown on reflected ceiling plans.

3.03 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, trim, edge moldings, and suspension members to comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.
- B. Remove work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.04 PROTECTION

- A. Provide required protection for the acoustical ceilings, including temperature, humidity limitations and dust control so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09510

SECTION 09650

RESILIENT FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Vinyl Composition Tile.
- B. Resilient Base.
 - 1. Owner furnished, contractor installed 4" resilient base.
- C. Accessories.
- D. Subfloor Preparation.

1.03 RELATED WORK

- A. Selective Demolition: Section 02070.
- B. Cast-in-Place Concrete: Section 03300.
- C. Carpet (vinyl and metal reducers): Section 09680.

1.04 QUALITY ASSURANCE

- A. Provide each type of resilient flooring and accessories from a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
- B. Installers Qualifications: Installer experienced (minimum of 2 years) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to the product manufacturer.
- C. Materials: For each type of material required for the work of this Section, provide primary materials which are the products of one manufacturer. Provide secondary materials which are acceptable to the manufacturer of the primary materials.
 - 1. Comply with applicable regulations regarding VOC (volatile organic compound) content of adhesives.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Manufacturer's technical data for each type of resilient flooring and accessory.
 - a. Data indicating adhesive and accessories meet VOC requirements.
 - 2. Manufacturer's standard color charts in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.

3. Submit samples of metal edge strips.
4. Two copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors and patterns, and quality designations legible and intact.
- B. Store and protect materials in accordance with manufacturer's recommendations.

1.07 PROJECT CONDITIONS

- A. Maintain minimum temperature of 65 degrees F and maximum temperature of 90 degrees F in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Subsequently, maintain minimum temperature of 55 degrees F in areas where work is completed.
- B. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation.
- C. Install resilient flooring and accessories after other finishing operations, including painting, have been completed.
- D. Do not install resilient flooring over concrete slabs until they have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.
- E. Close areas to traffic and to other work until flooring is firmly set. Tile shall have 72 hours with no traffic.
- F. Where solvent based adhesives are used, provide safety sparkproof fans when natural ventilation is not adequate.

1.08 EXTRA MATERIALS

- A. Deliver stock of extra materials to Owner. Furnish extra materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 1. Furnish one box for each type, color, pattern and size installed.

PART 2 - PRODUCTS

2.01 VINYL COMPOSITION TILE - 1

- A. General: 1/8 inch by 12 inches by 12 inches; ASTM F1066-87, Composition 1, Class 2.
- B. Armstrong Excelon Stonetex (52122 Pebble Gray), or approved equal by Mannington, or approved equal.

2.02 VINYL COMPOSITION TILE - 2

- A. General: 1/8 inch by 12 inches by 12 inches; ASTM F1066-87, Composition 1, Class 2.
- B. Armstrong Excelon Imperial (51915 Charcoal), or approved equal by Mannington, or approved equal.

2.03 RESILIENT WALL BASE

- A. General: Rubber, cove base, top set, roll stock.
 - 1. Height: 4" and 6", as indicated on Drawings. Owner furnished contractor installed 4" resilient base.
- B. Manufacturers: Armstrong (colors to be selected from manufacturers' full range) or approved equal by:
 - 1. Flexco.
 - 2. Freudenberg Building Systems, Nora.
 - 3. Johnsonite.
 - 4. Roppe.

2.04 ACCESSORIES

- A. Adhesives: Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions; equal to HENRY GreenLine GL33High-Performance VCT Adhesive, low VOC type.
- B. Adhesive for Wall Base: W.W. Henry "595 Cove Base Adhesive", zero-VOCs; W.F. Taylor "2035 Cove Base Adhesive" or "2040 Premium Cove Base Adhesive", GreenGuard certified; PL Adhesives & Sealants "Cove Base Adhesive"; Bostik Findley, Durabond "D-740 Multipurpose Wall Adhesive".
 - 1. Low-VOC type: VOC content less than 100 g/l.
- C. Concrete Slab Primer: Non-staining, low-VOC type, equal to W.F. Taylor Co. "Envirotec Healthguard" #2006, as approved by flooring and underlayment manufacturers.
- D. Patching, Leveling, Underlayments: The leveling materials must be portland cement based and provide a minimum 3,500 PSI compressive strength (ASTM C 109) and sufficient bond to existing subfloor surface.
 - 1. Ardex, Laticrete, Duralox, Mapei, or equivalent, approved by flooring manufacturer.
- E. Metal Edge Strip: Similar to Ceramic Tile Company CTC1132CTA.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine subfloor surfaces to determine that they are dry, clean, and smooth.
- B. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compound. Do not use curing compounds on concrete subfloors.
- C. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory. Indicate adverse conditions of any type by letter.

3.02 PREPARATION

- A. Comply with ASTM F 710, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring, and manufacturer's recommendations for surface preparation. Remove substances incompatible with resilient flooring adhesive by method acceptable to manufacturer.
 - 1. Concrete floors with steel troweled (slick) finish shall be properly roughened (sanded) to ensure suitable adhesion.
 - 2. Concrete floors with curing, hardening and/or breaking compounds shall be abraded with mechanical methods only to remove compounds.
 - a. Do not use chemicals for removal.

- b. Do not use wax or oil based sweeping compounds.
- B. Sand or grind subfloors to remove mortar, paint, other surface irregularities.
- C. Where filling, patching, leveling is required of thickness exceeding 1/8-inch apply latex type underlayment in two or more applications. Apply compound in accordance with manufacturer's printed instructions.
- D. Remove all debris, sand, and other materials which would result in lack of adhesion and/or star cracking.

3.03 VINYL COMPOSITION TILE INSTALLATION

- A. Install resilient flooring and accessories using method indicated in strict compliance with manufacturer's printed instructions. Extend resilient flooring into toe spaces, door reveals, and into closets and similar openings.
- B. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.
- C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.
- D. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter.
- E. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
- F. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable. Lay tile with grain running parallel in adjacent tiles.
- G. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.
- H. Apply wall base to all gypsum surfaces and casework, as indicated in Finish Schedule, and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 1. Adhesive shall cover a minimum of 90 percent of ribbed back of base.
 - 2. Leave 1/4 inch uncovered space at top edge of base to prevent oozing.
 - 3. Roll base firmly, roll back toward starting point.
- I. Apply butt type metal edge strips where indicated on Finish Schedule, and before installation of resilient flooring. Secure units to substrate with countersunk stainless steel anchors, complying with manufacturer's recommendations.

3.04 WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.
- B. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Cut no shorter than full wall length.
- C. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
 - 1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 2. Adhesive shall cover a minimum of 90 percent of ribbed back of base.
 - 3. Leave 1/4 inch uncovered space at top edge of base to prevent oozing.
 - 4. Roll base firmly, roll back toward starting point.

3.05 CLEANING

- A. Perform following operations immediately upon completion of resilient flooring.
 - 1. Sweep or vacuum floor thoroughly.
 - 2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-adhered to adhesive.
 - 3. Damp-mop floor being careful to remove black marks and excessive soil.
 - 4. Remove any excess adhesive or other surfaces blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.
 - 5. Provide two coats of wax of type as recommended by flooring manufacturer. Buff to shine for each coat.

3.06 PROTECTION

- A. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.

END OF SECTION 09650

SECTION 09680

CARPET

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 SUMMARY

- A. Standard Commercial Carpet.
- B. Metal Transition Strips.
- C. Floor Filler.
- D. Adhesives.

1.03 RELATED WORK

- A. Related Sections include the following:
 - 1. Section 02070: "Selective Demolition" for removing existing floor coverings.
 - 2. Section 09650: "Resilient Flooring" for resilient wall base installed with carpet.

1.04 REFERENCES

- A. Carpet shall be in strict accord with Wisconsin Enrolled Commercial Building Code, Chapter 11 - "Accessibility".
- B. Carpet and Rug Institute (CRI).

1.05 SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
 - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, fade resistance and printed statement of VOC content.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet: 12-inch square, (2) Samples.
 - 2. Exposed Edge, Transition, and other Accessory Stripping: 6-inch long, (2) Samples.
 - 3. Seaming diagrams. (Note: Any room or space with at least one dimension 12'- 0" or less shall not have a seam that is perpendicular to this 12'- 0" or less dimension). Dominant linear pattern of carpet to run with the longest dimension of the room.
- C. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.

D. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.08 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

1. Test concrete sub-floors for acceptable moisture and alkalinity levels prior to installation of carpet systems in accordance with manufacturer's recommendations.

D. Floors must be free of dust, oils, grease, or other foreign matter.

E. Where items are indicated for installation on top of carpet, install carpet before installing these items.

F. Allow installation to cure for a minimum of 24 hours before subjecting it to any traffic, moving of furniture, or other heavy equipment.

1.09 WARRANTY

A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.

2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

3. Warranty Period: Lifetime.

1.010 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.01 STANDARD COMMERCIAL CARPET

A. Products: Subject to compliance with requirements, provide one of the following:

1. Carpet, CPT-1:
 - a. Manufacturer: Patcraft Designweave
 - b. Style: Night Moves I0129
 - c. Color: Fire Flies 29523
 - d. Backing: Ultraloc® Pattern

OR

- e. Manufacturer: Shaw
- f. Style: Prisma Tile 59463
- g. Color: Opaque Black 63500
- h. Backing: Ecoworx®

2. Carpet, CPT-2:
 - a. Manufacturer: J&J Commercial
 - b. Style: Static 2260
 - c. Color: Pulse 1378
 - d. Backing: ActionBac® LTP™

OR

- e. Manufacturer: Shaw
- f. Style: Prisma Tile 59463
- g. Color: Opaque Black 63500
- h. Backing: Ecoworx®

3. Characteristics: All carpet shall be same mill run throughout.

2.02 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, non-staining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and equal to Commercialon 600 Carpet Adhesive or W. W. Henry, HENRY “GreenLine GL62 High-Performance Carpet Adhesive” and is recommended or provided by carpet manufacturer.
 1. VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D 5116:
 - a. Meeting CRI low-VOC emission criteria #AA-580309.
 - b. Total VOCs: 10.00 mg/sq. m x h.
 - c. Formaldehyde: 0.05 mg/sq. m x h.
 - d. 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.
- C. Carpet Sealer: Equal to Commercialon “Strong Seal 557 Solvent Free Carpet Seam Sealer”; or as recommended by carpet manufacturer to achieve full warranty coverage; suitable for abutting edges.
 1. Meeting CRI low-VOC emission criteria #AA-580309.
- D. Metal Transition Strip: Schluter-Systems “RENO-U”, AEU 80 (5/16”), anodized aluminum.
 1. Plastic or vinyl material not acceptable.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond.
 - a. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
 - 2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.03 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations, seam preparation, seam trimming, seam characteristics, and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
 - 1. It door openings install adapters/transitions/reducers to be covered by door when in the closed position.
 - 2. Level adjoining border edges.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
 - 1. Install metal transition strip with anchoring leg under carpet where carpet abuts terrazzo or vinyl composite tile.
 - 2. Secure metal transition strip to substrate according to manufacturer's instructions.

- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- H. All selvages shall be trimmed to ensure good side seams. All seams shall receive an 1/8" continuous bead of seam adhesive at the point the face yarn enters the back.
 - 1. Fit edges together with an invisible seam and bond with appropriate adhesive.

3.04 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION 09680

SECTION 09720

DRY ERASE WALLCOVERINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Dry Erase wallcovering

1.03 RELATED WORK

- A. Metal Fabrications: Section 05500.
- B. Paint Section: 09900.
- C. Gypsum Board Section: 09250.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):E84
 - 1. Test Method for Surface Burning Characteristics of Building Materials.
- B. Gypsum Association GA-14-M-97
 - 1. Recommended Levels of Gypsum Board Finish.

1.05 SUBMITTALS

- A. Manufacturer's product data and installation instructions for each type of dry erase wallcovering, adhesive, and accessories required.
- B. Manufacturer's written product data indicating compliance with specified materials required.
- C. Manufacturer's written installation instructions.
- D. Manufacturer's written instructions for recommended maintenance of each type of dry erase wallcovering required.
- E. Samples:
 - 1. 7 x 9 inch (18 x 23 centimeter) samples of each dry erase material required.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Provide each type of dry erase wallcovering required produced by one manufacturer.
- B. Installer: Installation by skilled commercial wallcovering contractor with no less than three years of documented experience installing dry erase wallcovering of the types and extent required.

- C. Composition:
 - 1. Provide non-woven , pigmented vinyl, coating.
- D. Surface Burning Characteristics Classification: Provide materials that meet Class I/A rating when tested in accordance with ASTM E84 for flame spread and smoke developed: Class II/B.
- E. Field Samples: Prepare field samples for architect's review and establish requirements for seaming and finish trim.
 - 1. Install sample panel of each type presentation wallcovering specified in area designated by architect.
 - 2. Maintain corrected and approved samples to serve as a standard of performance for the project.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver presentation wallcoverings to the project site in unbroken and undamaged original factory packaging and clearly labeled with the manufacturer's identification label, quality or grade, and lot number.
- B. Store materials in a clean, dry storage area with temperature maintained above 55° F (13° C) with normal humidity.
- C. Store material within original packaging to prevent damage.

1.08 PROJECT CONDITIONS

- A. Ventilation
 - 1. Do not apply presentation wallcoverings when surface and ambient temperatures are outside the temperature ranges required by the wallcovering manufacturer provide ventilation during and following adhesive and joint treatment applications.
 - 2. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 55° F unless required otherwise by manufacturer's instructions.
 - 3. Apply adhesive when substrate surface temperature and ambient temperature is above 55° F and relative humidity is below forty percent.
 - 4. Maintain constant recommended temperature and humidity for at least seventy-two hours prior to and throughout the installation period, and for seventy-two hours after wallcovering installation completion.
 - 5. Provide not less than 80-foot-candles per square foot lighting level measured mid-height at sub-strate surfaces.

1.09 WARRANTY

- A. Submit manufacturer's limited five-year written warranty against manufacturing defects.

1.10 MAINTENANCE

- A. Maintenance instructions: Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. RJF International, Koro-Rite “Walltalkers”. Walltalkers Wallcoverings manufactured by RJF International Corporation, Fairlawn, Ohio, and distributed by Koroseal Mid-West. Contact sales representative Koreen Liepitz at: Koroseal Mid-West, Madison, WI, 608-852-6299.
- B. Speak easy, or approved equal.

2.02 MATERIALS

- A. “Walltalkers” “erase•rite”: Smooth, color and sheen to be determined from manufacturer’s full line.
 - 1. ER50: 49/50 inch (124/127 centimeter) width, 18 ounce per square yard (.61 kilogram per square meter), non-woven backing.
- B. Or approved equal.

2.03 ACCESSORIES

- A. Adhesives: Heavy-duty clear or clay based premixed vinyl adhesive. Sherwin-Williams Heavy Duty Clay Base Adhesive or approved equal.
- B. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wallcoverings. Sherwin-Williams R35 Heavy Duty Acrylic Primer Pro 935 or approved equal.
- C. Presentation Starter Kit: Provide one Walltalkers starter kit containing eight dry erase markers, two erasers, ten cleaning towels, and one 8 ounce (.23 kilogram) bottle liquid surface cleaning solution for each room installed with dry erase wallcovering. Or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and installation conditions to ensure surface conditions meet or exceed a Level 4 finish, per GA-214-M-97: Recommended Levels of Gypsum Board Finish, and permanent lighting should be installed and operational.
- B. Test substrate with a suitable moisture meter and verify that moisture content does not exceed four percent.
- C. Verify substrate surface is clean, dry, smooth, structurally sound, and free from surface defects and imperfections that would show through the finished surface.
- D. Evaluate all painted surfaces for the possibility of pigment bleed-through.
- E. Notify the contractor and architect in writing of any conditions detrimental to the proper and timely completion of the installation.
- F. Beginning of installation means acceptance of surface conditions.

3.02 INSTALLATION

- A. Acclimate wallcovering in the area of installation a minimum of twenty-four hours before installation.

- B. Read and follow the manufacturer's installation instruction sheet contained in each roll of the dry erase wallcovering.
- C. Examine all materials for pattern, color, quantity and quality, as specified for the correct location prior to cutting.
- D. Adhesive: Apply a uniform coat of heavy-duty pre-mixed clay-based or extra strength clear wallcovering adhesive.
- E. Primer: Use a quality pigmented acrylic wallcovering primer.
- G. Install dry erase wallcovering sheets in exact order as they are cut from bolt. Reverse hang alternate strips (except lined products). Do not crease or bend the wallcovering when handling.
- H. Install dry erase wallcovering horizontally, in the same sequence as cut from the roll, using a level line.
- I. Using a level or straight edge, double cut the seam with a seam-cutting tool (Ex: Double Seam-Cutter or Swedish Knife). Do not score drywall or plasterboard when cutting material.
- J. When covering the entire wall, seam the material out of the main writing and viewing areas of the wall.
- K. Apply wallcovering to the substrate using a wallcovering smoother, wrapped with a soft cloth, to remove air bubbles. Do not use sharp edged smoothing tools. Smooth material on the wall from the middle to the outside edge.
- L. Remove excess adhesive immediately after the wallcovering is applied. Clean entire surface with a warm mild soap solution, and clean soft cloths. Rinse thoroughly with water and let dry before using. Change water often to maintain water clarity.
- M. Stop installation of material that is questionable in appearance and notify the manufacturer's representative for an inspection.

3.04 CLEAN-UP

- A. Upon completion of installation, remove all exposed adhesive immediately using a soft cloth and a warm, mild soap solution and rinse thoroughly with water and dry with clean towel prior to using.
- B. Upon completion of the work, remove surplus materials, rubbish, and debris resulting from the wallcovering installation. Leave areas in neat, clean, and orderly condition.

END OF SECTION 09720

SECTION 09900

PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.01 WORK INCLUDED

- B. Painting and finishing of interior exposed items and surfaces throughout Project.
- C. Field painting of exposed bare and covered pipes and ducts and hangers, exposed steel and iron work, all metal fabricated Section 05500 items, and primed metal surfaces including but not limited to, hollow metal work, equipment installed under mechanical and electrical work.
- D. HVAC items that require painting are:
 - 1. Grilles, radiation enclosures.
- E. "Paint" as used herein means all coating systems materials including primers, emulsions, enamels, stains, sealers and fillers, and other applied material whether used as prime, intermediate or finish coats.
- F. Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas.
- G. Following categories are not included as part of field-applied finish work.
 - 1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified.
 - 2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces in concealed areas and generally inaccessible areas.
 - 3. Finished Metal Surfaces.
 - 4. Operating Parts.

1.02 RELATED WORK

- H. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
- I. Examine the Contract Documents and be familiar with all their provisions regarding painting. All surfaces that are left unfinished by the requirements of other Sections shall be painted or finished as part of this Section.
- J. For primer on gypsum substrate located behind dry erase wallcoverings, refer to Section 09720.

1.03 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract:

1. Paint: Submit a list of specified products with corresponding name of manufacturer, identifying name and number of proposed products along with manufacturer's written instructions for use of each product.
2. If manufacturer to be used is different from that of color chips furnished, prepare and submit two approximately 6 inch square, properly labeled samples of each color and sheen required on properly prepared paint-out cards or hardboard.
3. Stain: Two, 6 inch square properly labeled samples of each color and sheen required on actual wood for project.

1.05 QUALITY ASSURANCE

- A. Painting and finishing of interior exposed items and surfaces throughout Project. MPI Standards:
 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
 - a. For areas to be renovated, comply with requirements in "MPI Maintenance Repainting Manual".

1.06 DELIVERY, STORAGE AND HANDLING

- B. Do not deliver materials to site until having received all written approvals of submitted information and samples.
- C. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label.
- D. Store materials not in actual use in tightly covered containers.
- E. Take all precautions to ensure that workers and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.
- F. Remove rags and waste from storage areas daily.

1.07 PROJECT CONDITIONS

- G. Apply water-base paints only when temperatures of surfaces to be painted and surrounding air temperatures are between 50 and 95 degrees F.
 - A. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F. and 95 degrees F.
 - B. Do not apply paint when relative humidity exceeds 85%; at temperatures less than 5 degrees F. above the dew point; or to damp or wet surfaces.

1.08 SEQUENCING AND SCHEDULING

- A. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto newly-painted surfaces.

1.08 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Painting and finishing of interior exposed items and surfaces throughout Project.
- B. AFM Safecoat.
- C. Benjamin Moore & Co.
- D. ICI/Dulux.
- E. PPG Architectural Finishes, Inc.
- F. Sherwin Williams Company
- G. Diamond Vogel Paints

2.02 COLORS

- A. Painting and finishing of interior exposed items and surfaces throughout Project. Colors:
 - 1. Paint-1 (General Paint), Ceilings.
 - 2. Paint-2 (General Paint), Walls.
 - 3. Paint-3 (Accent Paint), Walls.
 - 4. Paint-4 (Accent Paint), Walls.
 - 5. Paint-5 (Accent Paint), Walls.

2.03 MATERIALS

- B. Use the materials of the same manufacturer for each system.
- C. Sherwin Williams systems are called out in the system schedules to establish quality and dry mil thickness of finished installation for all systems. A different manufacturer may be used for color selection. Any manufacturer noted above may be used as long as quality and color requirements are met.
 - 1. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.
- D. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers.
- E. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- F. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop.
1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Non-flat Paints and Coatings: VOC content of not more than 150 g/L.
 3. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 4. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
 5. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

2.04 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.

2.05 METAL PRIMERS

- A. Rust-Inhibitive Primer (Water Based): MPI #107.

2.06 LATEX PAINTS

- B. Institutional Low-Odor/VOC Latex (Flat): MPI #143 (Gloss Level 1).
- C. Institutional Low-Odor/VOC Latex (Low Sheen): MPI #144 (Gloss Level 2).
- D. Institutional Low-Odor/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).

- E. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).
 - 1. Odor and VOC's of specified products are acceptable.

2.07 EQUIPMENT

- A. Provide all brushes, rollers, ladders, scaffolding, and other equipment of any kind to properly execute each type of work.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

- A. Perform preparation and cleaning procedures in accord with paint manufacturer's instructions and as specified for each particular substrate condition.
 - 1. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations.
 - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - b. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 2. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning.
 - 3. Remove dirt, rust, scale, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.
- B. Gypsum Board: Fill minor irregularities with patching material and sand to smooth level surfaces taking care not to raise nap of paper.
- C. Ferrous Metal
 - 1. Remove dirt and grease with mineral spirits or solvent recommended by paint manufacturer and clean cloths.
 - 2. Where not galvanized, shop coat of primer will exist on surface. If prime coat is not smooth, sand to bare metal and re-prime.
- D. Existing Surfaces: Prepare to provide good adhesion and appearance.
 - 1. Remove loose paint and rust from metal surfaces.
 - 2. Feather sand edges of existing paint and spot prime bare metal to provide a smooth surface.

3.03 APPLICATION

- A. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.
- B. Do no interior work until building is properly enclosed.
- C. Do work under adequate illumination and dust-free conditions.
- D. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- F. Materials
 - 1. Do not open containers until required for use.
 - 2. Stir materials thoroughly and keep at uniform consistency during application.
- G. Coats
 - 1. Number specified is minimum.
 - 2. Touch up suction spots between coats.
 - 3. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
 - 4. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - 5. Refinish surfaces affected by refitting work.

3.04 COLOR SEPARATION

- A. An average of one or two wall colors will be used per room. Ceilings generally will be a different color than walls. Finished closets will usually be same as adjoining rooms.
- B. Job painted metal items such as diffusers, grilles and registers will generally be same color as adjacent surface.
- C. Hardwood generally will be the same color stain throughout.

3.05 CLEANING

- A. During the progress of this work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
- B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.06 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing.
- B. Provide "wet paint" signs to protect newly-painted finishes. Remove temporary protective wrappings, after completion of painting operations.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.07 SCHEDULE OF INTERIOR WORK

- A. In addition to obvious surfaces, the following do not require painting or finishing.
 - 1. Do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) acoustic materials, finished mechanical and electrical equipment including light fixtures and distribution cabinets.
 - 2. Painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
 - 3. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.
 - 4. Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated.
 - 5. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plate.
 - 6. N/A indicates system not applicable to this Project.
- B. Walls and Ceilings
 - 1. Paint all rooms listed on Room Finish Schedule. Paint patched walls from 90 degree corner and patched ceilings complete.
 - 2. Do not apply next coat until previous is thoroughly dry.
 - 3. Provide final coat which is solid and even in color, free from runs, laps, sags, brush marks, air bubbles and excessive roller stipple and worked into crevices, joints and similar areas.
- C. Electrical Panel Box Covers and Doors.
 - 1. Remove, paint and reinstall after paint is dry.
- D. Other Unfinished and Primed Surfaces
 - 1. Provide specified finish on exposed surfaces. This includes prime coated mechanical units, piping, pipe covering, conduit, interior duct surfaces visible behind grilles, and wood base.

Material	Type	Number and Type of Coating
2. IPS 4 - Wood coats (Satin)	Stain	One coat "Sherwood Wiping Stain", 2 "Wood Classics Fast Dry Varnish.
3. IPS 3 - Ferrous Metal Metal (Unprimed)	Latex Semi-gloss	One coat "Pro-Cryl Universal Primer", two coats "Sher-Cryl".
4. IPS 4 - Ferrous Metal (Primed)	Latex Semi-gloss	One coat "Pro-Cryl Universal Primer", two coats "Sher-Cryl".
5. IPS 5 - Plaster	Latex-Flat	One coat primer, "PrepRite Interior

		Eggshell	Masonry Primer” Two top coats, "Harmony Interior Latex Eggshell".
6.	IPS 7 - Gypsum Board	Latex-Eggshell	One coat "Harmony Interior Latex Primer", two coats "Harmony Interior Latex Eggshell".
7.	IPS 12 – Wood Base	Latex Semi-gloss	One Coat Prep Rite Classic Latex Primer Two top coats “Pro Classic” Latex Semi Gloss
8.	IPS 15 - Copper/Alum (Finished Rooms Only)	Latex-Flat	One coat "DTM Acrylic Primer Finish”, Two coats "ProMar 200 Interior Latex Flat".
9.	IPS 16 - Galvanized (Finished Rooms Only)	Latex-Flat	One coat "DTM Acrylic Primer” Finish, Two coats "ProMar 200 Interior Latex Flat".

END OF SECTION 09900

SECTION 10522

FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Type ABC Fire Extinguishers.
- B. Cabinets.

1.03 RELATED SECTIONS

- A. Gypsum Board: Section 09250.

1.04 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Product Data: Manufacturer's catalog information and specifications edited to indicate specific extinguishers, cabinets and accessories to be provided for this Project. Include rough opening dimensions and certification of U.L. rating.

PART 2 - PRODUCTS

2.01 TYPE ABC FIRE EXTINGUISHERS (4A-60BC RATED)

- A. J.L. Industries Cosmic. 10E.
- B. Larsen's MP10.
- C. Potter - Roemer 3010.

2.02 MOUNTING FX-1

- A. J.L. Industries Panorama 1017 semirecessed, 2-1/2 inch return, C70.
- B. Larsen's Gemini G2409-R3 semirecessed, 2-1/2 inch return, comparable door.
- C. Potter - Roemer Buena 7122 semirecessed, 2-1/2 inch return comparable door.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install all items in conformance with manufacturer's directions.
- B. Prepare recesses in wall for fire extinguisher cabinets.

- C. Securely fasten fire extinguisher cabinets to structure, square and plumb.
- D. Mount fire extinguisher cabinets so the top of the extinguisher is not more than 4 feet above the floor.

END OF SECTION 10522

SECTION 12304

PLASTIC LAMINATE FACED CASEWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. Base and Wall Cabinets and associated Partitions and Shelving.
- B. Countertops.
- C. Work Surfaces (with braces beneath).
- D. Hardware.

1.03 RELATED WORK

- A. Rough Carpentry: Section 06100.
- B. Joint Sealers: Section 07900.
- C. Plastic Fabrications (solid surface base): Section 06600.
- D. Resilient Flooring (resilient base): Section 09650.
- E. Mechanical (Sinks, pipe, fittings, final connections, etc.): Division 15.

1.04 REFERENCES

- A. Plastic Laminate: National Electrical Manufacturers Association (NEMA) Publication No. LD3-1991.
- B. Fiberboard Core: ANSI A208.2.

1.05 SUBMITTALS

- A. Submit in accordance with the General Conditions of the Contract.
 - 1. Product Data: Manufacturer's catalog information edited to indicate specific products and related accessories to be provided for this Project.
 - 2. Shop Drawings: Show layout of casework, typical details of construction, and finish selections.
 - a. Locate rough-in for services required and show methods of compensating for minor variations in actual job conditions within specified tolerances.
 - b. Include details of fastening to all other work, countertop layout for each location, details of countertop construction including backsplash, endsplash, and edge details, plastic laminate selections previously made by Architect/Engineer and type of core substrate material.
 - c. Field measure for all countertops.
 - d. Indicate all hardware and keying schedule.

1.06 QUALITY ASSURANCE

- A. Quality Standards: Perform work in accordance with Architectural Woodwork Quality Standards (current edition), Guide Specification and Quality Control Program as set forth by the Architectural Woodwork Institute (AWI).
- B. ANSI/BHMA A156.9 – Cabinet Hardware.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver casework items only when proper storage conditions will be available. Store casework in protected area until ready for installation.
- B. Maintain optimum humidity and temperature conditions after receipt of materials.
- C. Store in manner to allow free circulation of air around all items.
- D. Maintain temperature of casework storage areas between 50 to 75 degrees Fahrenheit.

PART 2 - PRODUCTS

2.01 CASEWORK

- A. AWI Section 400, Custom grade.

2.02 MANUFACTURERS

- A. The following casework manufacturers are acceptable as long as they meet or exceed this specification.
 - 1. A.J. Pietsch Company, (414) 342-0531.
 - 2. Carley Wood Associates, Inc. (608) 249-7444.
 - 3. Central Wisconsin Woodworking, (715) 675-4491.
 - 4. Creative Laminates, Inc., (800) 441-5885.
 - 5. Diversified Woodcrafts Inc., (920) 842-2136.
 - 6. Glenn Rieder, Inc., (414) 449-2888.
 - 7. Hillcraft Ltd., (608) 221-3220.
 - 8. Lange Brothers Woodwork Co, Inc., (414) 466-2226.
 - 9. O'Keefe Incorporated, (715) 425-8981.
 - 10. Stück Wood Works Inc., (414) 351-5595.
 - 11. T. J. Hale Company, (262) 255-5555.
 - 12. Techline, (608) 238-6868.
 - 13. Wood Design Inc., (920) 563-4833.
 - 14. Woodmill Products, Inc., (262) 754-4641.
 - 15. Or approved equal.
- B. Hardware manufacturers.
 - 1. Doug Mockett & Co. (800) 523-1269.
 - 2. A&M Hardware (888) 647-0200
 - 3. Or approved equal.

2.03 BASE CABINETS

- A. Bottoms, Sides and Sub-top: 3/4-inch 45-47 pound density particle board.
 - 1. Finish where not exposed: 8 to 11 mil melamine resin overlay.

- B. Back Panel: 3/8-inch 45-47 pound density particle board.
 1. Finish: 8 to 11 mil melamine resin overlay to match cabinet interior.
 2. Non-Exposed Side Finish: 8 to 11 mil melamine resin overlay to match.
 3. If back exposed, provide 3/4-inch material, finished to match.
- C. Top of Base Cabinet: Full framed wood. Provide full sub-top and 6 inch spreaders between all drawers and door/drawer.
- D. Back panels rabbeted into sides top and bottom. Secure with hot melt glue or glue and mechanical fasteners.
- E. Provide finished end panels at all exposed end locations. Ends adjacent to appliances shall be considered as exposed ends.

2.04 DOOR/DRAWER CONSTRUCTION AND EDGING

- A. Door/Drawer Fronts: 3/4-inch thick core.
- B. Exposed Edges, Endsplashes: Finished to match exposed face.
- C. Laminate face/balancer to core with PVA rigid adhesives, under pressure, nor natural setting process. Heat process or contact adhesive not allowed.
- D. Door/Drawer/Cabinet Body Edges: 1 mm PVC thru-color, acid resistant hot melt applied.

2.05 PLASTIC LAMINATE SURFACING

- A. Manufacturers: Wilsonart , Arpa, Formica, Lamin-Art, Nevamar, or approved equal.
- B. Exposed Exterior Surfaces (except countertops): NEMA GP28, 0.028 inch thick, standard vertical grade.
- C. Interior Surfaces/Backing Sheets: NEMA CL20, 0.020 inch thick, standard cabinet liner grade if applicable.
- D. Colors:
 1. Horizontal Surface Plastic Laminate color to be selected from manufacturer's full range.
 2. Vertical Surface Plastic Laminate color to be selected from manufacturer's full range.

2.06 DRAWERS

- A. Backs, Sides, Fronts: 1/2-inch thick, medium density fiberboard with melamine overlay.
- B. Dovetail/dado fronts and backs, secure with glue.
- C. Bottoms: 3/8-inch thick.
- D. Rabbet bottoms into sides, front and back; staple and glue.
- E. Drawer fronts screwed on from drawer inside.
- F. Reinforcement: 1/2 inch thick under-bottom stiffeners, one at 24 inch drawers, two at 36 inch drawers, four at 48 inch drawers.

2.07 SHELVES AND PARTITIONS

- A. Shelves under 27 inches long behind doors: 3/4-inch thick 45-47 pound density particle board.
- B. Shelves over 27 inches long behind doors and all open cabinets: 1 inch thick 45-47 pound density particle board.
- C. Shelves: 3/4 inch thick cabinet grade plywood (where indicated).
- D. Finish: Finished to match faces.
- E. Edging: 1 mm PVC thru-color, acid resistant, hot melt applied.

2.08 BASES

- A. Two, continuous, 4 inch high by 1-1/2 inch thick lumber, or 4 inch high by 3/4 inch exterior grade plywood, 2 foot on center.
- B. Provide two positioning strips to cabinet bottom for concealed fastening.

2.09 COUNTERTOPS

- A. Plastic Laminate: 1-1/2 inches thick 45-47 pound density particle board, NEMA GP50 finish top and edges, and NEMA CL20 backer sheet.
 - 1. Square front edge, back and side splashes. Provide cutouts for built-in fixtures.

2.010 HARDWARE

- A. Pulls: Doug Mockett & Co. 5 21/32" Aluminum Extrusion Pull – DP117B, Satin Aluminum.
- B. Self-Closing Hinges: Blum Model 71.6530 with 175L8100 base plate.
- C. Drawer Slides: Accuride or approved equal.
- D. Locks: Keyed to match, five pin. All casework to be lockable. Key casework alike per area.
- E. Steel Brackets: A&M Hardware or approved equal
 - 1. Color: To be selected by Architect from full line of powder coat finishes.
- F. Hardware finish: 626 (US26D) Brushed Chrome.
- G. Waste Bin Deflector: Stainless steel sheet metal, type 304, 16 gauge, #4 finish, hemmed edges.
- H. Paper Feed Grommet: Plastic, color to be from manufacturer's full range, inside opening of 1 9/16 inches by 1 3/4 inches by 1 inch deep, 3/8 inch flange at the exterior. To be used at the recycle/waste paper bins.
 - 1. Doug Mockett and Co.; "CP2" or equivalent.
- I. Keyboard Platform: Doug Mockett & Co., "KP1", adjustable type with non-skid pads and gel wrist pad. Mouse Support: Doug Mockett & Co., "KPA1".

2.011 WORKMANSHIP

- A. Cabinet parts shall be accurately machined utilizing hardwood dowels for premium quality grade joinery construction. Glue and mechanically fasten all joints for maximum rigidity.

- B. All cases shall be square, plumb, true and self-supporting.
- C. Provide removable back panels and closure panels for plumbing access where shown on Project Drawings.

PART 3 - EXECUTION

3.01 DELIVERY

- A. Store and install in a ventilated building not exposed to extreme temperature and/or humidity.

3.02 INSTALLATION

- A. Installation shall be by the manufacturer's authorized representatives using factory trained personnel experienced in the installation of this type of equipment.
- B. Uncrate, set up, place, level, scribe and anchor all cabinets according to manufacturer's recommendations.
- C. Remove and replace tops, backs, panels, shelves and other items necessary to allow other Sections to complete their work of connecting services.
- D. Do all cutting, boring, patching required for the installation of work of other Sections.
- E. Provide all necessary fillers, panels, end panels, scribes required to make complete installation as detailed.
- F. Where casework meets wall surfaces, set with uniform space not to exceed 1/8-inch. Seal all joints with silicone sealant to a slightly concave joint, using backer rod where required. Apply sealant in accord with Section 07900.
- G. Cabinets with surfaces having machine or tool marks will be rejected.
- H. All finishes must be smooth, uniform in color and match approved sample.
- I. Prior to final inspection, examine installation of the work of this Section. Repair or replace all defects found. Leave installation clean, undamaged and ready for use.

END OF SECTION 12304

SECTION 12490

INTERIOR ROLLER SHADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

- A. The following specifications detail the minimum performance and related criteria for manual shades or an electronic shade control system used on this project. Refer to Alternate Bids as indicated on drawings and in Division One of this Project Manual.
- B. This specification covers electronic shading systems, controls, and materials as specified in locations indicated on architectural plans.

1.03 RELATED WORK

- A. Rough Carpentry, Section 06100: blocking for support of window shade brackets.
- B. Substrate for window shade systems and installation of accessories supplied only under this section.
- C. Acoustical Ceilings, Section 09510: installations of shade pockets, pocket closure, and/or accessories supplied only under this section.
- D. Electrical, Division 16; installation of and connections to electrical motor control system and lighting control system components supplied only by this section as required to accomplish control requirements specified elsewhere and as indicated in the drawings.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall have 15 years experience in the manufacture of products comparable with those specified in this section.
- B. Manufacturer shall provide all shading components and electrical components for a complete installation and a single source of shading and lighting control where applicable.
- C. The manufacturer or licensed agent shall be approved to provide the products specified, honor all claims against the product in accordance with the warranty.
- D. Manufacturer shall provide 24/7 technical support to aid in troubleshooting system wiring and assist in system programming.
- E. Installer shall be qualified for installation by experience and be approved by the manufacturer.
- F. The responsibility for the design, engineering, installation, and performance of motorized window shade systems specified in this section shall be assigned to a single manufacturer and their authorized dealers/installers.
- G. The General Contractor shall coordinate installation of the following items with the Window Shade contractor for all window treatment systems:

1. Power wiring in accordance with requirements provided by the Window Shade Contractor.
2. Low-voltage wiring as necessary for operation of shade control system. (Window Shade Contractor shall specify power needs to General Contractor)

1.05 SUBMITTALS

- A. Submit manufacturer's descriptive literature for each product type specified. Details shall indicate materials, finishes, construction, and mounting requirements. Also include installation, wiring, and operating instructions.

1.06 SHOP DRAWINGS

- A. Indicate Head, jamb, and sill details to aid Base Building contractor to coordinate work as well as relevant dimensions and mounting requirements for each product type and mounting condition.
- B. Provide shade schedule coordinating room number, opening size(s), quantities and key to details.
- C. System one-line wiring diagrams including connection details and overall arrangement of all shades and control locations supplied by this section for installation and connection by Division 16.

1.07 SAMPLES

- A. Portfolio of shade fabric swatches for initial fabric color selection from manufacturer's full range of available fabrics.
- B. Material samples for color and finish selection of controls.
- C. One fully operational window shade sample of each type required complete with selected shade fabric including sample of seam/batten when applicable. Location of sample to be determined by Architect.
- D. One complete set of all shade components demonstrating compliance.

1.08 CERTIFICATION

- A. Test Reports indicating compliance with Fabric test properties listed in Section 2.
- B. Current certificates demonstrating all line voltage components of the system are either UL listed or are UL recognized. All low voltage components within the system shall be powered by UL listed or UL recognized class 2 transformers or power supplies and wired as NEC Class 2 circuits.

1.09 MANUFACTURE'S INSTRUCTION

- A. Installation, Programming, and Maintenance instructions to be included in product packaging.
- B. 24-Hour / 7-Day Technical support shall be available to aid with unforeseen installation difficulties.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection
 1. Do not deliver items to the project until all concrete, masonry, plaster, painting and other wet work has been completed and is dry.
 2. Deliver shades to project in protective packaging, uniquely labeled to identify each shade for each opening. Schedule delivery to prevent delays to completion of work, but to minimize on-site storage time.

3. Store materials in a dry, secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and all other potential damage.
- B. PROJECT / SITE CONDITIONS
1. Shade system shall not be installed until the building is operating in ambient temperature and humidity ranges consistent with that intended for buildings ultimate use.
- C. SCHEDULING
1. Do not fabricate shades without obtaining field dimensions for each opening.
 2. Coordinate construction of surrounding conditions to allow for timely field dimension verification.
 3. Manufacturer's standard lead times apply. Reference submittal and schedule accordingly for project timeline.
- D. EXTRA MATERIALS
1. The manufacturer shall make available to the end user a method of ordering new equipment for expansions, replacement, or parts to be used as spares twenty-four hours a day, seven days a week.
 2. The manufacturer must make available new or remanufactured parts for a minimum period of ten years from the final date of commissioning.

PART 2 - PRODUCTS

1.01 MANUFACTURERS

- A. To establish the standard of quality, design, and function desired, drawings and specifications are based on the Sivoia QS roller shade system by:
1. Lutron Shading Solutions
11520 Sun Shade Lane
Ashland, Virginia 23005
United States of America
Web Site: www.lutron.com/shadingsolutions
Telephone (800) 446-1503, FAX (804) 752-3366
 2. Or approved equal by MechoShade Systems, Inc., Hunter Douglas or approved equal.

1.02 GENERAL SYSTEM SPECIFICATIONS

A. OPERATION

1. The Electronic Drive Unit shall operate without exceeding a 44dBA Sound Pressure Level (SPL) measured three (3) feet from the motor.
2. The system shall make no audible clicks when the motor starts or stops.
3. For systems with multiple Electronic Drive Units, Drive Units are electronically synchronized and will start, stop and move smoothly in unison at all times.
4. Each Electronic Drive Unit within the system shall store multiple intermediate presets positioned anywhere along the system travel and a full open and full close shade limit. Electronic Drive Unit shall position the shade fabric to $\pm 1/16''$ of preset positions.
5. Electronic Drive Unit and system controls shall have a 10 year power failure memory for preset positions, open and close limits, shade grouping, and system configuration.

B. CAPACITY

1. System shall allow for up to 96 devices per communication link including EDU's, controls and interfaces.

C. GROUPING

1. System groups and subgroups can be reconfigured at the point of control without rewiring or access to the Electronic Drive Unit
2. System keypads can control any Electronic Drive Unit, group, or subgroup without requiring Group Controls.

D. LIMITS AND INTERMEDIATE PRESETS

1. Limits shall be programmable and adjustable from the Electronic Drive Units, wall-mounted keypads, or hand-held infrared transmitters as applicable.
2. Open and Close limits may be recalled at the Electronic Drive Unit. Preset positions may be recalled by contact closure inputs, keypads, infrared receivers, and lighting control system interfaces.
3. Preset positions shall be user adjustable with a 5-second button “press and hold” from keypads, infrared transmitters, or contact closure boards. The user adjustment feature can be disabled at the keypad location

E. PROTECTION

1. System components shall provide appropriate (spike and brownout) overcurrent protection ($\pm 10\%$ of line voltage) for all devices in the system.
2. The Electronic Drive Unit shall be powered via a UL Listed or UL Recognized Class 2 Power Supply.

F. INTEGRATION

1. The Electronic Drive Unit(s) shall seamlessly integrate with Lutron lighting control systems including GRAFIK Eye.
2. System shall integrate with A/V equipment such as timeclocks and security systems through contact closure inputs
3. Electronic Drive Unit shall be capable of receiving Infrared (IR) from hand-held transmitters through infrared receivers on a keypad, contact closure interface, or through an IR receiver wired directly to the Electronic Drive Unit.

1.03 ROLLER SHADES

A. MOUNTING

1. Roller shade brackets shall allow for symmetrical light gaps as small as $\frac{3}{4}$ " on each side of shade.
2. System shall have a roller shade leveling adjustment that allows level adjustment while the roller shades are mounted to the brackets.
3. System shall allow a side-to-side adjustment of up to $\pm 3/8$ " on each side while the shade is mounted to the bracket to properly center shade over the window.
4. System shall have a projection adjustment of up to $1/2$ " allowing the shade to clear the trim or move the shade closer to the window in order to have a tighter seal between the fabric and the window.
5. System dual brackets shall be provided to permit two shades rollers to be mounted in the same opening

B. SHADE TUBE

1. 2.5" aluminium extrusion

2. Fabric shall be connected to the tube with double-sided adhesive strip applied for exact and firm mounting of the fabric and for easy adjustment of fabric to prevent telescoping.
3. A minimum of one turn of fabric will be placed on the roller before the working section of fabric starts, to protect the fabric and smooth out the starting seam.

C. FABRICS

1. Qualifications

- a. Fire – Provide shade fabrics tested in accordance with:
 - i. 1989 NFPA 701 small scale Vertical Burn Test and rated "PASS."
 - ii. 1996 NFPA 701 small scale Vertical Burn (telephone booth test) and rated "PASS."

E. MANUFACTURING

1. Where applicable, shade fabric will be ultrasonically cut and friction sealed to minimize fraying.
2. Woven yarn fabrics will be interlocking and heat-treated so that all material is securely bonded.
3. Shade Fabric panels shall be 100% visually inspected for defects using a light box integrated into the manufacturing line.
4. 100% visual inspections shall be performed on each shade seam and hem bar welds and compared to strict aesthetic standards.
5. Shade seam weld strength process shall be tested on a daily basis to ensure controlled consistency of weld quality.
6. Shade panels shall be 100% checked for squareness ($\pm 1/16''$)
7. Shade panels shall be 100% visually inspected to ensure there are no frayed edges or defects in the cut.

F. LIGHT FILTERING FABRICS

1. Sheer Shade Basketweave 90

- a. Openness factor to be determined based on window orientation.
- b. Color to be selected by architect from manufacturer's full range.

G. HEM BAR

1. Standard Sealed Hem Bar shall be a 1" wide by .1875" thick extruded aluminum bar enclosed on all sides in a thermally sealed pocket across the bottom of the shading fabric.

2.04 CONTROLS

A. WALL MOUNTED CONTROLS

1. Keypad(s) shall be able to electronically set and reconfigure shade open and close limits, shade preset positions, system groups, and system subgroups at the control without rewiring and without access to the Electronic Drive Unit.
2. Wallplate shall attach using no visible means of attachment.
3. Any engraved artwork specified for controls, such as borders and logos, shall be applied in a method designed to resist removal by scratching, cleaning, etc.
4. Manufacturer shall ensure the following items regarding product color:
 - a. Product color matches NEMA standard WD1, Section 2, and the maximum color deviation from this standard shall not exceed $\Delta E=1$, CIE L*a*b color space units. For non-NEMA colors, color match coordination shall be provided on request.

- b. Color variation of any control in the same product family shall not exceed $\Delta E=1$, CIE L^*a^*b color units.
 - c. Visible parts shall exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674-89. Manufacturer to submit proof of testing upon request.
5. Keypad(s) shall mount in standard U.S. backboxes in either single-gang or multi-gang installations. Keypad(s) shall be available in "Insert" and "No Insert" models. Manufacturer to supply appropriate wallplate based on ganging options and insert options specified.
 6. Keypad(s) shall provide an immediate local LED response upon button activation to indicate that a system command has been sent from the keypad. LED will remain lit contingent upon receiving system confirmation of the successful completion of the command.
 7. Keypad(s) shall have removable button assemblies that can be replaced in the field to change colors, button configurations, and engraving.
 8. Keypad(s) shall have a backlighting option.
 9. Keypad(s) shall be capable of simultaneously controlling one or more shades, up to the maximum number of shades in the system.
 10. Keypads shall be of type:
 - a. Three-Button Keypad
 - i. Keypad will provide buttons for selecting the following for one group of shades: full-open, full-close, and one programmable preset position.

B. INTERFACES

1. Interface with Lutron Grafik Eye QS system:

- a. Shade system shall interface to Lutron Grafik eye lighting control system to provide single system control of the natural and artificial light in the space.
- b. Interface shall provide buttons for selecting the following for one group of shades: full-open, full-closed, three programmable preset positions, and raise/lower. Pressing any button (other than Raise or Lower) while the shades are moving will stop the movement of the shades.
- c. Interface(s) shall provide an immediate local LED response upon button activation to indicate that a system command has been sent from interface. LED will remain lit contingent upon receiving system confirmation of the successful completion of the command.
- d. Interface(s) shall be capable of simultaneously controlling one or more electronic shade, up to the maximum number of shades in the system, without affecting the lighting control system.
- e. Interface(s) wallplate shall attach using no visible means of attachment.
- f. Interface(s) shall have removable button assemblies that can be replaced in the field to change colors, button configurations, and engraving.
- g. Interface(s) shall mount in standard U.S. backboxes in either single-gang or multigang installations. Interfaces shall be available in "Insert" and "No Insert" models. Manufacturer to supply appropriate wallplate based on ganging options and insert options specified.
- h. Interface(s) functions shall be configured through the lighting control system.
- i. Interface(s) shall have a backlighting option.

C. TRANSFORMERS

1. Plug in transformer 50VA

- a. Transformer shall be UL Listed
- b. Transformer shall provide integral 3 prong connector to mount directly to a standard 120VAC outlet

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Refuse delivery of any damaged packaging.
- B. Ensure all parts match specified bill of materials and purchase order.

3.02 INSTALLATION

- A. Install shades in windows level and plumb to provide smooth operation.
- B. Install in accordance with manufacturer's product data and approved shop drawings
- C. Field measurement and installation shall be performed by a factory-trained technician.

3.03 FIELD QUALITY CONTROL

- A. Site test/Inspection
 1. Examine substrate and conditions for installation. Do not commence installation until conditions are satisfactory. Commencement of installation indicates acceptance of site conditions by Contractor. Notify the Design Professional upon inspection when the project conditions are unacceptable for shade installation. "Beginning of installation" means acceptance of substrate and project conditions.

3.04 ADJUSTING

- A. Adjust fabric on tube to prevent telescoping of fabric over time.

3.05 CLEANING

- A. Touch up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be satisfactorily repaired.
 1. Clean exposed surfaces, including metal and shade fabric, using non-abrasive materials and methods recommended by the Shade Fabric Manufacturer. Remove and replace work that cannot be satisfactorily cleaned.

3.06 DEMONSTRATION

- A. Demonstrate operation method and instruct Owner's personnel in the proper operation and maintenance of the window shade systems.

END OF SECTION 12490

SECTION A15010

BASIC PLUMBING GENERAL REQUIREMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Applicable requirements of instruction to bidders, conditions of contract, and of Sections listed under related Sections of this Division apply to all work specified in this Division 15000.

1.02 RELATED SECTIONS OF THIS DIVISION

- A. A15010 Basic Plumbing General Requirements
- B. A15050 Basic Plumbing Materials and Methods
- C. A15250 Plumbing Systems Insulation
- D. A15400 Plumbing Systems

1.03 RELATED WORK OF OTHER SECTIONS OR DIVISIONS

- A. Division 1
- B. B15000 – HVAC
- C. 16000 - Electrical

1.04 WORK INCLUDED IN THIS SECTION

- 1.05 Work Not Included in This Section
- 1.06 General Requirements
- 1.07 Visiting the Premises
- 1.08 Codes and Regulations
- 1.09 Permits, Fees and Inspections
- 1.10 Discrepancies
- 1.11 Workmanship and Materials
- 1.12 Manufacturer's Recommendations
- 2.01 Submitted Data and Shop Drawings
- 2.02 Maintenance Manuals
- 3.01 Openings, Cutting, and Repairing
- 3.02 Concrete Work
- 3.03 Cleaning Equipment and Materials
- 3.04 Cleanup
- 3.05 Guarantee

1.05 WORK NOT INCLUDED IN THIS SECTION

- A. Electrical, Line Voltage Wiring
- B. Painting
- C. For temporary services and utilities, see Division 1 requirements.

1.06 GENERAL REQUIREMENTS

- A. This Section includes all new plumbing and drainage work to constitute complete installation as specified, shown on drawings, and as required, including such items as plumbing demolition, drainage and waste systems, hot and cold water distribution, plumbing fixtures, connections for heating and ventilating equipment.
- B. Obtain information on conditions affecting work at building, including the following:
 - 1. Complete information as to details of building construction, pipe, and equipment layout, in order to install system to clear structural work and piping of equipment of other trades.
 - 2. Accessibility: Minor deviations from the drawings may be made to allow for better and more coordinate accessibility. Changes of magnitude that may affect the work of other Contractors shall not be made without authorized approval.
 - 3. Storage Space: Stored materials shall be located so as to facilitate prompt inspection. See Conditions of Contract.
- C. On all conditions affecting work, obtain at building conditions of foundations and surfaces to support pipe and equipment.
 - 1. Examine details of building construction in order to install system to clear all structural work and finished work.
 - 2. Examine electrical, heating and ventilating, and special equipment and piping layouts and specifications.

1.07 VISITING THE PREMISES

- A. The Contractor, before submitting his bid on the work, must visit the site and familiarize himself with all visible existing conditions.
- B. As a result of having visited the premises, the Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions.
- C. The submission of a bid will be considered an acknowledgement on the part of the bidder of his visitation to the site.

1.08 CODES AND REGULATIONS

- A. All work and materials shall be installed as shown and herein specified in accordance with the approved editions of state and local codes, laws, regulations, and the 2003 edition of the International Plumbing Code.

1.09 PERMITS, FEES AND INSPECTIONS

- A. Unless otherwise distinctly hereinafter specified, this Section of the work shall apply and pay for all necessary permits, fees, and inspections required by any public authority having jurisdiction for the performance of this work.

1.10 DISCREPANCIES

- A. The Drawings and Specifications are intended to cooperate. Any materials, equipment or systems related to this Section and exhibited on the Architectural and Plumbing Drawings, but not mentioned in the Specifications are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings.
- B. In case of differences between the Drawings and Specifications, the Specifications shall govern first, and then the Drawings. Large-scale details shall take precedence over smaller scale Drawings as to shape and details of construction. Specifications shall govern as to materials.

- C. Drawings and Specifications are intended to be fully cooperative and to agree, but should any discrepancy or apparent difference occur between Drawings and Specifications or should error occur in the work of other affecting the work, the Contractors shall notify the Architect at once. If the Contractor proceeds with the work affected without instructions from the A/E, he shall make good any resultant damage or defect. All misunderstandings of Drawings and Specifications shall be clarified by the A/E.

1.11 WORKMANSHIP AND MATERIALS

- A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent who will be constantly in charge of the erection of the work until completed and accepted.
- B. Unless otherwise hereinafter specified, all materials and equipment under this Division of the Specifications shall be new, or best grade and as listed in printed catalogs of the manufacturer. Each article of its kind shall be the standard product of a single manufacturer.
- C. All manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating.
- D. Reference to standards are intended to be the latest revision of the standard specified.

1.12 MANUFACTURER'S RECOMMENDATIONS

- A. Equipment and materials installed under this Division of the Specifications shall be installed according to manufacturers' recommendations, and installation instructions.

PART 2 - PRODUCTS

2.01 SUBMITTED DATA AND SHOP DRAWINGS

- A. Submit specified number of copies of drawings (five minimum) with dimensions, capacities, and information as soon as available from manufacturers. Shop drawings will not be reviewed if submittal is incomplete. Refer to list of submittal data required below.
- B. This Contractor shall review all the shop drawings for complete compliance to the drawings and the specifications before submitting the drawings to the A/E. The Contractor's review shall verify the following:
 - 1. All items requiring submittal are included in first submittal.
 - 2. Equipment being submitted was specified.
 - 3. Quantities submitted are correct.
 - 4. Sizes and capacities are as specified.
 - 5. Electrical characteristics have been checked with the Electrical Contractor, or verified at the site.

Any deviations from the Drawings or the Specifications shall be pointed out and provided with an explanation with the submittal.

- C. The Contractor shall stamp the shop drawings with his own review stamp, or submit a separate statement that the enclosed shop drawings have been reviewed in accordance with the specifications. The shop drawings shall not be reviewed without the Contractor's review statement.
- D. Final review of the drawings by the A/E or his representative shall not relieve the Contractor from the responsibility of complying with the requirements of the drawings and specifications.

E. Submittal Data:

1. Submit complete brochures giving names of manufacturers and catalog figure numbers, trade names, technical data, and requested information of each item listed as follows:
 - a. Cleanouts
 - b. Floor Drains
 - c. Plumbing Fixtures
 - d. Backflow Preventer

2.02 MAINTENANCE MANUALS

- A. Maintenance manuals, instructional data, and operating instructions for equipment and materials in this Section shall be assembled by trade and delivered to the following: Three (3) copies to the Owner.

PART 3 - EXECUTION

3.01 OPENINGS, CUTTING, AND REPAIRING

- A. This Contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls, slabs, and footings for all piping and equipment, including sleeves where required.
- B. Any drilling, or cutting, required for the performance of work under this Section shall be the responsibility of this Contractor, and the cost thereof shall be borne by him.
- C. Holes in Concrete: Sleeves shall be furnished, accurately located and installed in forms before pouring of concrete. This Contractor shall pay all additional costs for cutting of holes as the result of the incorrect location of sleeves. All holes through existing concrete shall be either core drill or saw cut. All holes required shall have the approval of the Structural Engineer prior to cutting or drilling.
- D. It shall be the responsibility of this Contractor to ascertain that all chases and openings are properly sized and located.
- E. All exposed, visible pipe wall penetrations shall be provided with pre-manufactured escutcheons as specified.

3.02 CONCRETE WORK

- A. All concrete provided under the work of this Section shall be in accordance with that specified under the "Concrete" section of these specifications.

3.03 CLEANING EQUIPMENT AND MATERIALS

- A. Provide for the safety and good condition of all materials and equipment until final acceptance by the Owner. Protect all materials and equipment from damage. Provide adequate and proper storage facilities during the progress of the work. Special care shall be taken to provide protection for bearings, open connections, pipe coils, pumps, compressors, and similar equipment.
- B. All fixtures, piping, finished surfaces and equipment shall have all grease, adhesive labels and foreign materials removed.
- C. All piping shall be drained and flushed to remove grease and foreign matter. Pressure regulating assemblies, traps, flush valves, and similar items shall be thoroughly cleaned. Remove and thoroughly clean and install all liquid strainer screens after the system has been in operation ten (10) days.

3.04 CLEANUP

- A. Remove from the premises all unused material and debris resulting from the performance of work under this Section.

3.05 GUARANTEE

- A. All materials and equipment provided and/or installed under this Section of the Specifications shall be guaranteed for a period of one year from the date of acceptance of the work by the Owner. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without any cost to the Owner. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the entire satisfaction of the Owner.
- B. In the event of occupancy by the Owner prior to final acceptance of the project, the guarantee date for equipment placed in operation shall be mutually agreed to by the Contractor and the Owner's representative.

End of Section A15010

SECTION A15050

BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED SECTIONS OF THIS DIVISION

A15010 - Basic Plumbing General Requirements

A15250 - Plumbing Systems Insulation

A15400 - Plumbing Systems

1.02 WORK INCLUDED IN THIS SECTION

2.01 Sleeving and Fire Stopping

2.02 Hangers and Inserts

2.03 Safing

2.04 Dissimilar Metals

2.05 Unions

2.06 Cleanouts

2.07 Floor Drains

2.08 Joints

2.09 Escutcheons

2.10 Electric Wiring

3.01 Installation

3.02 Tests

3.03 Disinfection and Flushing

PART 2 - PRODUCTS

2.01 SLEEVING AND FIRE STOPPING

A. All penetrations of masonry, fire rated or smoke walls, floors, or roofs shall be done by use of sleeves manufactured for that purpose. Sleeves in concrete, masonry, or pre-cast concrete shall be galvanized steel with 1/4" minimum wall thickness. All other sleeves to be #22 gauge galvanized iron.

B. Installation:

1. Provide clearance of 1/2" around piping or insulation if pipe is insulated.

2. Each sleeve to pass through entire floor, wall, or roof construction (or as detailed) and end to be set flush with surrounding surface in which it is installed except sleeves through floors must project 2" above finished floor.

3. Fire and smoke rated floor and wall penetrations: Fill opening between pipe and sleeve with Nelson CLK (or Tremco or 3M approved equivalent) fire stop material. Fire and smoke rating of sealant shall match rating of wall or floor being penetrated.

2.02 HANGERS AND INSERTS

A. Hangers shall be steel clevis type for steel or cast iron pipe with solid threaded stem support of adequate size. Dipped ring type for uninsulated copper. Where pipes are grouped, install

Strut trapeze with "U" spacers to hold pipe alignment. Adjustable band hangers for use on uninsulated piping.

- B. Where thermal movement in the pipe line will occur, the pipe hanger assembly must be capable of supporting the line in all operating conditions.
- C. All anchors, hangers, and supports to be designed to meet local structural requirements and Architect's approval. Perforated iron shall not be used on any part of the plumbing system.
- D. All hangers of one type shall be catalog items of one manufacturer.
- E. No work shall be supported from and structural bridging angles.
- F. Strut supports by B-Line or Unistrut are acceptable.
- G. Joints subject to thrust forces shall be restrained externally to prevent joint separation.
- H. The minimum rod diameter for single rigid rod hangers shall be as follows. Rods may be reduced one size for double rod hangers with 3/8 inch minimum diameter.

<u>Nominal Pipe or Tubing Size (Inch)</u>	<u>Nominal Rod Diameter (Inch)</u>
1/4	3/8
3/8	3/8
1/2	3/8
3/4	3/8
1	3/8
1-1/4	3/8
1-1/2	3/8
2	3/8
2-1/2	1/2
3	1/2
3-1/2	1/2
4	5/8

I. Hangers:

1. Hangers for Pipe Sizes 1/2" through 2":

Carbon steel, adjustable swivel ring. B-Line B3170NF, Grinnell 69 or 70.

Carbon steel, adjustable clevis, standard. B-Line B3100, Grinnell 260.

2. Multiple or Trapeze Hangers:

Steel channels with welded spacers and hanger rods.

J. Space hangers for pipe as follows:

<u>Pipe Material</u>	<u>Pipe Size</u>	<u>Maximum Horizontal Spacing</u>	<u>Maximum Vertical Spacing</u>
Copper	1/2" through 3/4"	5' 0"	10' 0"
Copper	1" through 1-1/4"	6' 0"	10' 0"
Copper	1-1/2" through 2-1/2"	8' 0"	10' 0"
Steel	1/2" through 1-1/4"	7' 0"	15' 0"
Steel	1-1/2" through 6"	10' 0"	15' 0"

2.03 SAFING

- A. All drains over excavated areas shall be safed. Safing shall consist of a four (4) pound, 35" diameter lead disc clamped to flashing flange.

2.04 DISSIMILAR METALS

- A. Manufacturers: Watts Regulator Company, Lochinvar, Wilkins or EPCO Sales, Inc.
- B. Provide dielectric unions, couplings, or flanges with an inert and non-corrosive, thermoplastic lining between copper or brass piping material and steel piping or tanks. Minimum pressure rating of not less than 175 psig at 180°.

2.05 UNIONS

- A. Unions, flanges and gasket materials to have a pressure rating of not less than 150 psig at 180°. Locate at inlet and outlets of all equipment and apparatus.
 - 1. 2" and Smaller Copper: ANSI B16.18 cast bronze union coupling or ANSI B15.24 Class 150 cast bronze flanges.

2.06 CLEANOUTS

- A. Provide cleanouts as manufactured by Sioux Chief, J.R. Smith, Zurn, Josam, or Wade. Install at the base of every soil stack wherever there is a 90 degree change of direction and every fifty feet.

2.07 FLOOR DRAINS

- A. Provide floor drains as manufactured by Sioux Chief, Smith, Zurn, Josam, or Wade, with threaded adjustable strainer and top as noted below.
- B. Installation to be made in accordance with manufacturer's directions, so that drains will serve the purpose intended.
- C. Floor Drains:
 - 1. FD-1: Sioux Chief Series 863-4NR, round polished metal ring and strainer.

2.08 JOINTS

- A. Joints shall be watertight and gas-tight for the pressure required by test or system design, whichever is greater.
- B. Joints shall be made in the following manner:
 - 1. Soil, Waste and Vent Piping:
 - a. No-hub couplings, CISPI 310.
 - b. PVC solvent joints ASTM D2564; ASTM F656
 - 2. Water Piping:
 - a. Copper Water Tube (Above Ground): The joint surfaces shall be cleaned bright, properly fluxed and soldered or sweated with lead free (<.2%) solder, ASTM B32; flux ASTM B813.

2.09 ESCUTCHEONS

- A. Provide on all exposed to view pipe passing through finished floor, walls, and ceilings with outside diameter sufficient to cover sleeved openings and inside diameter to fit snugly around pipe.
- B. All escutcheon plates to be metal, chromium plated brass in toilet rooms.

2.10 ELECTRIC WIRING

- A. All line voltage wiring shall be by Electrical Contractor; Plumbing Contractor shall furnish wiring diagrams to Electrical Contractor for electric equipment furnished.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Exposed and concealed horizontal lines of pipe shall be carried on specified hangers properly spaced to maintain alignment.
- B. Piping shall be concealed except where noted. Where suspended ceiling exists, piping shall be installed in coordination with mechanical ducts and equipment. Install in walls and partitions where practical. Exposed piping shall be installed parallel to or at right angles with building walls, except where otherwise shown on drawings.
- C. Exposed pipe passing through walls, floors, and ceilings shall be fitted with wall plates securely held in position and allowing clearance for expansion. Plates shall be large enough to cover opening around pipe.
- D. Install pipelines true to line and grade.
- E. Plated, polished, or soft metal piping shall not show tool marks or abrasions.
- F. Wherever changes in sizes of piping occur, changes shall be made with reducing fittings. The use of bushings will not be permitted.
- G. Cutting and boring through structural members shall be done only when approved by and under supervision of Architect and/or Structural Engineer.
- H. Offsets in all piping shall be made with fittings. Bending of pipe shall not be permitted.
- I. All hot and cold water piping shall be separated by at least 6".

3.02 TESTS

- A. Soil, Waste, and Vent Piping:
 - 1. Roughing-in tests consist of all work between the building drain connections to points above the finished floor and beyond the finished face of construction.
 - a. Water Test: Plug all openings and fill entire system, or sections of system, with water so as to develop no less than a 10 foot head, or 5 psi. The water pressure shall remain constant for not less than 15 minutes.
 - b. Air Test: Plug all openings and pressurize the entire system, or sections of system, to a pressure no less than 10 inches of mercury, or 5 psi, for a period of not less than 15 minutes.
- B. Water Distribution Piping: Test to a pressure of 100 psi in all parts of the system for eight (8) hours. The system shall be leak free.
- C. All tests to be made in the presence, and to the satisfaction, of the representative of the Architect.

3.03 DISINFECTION AND FLUSHING

- A. Disinfection of all water pipe shall be the responsibility of the Contractor. All pipe shall be clean at the time of installation which should result in a prompt, safe water sample. Delay in disinfection shall in no way create liability on the part of the Owner. Disinfection and flushing shall be done per state and local codes.

End of Section A15050

SECTION A15250
PLUMBING SYSTEMS INSULATION

PART 1 - GENERAL

1.01 RELATED SECTIONS OF THIS DIVISION

- A15010 - Basic Plumbing General Requirements
- A15050 - Basic Plumbing Materials and Methods
- A15400 - Plumbing Systems

1.02 WORK INCLUDED IN THIS SECTION

- 1.03 General
- 1.04 Approved Materials
- 1.05 Workmanship
- 2.01 Domestic Hot Water Supply Piping
- 2.02 Domestic Cold Water Piping
- 3.01 Protection and Cleaning
- 3.02 Installation

1.03 GENERAL

- A. Clean all piping, apparatus and equipment to be covered, and insulate carefully without voids or the use of damaged sections. Use full length pieces only.
- B. All insulation thickness shall meet the minimum requirements as specified in state and local codes, unless herein specified to be greater.
- C. Remove insulation if defects develop after insulating. After repair of defects, replace the insulation equal to original without cost to Owner.
- D. All pipe covering, jackets, vapor barriers, adhesives and mastics shall have a flame spread classification of 25 or less, and a smoke developed classification of 50 or less.

1.04 APPROVED MATERIALS

- A. Fiberglas insulation materials and accessories as manufactured by Owens-Corning Fiberglas Corporation, Johns-Manville, Certaineed Saint-Gobain, Armstrong, and Knauf Fiber Glass.

1.05 WORKMANSHIP

- A. After completion of tests and final approval, clean all piping apparatus and equipment to be covered.
- B. Where methods are not specified herein, install insulation in accordance with manufacturer's instructions and methods, using competent, experienced workmen.
- C. Apply pipe covering without voids, without the use of damaged section, or without short pieces where full length would fit.
- D. Apply insulation without sagging. Any damages to the insulation caused by application of insulation shall be repaired without cost to the Owner.
- E. Insulation shall be properly terminated and sealed at ends.

PART 2 – PRODUCTS

2.01 DOMESTIC HOT WATER SUPPLY PIPING

- A. Cover piping with molded glass fiber meeting requirements of ASTM C-547, Class 1 with factory ASJ jacket with self sealing lap, with a K factor of 0.24 at 100°F. 1" thick through 4" pipe, 1-1/2" thick 5" and larger pipe. Fasten with galvanized flare type staples on 18" centers.
- B. Terminate covering with plastic material, troweled on a bevel, and finish with 10 x 20 glass mesh at each side of flanges or unions, leaving them uncovered. Finish with Sealfas 30-36.
- C. Insulate fittings and valves with hydraulic setting cement to thickness equal to insulation. Apply 10 x 20 glass mesh, and finish with Sealfas 30-36. Use of Zeston fitting jackets acceptable.

2.02 DOMESTIC COLD WATER PIPING

- A. Cover piping with molded glass fiber meeting requirements of ASTM C-547, Class 1, factory ASJ jacket with self-sealing lap, with a K factor of 0.24 at 75°F. 1/2" thick through 1" pipe, 3/4" thick 1-1/4" through 2" pipe, 1" thick for 1-1/2" pipe and larger.
- B. Insulate fittings, valves and flanges with hydraulic setting cement to thickness equal to insulation. Apply 10 x 20 glass mesh and vapor seal with Sealfas 30-36. Use of Zeston fitting jackets acceptable.
- C. Seal open ends of pipe insulation with vapor barrier adhesive at all joints, flanges, valves and fittings.

PART 3 - EXECUTION

3.01 PROTECTION AND CLEANING

- A. Protect mechanical equipment and piping from dropping of material.
- B. Leave area in clean condition.

3.02 INSTALLATION

- A. Insulation shall be installed by a trained, certified, experienced, professional insulation installer.

End of Section A15250

SECTION A15400
PLUMBING SYSTEMS

PART 1 - GENERAL

1.01 RELATED SECTIONS OF THIS DIVISION

- A15010 - Basic Plumbing General Requirements
- A15050 - Basic Plumbing Materials and Methods
- A15250 - Plumbing Systems Insulation

1.02 WORK INCLUDED IN THIS SECTION

- 1.03 Kind and Quality of Materials
 - 2.01 Pipe and Fitting Materials
 - 2.02 Valves
 - 2.03 Plumbing Fixtures
 - 3.01 Valving
 - 3.02 Sanitary Drain and Vent System Installation
 - 3.03 Plenum Spaces
 - 3.04 Water Supply System Installation
 - 3.05 Protection of Finished Work

1.03 KIND AND QUALITY OF MATERIALS

- A. Materials, appliances, and fixtures to be new, of best quality and grade, in strict accordance with specification requirements.

PART 2 - PRODUCTS

2.01 PIPE AND FITTING MATERIALS

- A. Pipe and pipe fittings shall conform to the latest editions of ASTM, AWWA or CISPI specifications as listed in this Specification. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Pipe Institute.
- B. Sanitary Drains and Vent:
 - 1. Inside of the Building:
 - a. Above Ground Floor: All drains 1-1/2" and less, type DWV, Type M, ASTM B88 copper tube with cast bronze drainage pattern fittings. 2" and over, no-hub pipe and fitting conforming to CISPI 301 with couplings conforming to CISPI 310 manufactured in USA or PVC, Schedule 40, ASTM D-2665;
- C. Water Pipe and Fittings:
 - 1. Above Ground Floor (Inside): Copper tube type "L" hard drawn temper, with wrought copper sweat fittings WW-T-799.

2.02 VALVES

- A. Domestic water valves for 1/2" to 2" size shall be full port two-piece ball valves with bronze hard chrome plate ball, thread or soldered ends, Milwaukee Model BA-155, Watts Model B-6080, Nibco 585-70.

- B. Reduced Pressure Backflow Preventer RPBP-1: Watts ¾" 909-QT-S.

2.03 PLUMBING FIXTURES

- A. General: In every case, fixtures must conform to general requirements given below and to specified requirements for each type. Waste and supplies, unless otherwise specified or required, shall be turned back into walls as high as possible under fixture. Piping shall be free from cross connections and of such design that back siphonage is impossible.
- B. Enameled Ware: Fabricated of best quality cast iron of necessary thickness to form fixtures of the best grade complying with Federal Specification WW-P-541b.
- C. All fixtures shall be so designed and constructed that all parts are accessible for repairs when fixtures are in place. Manufacturer's trademark or name located so that it will not be noticeable.
- D. Faucets, traps, exposed fittings, and trimming shall be chromium plated over nickel plating, unless otherwise specified.
- E. Fixtures as manufactured by the following list of manufacturers will be acceptable if they are of the same type, quality, and design and are approved by the Architect and Engineer.
1. Faucets:
 - a. Symmons
 - b. Kohler
 2. Stops, Supplies, Traps:
 - a. McGuire
 - b. Brasscraft
 - c. Keeney Mfg. Co.
 - d. Kohler
 - e. Zurn
 3. Sinks:
 - a. Elkay
 - b. Just
 - c. Kohler
- F. Wall supports secured to hollow tile walls with "Ankyra" or toggle bolts, to concrete or masonry with bolts and iron and lead expansion shields; wood plugs are not acceptable. Caulk around all plumbing fixtures.
- G. Submit cuts and descriptions of all fixtures to Architect for approval.
- H. ADA Fixture Installations: All ADA labeled fixture installations shall conform to the requirements of the Americans with Disabilities Act (ADA), State and Local Accessibility Codes, Architectural Details.
- I. Fixtures:
- Sink S-1 (ADA Compliant):
- Fixture:* Elkay LRAD-2219
- Material:* Stainless Steel
- Number of Compartments:* 1
- Sink Compartment Depth:* 6 inches
- Number of Faucet Holes:* 4
- Faucet:* Kohler Triton K-7761-K-CP/K-16012-4-CP.
- Trap:* Cast brass, chrome plated P-trap
- Stops and Supplies:* McGuire chrome angle stop and tube supplies.

Disposer: Insinkerator Badger I with cord and plug.

PART 3 - EXECUTION

3.01 VALVING

- A. Fixtures: Each individual fixture or piece of equipment shall have an independent shut-off valve adjacent to fixture in addition to the required branch shut-off valve. Where supplies are installed in walls, shut-off valves shall be concealed and an access panel shall be provided.
- B. Branches: Valve shut-off full size of branch for each branch takeoff to supply stack or fixture group.
- C. Drains: Provide valved drains at low points of systems as required or directed. All piping shall be arranged to be drained through valved drains.

3.02 SANITARY DRAIN AND VENT SYSTEM INSTALLATION

- A. Drains: Extend drain pipe to all points according to pitch and elevation shown. Provide traps, heads, and all other fittings as required. Make changes in directions of pipe with Y's and 1/8 and 1/16 bends.
- B. Soil, Waste, and Vent: Install all soil, waste, and vent stacks as shown on the drawings. Support substantially in place with approved pipe clamps and supports, along with necessary supports for horizontal branches. Provide, where necessary, the adapter type fitting for connection between steel waste and cast iron soil pipe.
- C. Traps:
 - 1. Above Ground Floors: Provide for fixtures for all purposes where traps are required, unless otherwise so specified, cast brass fittings and pipe or approved cast brass traps with threaded cleanout screw.
- D. Vent Pipe: Shall be of diameter shown or required by Plumbing Code.

3.03 PLENUM SPACES

- A. Plastic piping shall not be installed in air plenum spaces.

3.04 WATER SUPPLY SYSTEM INSTALLATION

- A. Installation of Piping:
 - 1. All pipes and tubes shall be installed to permit expansion and contraction and without strain on jointing.
 - 2. Pipes shall be adequately supported at intervals and shall be installed straight and plumb without sags, kinks, or reduced deformed bends.
 - 3. Make test of all water piping before building is plastered and allow to stand overnight. Inspect along all lines for leaks and dripping and tighten up immediately or replace as required.
 - 4. Piping shall not be installed in exterior walls. All piping shall be rigidly supported.

3.05 PROTECTION OF FINISHED WORK

- A. Repair, replace, and pay for breakage of glass, patching, and repairing of all damage to finished work caused by this section of the work.

End of Section A15400

SECTION B15010

BASIC HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

Applicable requirements of instruction to bidders, conditions of contract, and of Sections listed under related Sections of this Division apply to all work specified in this Division B15000.

1.02 RELATED SECTIONS OF THIS DIVISION

B15010-Basic HVAC General Requirement
B15050-Basic HVAC Materials and Methods
B15250-HVAC Systems Insulation
B15500-HVAC Basic Piping Requirements
B15750-Mechanical Heat Transfer Equipment
B15880-Air Distribution
B15950-Automatic Temperature Control Work
B15990-Testing, Adjusting, and Balancing

1.03 RELATED WORK OF OTHER SECTIONS OR DIVISIONS

1010 - Summary of Work
1020 - Allowances
1045 - Cutting and Patching
1100 - Alternative Bids
1300 - Submittals
1500 - Temporary Facilities and Control
1522 - Temporary Enclosure
1700 - Contract Close-out
1710 - Cleaning
9900 - Painting
A15000 - Plumbing
B15990 - Testing, Adjusting, and Balancing
16000 - Electrical

1.04 WORK INCLUDED IN THIS SECTION

3.01 Codes and Permits
3.02 Interpretation of Specifications, Drawings, and Associated Work
3.03 Visiting the Premises
3.04 Shop Drawings
3.05 Dimensions and Locations
3.06 Coordination and Cooperation
3.07 Substitution of Equipment and Materials
3.08 Record Drawings
3.09 Asbestos and Hazardous Waste Handling
3.10 Manual and Instructions
3.11 Warranties
3.12 Alternative Bids

1.05 GENERAL SCOPE

Provide a complete heating and air conditioning system in the building in accordance with the Bid Documents. Provide competent superintendent, or foreman, at the job site.

1.06 DESIGN CONDITIONS

A. Outside Conditions:

1. Winter: -15°F
2. Summer: 89°F, D.B.; 75°F, W.B.

B. Inside Conditions:

1. Winter: Minimum temperatures are all in accordance with requirements of Chapter ILHR 64, Wisconsin Administrative Code.
2. Summer: 75°F to 78°F, 50% Relative Humidity

C. Water Temperatures:

1. Hot water supply shall be a maximum of 210°F at -15°F outside.
2. Chilled water supply shall be 45°F.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.01 CODES AND PERMITS

Comply with codes, laws, and ordinances in force at the building. Secure and pay for permits and inspection fees required for fulfilling requirements of these specifications.

3.02 INTERPRETATION OF SPECIFICATIONS, DRAWINGS, AND ASSOCIATED WORK

- A. This Contractor shall read the entire specification including Instruction to Bidder, General Conditions and Special Conditions, and Division 1, all of which are applicable to this work and shall thoroughly examine all the project plans as he will be required to do all of the work belonging to this branch of work whether or not specifically mentioned herein, or indicated or shown on the Heating, Ventilating, and Air Conditioning plans.
- B. Successful bidder will not be allowed any extra compensation by reason of any matter or thing concerning which such bidder might have informed himself prior to the bid opening. It shall be understood that the act of submitting a bid by the Contractor carries with it the agreement to all items and conditions referred or indicated or implied on the drawings and the specifications and no consideration will be granted for any alleged misunderstanding of materials to be furnished or work to be done.

- C. Any conflict between the contract drawings and specifications or the Architectural, Plumbing, and Electrical Drawings and the Mechanical Drawings, or between the Architectural, Plumbing, and Electrical Specifications and the Mechanical Specifications shall be deemed to have been estimated the more expensive way of doing the work, unless the Contractor asks and receives a decision in writing as to which shall govern, prior to submitting his bid.
- D. The drawings indicate the general arrangement and approximate location of piping, ductwork, equipment, etc. Extreme accuracy is not guaranteed and field verification and coordination of all locations and dimensions of new and existing conditions and work is directed. When removing equipment, piping, ductwork, etc., contractor shall remove all supports and hangers associated with same.
- E. Do not scale from the drawings, if lengths are scaled for bidding the Contractor assumes the risks of accuracy.
- F. It shall be the Contractor's responsibility to notify other contractors to arrange clearances and access openings for all large equipment and to advise affected Contractors associated with this project of areas requiring coordination before any roughing-in is done, so associated work can be installed without interfering with installation of HVAC work.

3.03 VISITING THE PREMISES

- A. The Contractor, before submitting his bid on the work, must visit the project site and familiarize himself with all visible existing conditions.
- B. As a result of having visited the premises, the Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions.
- C. The submission of a bid will be considered an acknowledgment on the part of the bidder of his visitation to the site.
- D. This Contractor shall arrange and provide all necessary equipment required to rig, lift, or move equipment into final location.

3.04 SHOP DRAWINGS

- A. Submit specified number of copies of drawings (five minimum) with dimensions, capacities, and information as soon as available from manufacturers.
- B. This Contractor shall review all the shop drawings for complete compliance to the Bid Documents before submitting the drawings to the A/E. The Contractor's review shall verify the following:
 - 1. Equipment being submitted was specified.
 - 2. Quantities submitted are correct.
 - 3. Physical sizes, unit access, service clearances, and capacities are as specified.
 - 4. Electrical characteristics have been checked with the Electrical Contractor, or verified at the site.
 - 5. Equipment to be shipped assembled or as required to fit into final location.

Any deviations from the drawings, or the specification, shall be pointed out and provided with an explanation with the submittal.

- C. The Contractor shall stamp the shop drawings with his own Review for Approval stamp, or submit a separate statement indicating that the enclosed shop drawings have been reviewed in accordance with the specifications. The shop drawings shall not be reviewed without the Contractor's review statement.
- D. Final review of the drawings by the A/E or his representative shall not relieve the Contractor from the responsibility of complying with the requirements of the drawings and specifications.

3.05 DIMENSIONS AND LOCATIONS

- A. Verify measurements at the building, check levels, and grades, and be responsible for grading, fitting, joining, or adjusting of work to adjoining work by other Contractors.
- B. Where work on existing systems is required, this Contractor shall verify all equipment locations and sizes before ordering any new materials.
- C. Before the work is installed, the A/E reserves the right to slightly change location of piping, radiation, ducts, equipment, etc., without additional pay to Contractor.
- D. The drawings indicate the general arrangement and approximate location of piping, ductwork, equipment, etc. Extreme accuracy is not guaranteed and field verification and coordination of all locations and dimensions of new and existing conditions of work is the responsibility of this Contractor.

3.06 COORDINATION AND COOPERATION

- A. Coordinate this work with other Contractors, because no Contractor has exclusive right-of-way in installing his work.
- B. Make arrangements with other Contractors for framing, openings, spacing, chases, pipe runs, duct locations, ceiling heights, etc.

3.07 SUBSTITUTION OF EQUIPMENT AND MATERIALS

The design of the HVAC systems are based upon the manufacturer listed in the schedules. Where any other equipment either listed in the specification or substituted, is used, this Contractor will be responsible for any changes required to the system or to the building due to physical limitations of the equipment, and he shall pay for all structural, mechanical, and electrical changes required by the equipment. This Contractor shall inform the Owner, A/E and all Contractors, in writing within five (5) days of award of contract, of any changes before they begin their respective work. No equipment shall be ordered prior to final review of shop drawings from the A/E. This Contractor shall bear all financial costs for rejected equipment ordered prior to final review of shop drawings from the A/E. **Submittal of manufacturers not listed in specification sections or in schedules as "equal" must be approved in writing prior to bid day.**

3.08 RECORD DRAWINGS

Record drawings shall be kept daily, noting all changes, and available upon demand. No progress payments will be approved unless record drawings are shown to be up-to-date.

3.09 ASBESTOS AND HAZARDOUS WASTE HANDLING

- A. In the event that this Contractor finds that this work requires the demolition, removal, or disposal of any asbestos or other hazardous waste, he shall halt work in the affected areas and inform the Owner of all conditions.
- B. The Owner shall test for asbestos and shall remove all hazardous wastes as defined by the Environmental Protection Agency.
- C. The Owner shall inform the Contractor when he may proceed with the work.

3.10 MANUAL AND INSTRUCTIONS

- A. Submit rough drafts of maintenance manual presenting valve charts and full details of construction, parts list, capacities, care, normal servicing and lubrication intervals, wiring diagrams, maintenance, and operation of mechanical equipment as shown on bid documents, scheduled, specified, and furnished under this Contract to A/E. Upon approval, furnish three (3) corrected copies bound in hard cover, three-ring binder with index and tabs indicating separations between equipment.
- B. Contractor shall instruct Owner's maintenance personnel in operations, lubrication points, and maintenance locations of equipment furnished under this Contract.
- C. All manufacturer's warranties shall be included in the manual. All extended warranties shall be included with their expiration date.

3.11 WARRANTIES

- A. This Contractor shall warrant all work, materials, and apparatus installed under this Contract, for one (1) year from the completion and acceptance of the entire system, and must keep same in repair for said period unless such defects are clearly the result of bad management after apparatus is out of his control.
- B. The one (1) year warranty period for equipment and materials shall begin after the entire system has been completed and accepted. It shall not start from the date of delivery, installation, or date of usage of equipment as required under "Temporary Heating". If any portion of the system is accepted by the Owner for his use prior to total completion, then the warranty period for only that portion will begin.

3.12 ALTERNATIVE BIDS –

END OF SECTION

SECTION B15050

BASIC HVAC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 DESCRIPTION

Applicable basic requirements of all HVAC work and methods described in this Section apply to all Sections listed in this Division B15000.

1.02 RELATED WORK

B15010 - Basic HVAC General Requirements

1.03 WORK INCLUDED IN THIS SECTION

- 3.01 Sleeves, Openings, Cutting, Patching, and Drilling
- 3.02 Suspended Ceiling Removal
- 3.03 Curbs and Bases
- 3.04 Painting and Finishes
- 3.05 Plumbing
- 3.06 Electrical
- 3.07 Lubrication
- 3.08 Identification
- 3.09 Architectural Access Panels
- 3.10 Vibration and Noise Control
- 3.11 Temporary Heating
- 3.12 Tests
- 3.13 Explosion Resistant Locations
- 3.14 Codes and Standards

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.01 SLEEVES, OPENINGS, CUTTING, PATCHING, AND DRILLING

A. General:

1. This Contractor shall provide and patch all duct and pipe openings in the existing building unless this work is specifically mentioned to be done by another Contractor. This Contractor shall provide required lintels.
2. This Contractor shall provide all openings for piping in new construction.
3. General Contractor will provide and patch all duct openings required in new construction. This Contractor will inform the General Contractor of all duct opening sizes and locations in walls, ceilings, roof, and partitions. Make arrangements with various other Contractors for all special sleeves, framing, spacing, and chases.

4. This Contractor shall cut duct openings, if sizes and locations were not provided to the General Contractor within 48 hours after request for this information, and if construction proceeds without openings. Obtain A/E approval before cutting or drilling any steel, concrete, or masonry, and repair any damage to his satisfaction. No chopping or breaking out is permitted. This Contractor shall pay for repair of any unnecessary damage.
5. This Contractor shall patch all openings remaining after ducts and pipes have been removed under demolition work. Finished conditions shall be not less than existing conditions.

B. Penetrations:

1. Wherever pipes or ducts penetrate smoke partitions or fire rated floors or walls, fill opening around pipes or ducts with U.S.G. Thermofiber Felt and Firecode Gypsum Cement, Dow Corning Fire Stop Sealant, or equivalent material, equal to the rating of the assembly penetrated.
2. On all ducts passing through walls, floor, and ceilings exposed to occupied spaces provide painted galvanized steel metal escutcheons or angles with mitered corners on both sides of wall having outside dimensions to cover wall opening and inside dimensions to fit duct. Securely fasten in place to floor, walls, and ceilings.
3. Wherever ducts pass through roofs from packaged rooftop units or other roof openings, the annular roof openings should be packed with glass fiber and sealed on both sides with a nonhardening material such as "Tremco" acoustical sealant. The annular roof openings shall be cleanly cut and not over 3/8" oversize.
4. Furnish each duct opening in walls, floors, and ceilings having outside dimension 1" larger than outside dimension of uninsulated ductwork, unless the wall or floor is a fire wall, in which case, only the duct shall penetrate.
5. Provide steel pipe sleeves and caulking as indicated in Section B15500.
6. Provide 2" high angle iron frames around each duct opening through floors of equipment rooms located above the basement floor, and caulk so no water leakage can occur between frames and floor.

3.02 SUSPENDED CEILING REMOVAL

This Contractor to remove all suspended ceilings required to complete work as shown on Bid Documents in existing buildings, store in area as directed by Owner, and reinstall unless this work is specifically mentioned to be done by another Contractor. Any damaged ceiling tiles or supports shall be replaced by this Contractor to exactly match the existing.

3.03 CURBS AND BASES

- A. Provide concrete bases, footings, piers, platforms, curbs, pipe frames, steel grillage, etc., for all equipment as shown, or as required, unless otherwise noted on the Bid Documents. Be responsible for location, size, and any changes required by substitution of equipment.

3.04 PAINTING AND FINISHES

- A. Painting will generally be done by others. Check painting specification.
- B. The following shall be painted by this Contractor of colors selected:
 - 1. Indoor piping exposed to occupied areas.
 - 2. Uninsulated and exposed hangers in mechanical equipment rooms to match existing.
 - 3. Insulated piping and hangers exposed in mechanical equipment rooms to match existing.
 - 4. Structural iron provided by this Contractor. Prime plus two (2) coats.
 - 5. Wood surfaces provided by this Contractor to be primed and covered with two (2) finish coats.
 - 6. Any equipment which was not furnished with a factory finish. Prime plus two (2) coats.
 - 7. Any damaged or rusted surfaces where an existing finish has been destroyed.
- C. All surfaces shall be clean before painting. They shall be wire brushed free of rust and scale and then primed. All metal surfaces shall be adequately covered with two applications of rust inhibiting, zinc rich coating, of colors selected.

3.05 PLUMBING

- A. The Heating Contractor shall locate final drain and cold water supply requirements for the Plumbing Contractor.
- B. The Plumbing Contractor shall provide the following:
 - 1. Floor drains.
 - 2. Hub drains.
 - 3. Site drains.
 - 4. Cold water supply terminated near requirements.
- C. The Heating Contractor shall provide the following:
 - 1. Drain piping to drains. Install all cooling coil drain pans at sufficient height to properly drain through water traps.
 - 2. Final cold water supply connections.

3.06 ELECTRICAL

- A. All polyphase AC motors from 1 to 125 horsepower shall be manufactured and tested in accordance with NEMA MG1-12.53a standards for high efficiency motors. All motors shall meet as a minimum appropriate local utility rebate program guidelines. Provide motors with current characteristics verified by the Electrical Contractor. Notify the A/E of any discrepancies before ordering motors and controls.

- B. Provide starters and disconnects as described or shown on drawings and motor starter schedule. Starters shall be Square D. Starters and push button stations shall be furnished by only one of the above manufacturers. Equipment manufacturers and subcontractors shall verify the particular brand with the Prime Contractor. All integral disconnect switches shall be fused type, and shall contain auxiliary contacts to disconnect control circuits entering the starters. Starters for 208 volts, and above, shall have 115 volt control circuits and transformer. Three phase starters shall be provided with three overloads. All pilot lights shall be "Push to Test" type. Coordinate starter types, required relays, and interlocks with control specifications.
- C. This Contractor shall label all starters and disconnects indicating each piece of equipment being served.
- D. All disconnect switches furnished with the unit as factory furnished, or factory installed, shall be furnished with fuse clips.
- E. This Contractor shall consult the Electrical Contractor for the proper sized fuses to be provided for all disconnects and starters by this Contract.
- F. This Contractor shall turn over all individually mounted disconnects and starters furnished under this Contract to the Electrical Contractor for installation by him.
- G. The following line voltage wiring shall be done by the Electrical Contractor:
 - 1. To all individually mounted starters.
 - 2. To HVAC factory mounted control panels.
 - 3. To HVAC factory mounted disconnect switches.
 - 4. To motor control centers.
 - 5. From starters to motors.
 - 6. To electric heating equipment.
- H. The following equipment requiring line, or low-voltage, wiring shall be done by the Heating Contractor:
 - 1. All packaged electronic variable air volume control system wiring. Including wiring to interface with existing automatic hot water zone valves in hot water radiation and all wiring to unit control panel near unit.
- I. The following equipment requiring line, or low voltage, wiring shall be done by the Controls Contractor:
 - 1. DDC Electric thermostats.
 - 2. Pressure electric switches.
 - 3. Zone switches.

4. Starter interlocks.
 5. Smoke dampers.
 6. Power source sufficient for all electric/electronic or electric control and wiring to all controls. Coordinate with Electrical Consultant and Contractor.
 7. Automatic dampers.
- J. All wiring shall be installed in conduit in accordance with Electrical Specifications or Codes governing wiring in plenum ceilings. Concealed low voltage wiring shall also be installed in conduit if required by the Electrical Specifications or Codes. No exposed wiring shall be installed in finished areas. Exposed wiring shall be installed in wire mold or conduit in unfinished areas in inconspicuous manner. Install all wiring and wiring devices neatly parallel or perpendicular to building lines.
- K. Furnish wiring diagrams to Electrical Contractor for all electrical equipment furnished under this Contract. Each diagram must be in accordance with actual installations. Furnish complete sets of wiring diagrams for Owner's bound maintenance manual as described under "Manual and Instructions".
- L. Any changes in this Contract, after the bid opening, to the number and size of motors and starters due to substitution of equipment will become this Contractor's responsibility to inform and coordinate these changes with all affected Contractors.
- M. See Section B15050: Codes and Standards.
- N. Motor Control Center.
- 3.07 LUBRICATION
- A. All equipment must be checked and lubricated in accordance with manufacturer's instructions, before equipment is turned over to the Owner.
 - B. Lubrication points that are hard to get at shall have extended fittings to point of easy access; and shall be clearly marked.
- 3.08 IDENTIFICATION
- A. Piping shall be identified with clean-cut stenciled letters at least 1" high that shall indicate content of pipe. Apply arrow marker stencils, similar to labels, with arrows pointing in direction of flow. Provide stencils at every point of pipe entry or exit through wall, at 50' intervals on straight run of pipe and at each main riser.
 - B. Equipment: Provide laminated plastic plates with black face and white center of minimum size 3-1/2" x 1-1/2" x 1/8" nominal thickness, engraved with 1/4" high lettering. Use 1" lettering for major equipment. Fasten nameplates securely with stainless steel fasteners in conspicuous place. Where name- plates can not be mounted on cool surface, provide stainless steel standoffs. Identify equipment type and number (e.g. Pump No. 2) and service for areas or zones of building served e.g. south zone chilled water primary. All starters shall be similarly identified.

- C. All major equipment identification shall also include the date of start-up.
- D. Valve Tags: Provide Seton Name Plate Company, Style No. 2961 plastic color coded valve tags in accordance with ASA with the abbreviation "Heating" or "Cooling" above the numbers for all valves in this contract. Provide printed valve identification charts showing number, manufacturer, size, type, location, normal position (open or closed), and purpose of each valve including equipment it serves. Furnish three (3) copies of valve charts to the Owner, enclosed in a rigid vinyl covered three-ring binder. All charts must be typewritten. Fasten valve tags to valve handles with 4-1/2", size #16, Seton brass chains.
- E. Ducts: Stencil all ducts at air handling units in accordance with areas served. Letters shall be at least 1" high and in conspicuous locations.
- F. All insulation shall be identified as "ASBESTOS FREE" with direction arrows and termination reference points.

3.09 ARCHITECTURAL ACCESS PANELS

- A. Furnish 24" by 24" (larger where required) Milcor Type "K", or Cesco, steel access panels for installation in plaster or dry walls and ceilings.
- B. Furnish 24" by 24" (larger where required) Milcor Type "M", or Cesco, steel access panels for installation in masonry, brick, stone, tile, and wallboard walls and ceiling.
- C. Locate access panels at all concealed devices requiring accessibility for operation or maintenance. Notify Plastering, Drywall and Acoustical Tile Contractor of proper locations for access panels. Mark the location of all dampers located above acoustical tile ceilings as inconspicuous as possible.
- D. Provide fire rated access panels in all masonry shafts or ductwork requiring fire rated enclosures.
- E. Furnish access panels to proper Contractors for their accurate installation.

3.10 VIBRATION AND NOISE CONTROL

- A. The prime Contractor of this Contract shall provide Peabody Kinetics, Korfund, or Mason Industries vibration isolators and bases for all equipment furnished under this contract with minimum isolation as required for the installation.
- B. Floor Mounted Equipment: All floor-mounted centrifugal fans, pumps, air handling units, reciprocating equipment, etc., shall be mounted on bases and isolators as indicated on the drawings.
- C. Suspended Equipment: All suspended equipment shall be suspended from isolators as indicated on the drawings.
- D. Fan and Motor Bases: All steel bases shall be rectangular in shape, consisting of wide flange steel frames, with the motor located within the rectangular shape. All bases shall incorporate height saving devices.
- E. Pipe Hangers: See Pipe, Hangers, and Supports in Section B15500.

- F. Springs: All springs shall employ unhoused, stable, free-standing springs with a horizontal to vertical spring stiffness ratio of approximately one. Snubbers to limit extreme horizontal deflections during starts and stops shall be used. All spring mounts shall be provided with ribbed or waffled neoprene pads at least 1/4" thick to prevent transmission of high frequency vibrations to the building. Pads shall be loaded approximately 50 psi, and if bolts are necessary, they shall be isolated from mounts by soft neoprene sleeves at least 1/8" thick.
- G. Penetration: Wherever ducts and pipes pass through critical sound partition walls and floors, the annular openings should be packed with glass fiber and sealed on both sides with a non-hardening material such as "Tremco" acoustical sealant. The annular openings shall be cleanly cut and not over 3/8" wide.
- H. General Vibration Isolation Details:
 - 1. No rigid connections shall be made between spring mounted equipment and the structure.
 - 2. All fans shall be connected to ducts with flexible sleeves at least 6" wide and very slack.
 - 3. Piping connections to spring-mounted equipment shall be installed with spring type hangers at least three pipe hangers away from the unit.
 - 4. Electrical connections to equipment must be flexible and as slack as possible.

3.11 TEMPORARY HEATING

- A. Additional provisions for temporary heating are specified in Division 1.
- B. Central fan system shall not be used until the systems have been modified for temporary heating and until permission is granted by the A/E.
- C. This Contractor shall install all temporary located filters. Provide large return air openings in each return plenum with all supports and bracing as required to maintain these openings. Temporary air filter racks and 2" throwaway filters shall be installed in the openings and maintained by this Contractor, replacing dirty air filters with clean air filters as required during temporary heating period.
- D. The supply fans shall operate while the return air fan shall not operate. The existing return ducts shall be blocked off so that all return air must pass through the temporary air filters. The return air from all rooms, and floors, shall flow to the central fan systems using open walls, doorways, stair wells, elevator shafts, and duct shafts. This Contractor shall inform the General Contractor of opening sizes required, and shall maintain all sizes to accomplish this circulation. All doors shall not be installed until after the temporary heating period.
- E. This Contractor shall, at the end of temporary heating requirement, remove all temporary air filters, close up the temporary return air openings, open up all return air ducts and install all permanently located air filters.

3.12 TESTS

- A. Make all tests and trials of the system. Fill and vent all water systems. Prepare systems for testing and assist the Testing Agency. See Section B15990: Testing, Adjusting, and Balancing.

- B. Pressure Test: Apply a hydrostatic test to each steam or water system. Provide pressure at least 125 pounds per square inch, or 20% above working pressure, whichever is greater, and maintain this pressure for four (4) hours.

3.13 CODES AND STANDARDS

Each factory fabricated product listed in this specification shall be built, rated, and tested in conformance with applicable Codes and Standards as published in Chapter 48 of the ASHRAE 2000 HANDBOOK: HVAC SYSTEMS AND EQUIPMENT.

END OF SECTION

SECTION B15250

HVAC SYSTEMS INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

Provide all HVAC insulation for piping, tanks, breeching, stacks, chillers, ductwork, plenums, and any additional equipment as indicated on the BID DOCUMENTS.

1.02 RELATED WORK

B15010 - Basic HVAC General Requirements

B15050 - Basic HVAC Materials and Methods

1.03 INSULATION WORK INCLUDED IN THIS SECTION

2.01 Hot Water Piping

2.02 Thermal Insulation (Rigid)

2.03 Thermal Insulation (Flexible)

2.04 Acoustical Insulation

3.01 General Insulation Applications

1.04 GENERAL SCOPE

- A. All insulation thickness shall meet **the minimum requirements as specified in Chapter ILHR 63, Wisconsin Administrative Code**, unless herein specified to be greater.
- B. All pipe covering, jackets, duct insulation, vapor barriers, adhesives, and mastics located in **sheet metal or ceiling air transfer plenums** shall have a flame spread classification of 25 or less, and a smoke developed classification of 50 or less. All pipe covering, jackets, etc., located in all other areas of the building shall have a flame spread classification of 25 or less, and a smoke developed classification of 150 or less.
- C. See Section B15050: Codes and Standards.

PART 2 - PRODUCTS

2.01 HOT WATER PIPING

- A. Cover piping with molded glass fiber (4 lb. density) with K-factor of 0.24 at 75°F. or molded urethane (3 lb. density) with factory applied white fire retardant jacket with self-sealing lap. Fasten with galvanized flare-type staples on 4" centers.
- B. Insulate fittings with premolded fittings and valves with oversized insulation on pipes through 2". Apply 10 x 20 glass mesh and finish with Sealfas 30-36.
- C. Insulate fittings, valves, and flanges on pipes 2-1/2" and up with molded fittings, or mitered segments of insulation covered with 1/4" coat of hard setting cement. Apply 10 x 20 glass mesh and finish with coat of Sealfas 30-36.

2.02 THERMAL INSULATION (RIGID)

- A. Insulation shall be minimum 4 lb. density with a compressive strength of 200 psf at 10% deformation, K factor of 0.24 at 75°F. and factory applied .0025" thick aluminum facing.
- B. Apply 2" thick to blanked-off louvers, vent ducts from automatic damper to relief hood, combustion air ducts from intake to automatic damper, exhaust ducts from automatic dampers to discharge louvers, or roof hoods, outside air ducts, ductwork located outdoors, and to mixed outside and return air ducts.
- C. Apply 1-1/2" thick to exposed air conditioned supply air ducts. Apply greater thickness as required to be flush with standing seams.
- D. Apply 1½" thick on all hot water coil casing at each VAV device that has a hot water coil as part of VAV device.
- E. Fasten insulation with mechanical fasteners on 18" centers with a minimum of two rows of fasteners on all sides of ducts. Seal all joints and punctures with vapor barrier mastic. Imbed 4" wide 10 x 20 glass mesh at all joints to reinforce mastic.
- F. On all exposed ductwork apply brush coat of Sealfas 30-35, imbed 10 x 20 glass mesh while still wet, smooth out wrinkles and apply final brush coat.

2.03 THERMAL INSULATION (FLEXIBLE)

- A. Insulation shall be 1 lb. density with a K factor of 0.29 at 75°F and a factory applied reinforced foil vapor barrier jacket.
- B. Apply 1-1/2" thick to concealed supply ductwork.
- C. Adhere insulation to duct surfaces with 50% mastic coverage. Use mechanical fasteners on 18" centers on side and bottom sections when width exceeds 24". Butt all edges, lap all joints with 2" facing overlap and seal all joints and punctures with vapor barrier mastic. Use tying cord to secure the insulation until adhesive sets.

2.04 ACOUSTICAL INSULATION

- A. Insulation shall be 1" thick Johns-Manville LinaCoustic or Owens Corning Aeroflex duct lining, minimum 1-1/2 lb. density with a K factor of 0.23 at 75°F. mean temperature, and shall meet erosion test method described in U.L. Pub-181. Apply to the inside surfaces of the following equipment:
 - 1. The entire interior of every return-exhaust fan casing.
 - 2. The entire interior of every central fan system casing.
 - 3. Supply and return plenums and also 25' of supply and return ductwork from every air handling supply unit; include at least one 90° elbow in the above length, or add its equivalent to the above length.
 - 4. Line 25' of exhaust-return duct to all exhaust-return fans; include at least one elbow in the above length, or add its equivalent length to the above length.

5. Line 25' of all exhaust ducts to exhaust fans and power roof ventilators; include at least one elbow in the above length, or add its equivalent length to the above length.
 6. Line all transfer ducts, and all ducts as noted on the drawings.
 7. Line all ductwork from variable air volume devices to air outlets.
 8. Do not line exhaust ducts connected to kitchen hoods, fume hoods, paint spray booths, welding booths, duct collectors, transformer vaults, and similar units.
- B. Apply to butted edges and to the inside of all ducts with 100% adhesive coverage and mechanical fasteners located on 12" centers and within 2" of butted edges. Apply heavy coat of mastic (CMC 17-477) and butt joints tight.
- C. Ducts sizes must be increased where sound insulation occurs to maintain duct sizes as indicated on drawings.

PART 3 – EXECUTION

3.01 GENERAL INSULATION APPLICATIONS

- A. Clean all piping, apparatus, and equipment to be covered, and insulate carefully without voids or the use of damaged section. Use full length pieces only.
- B. Insulate sections of equipment requiring periodic servicing with removable sheet metal casings filled with the same thickness of material as the adjoining insulation.
- C. Remove insulation if defects develop after insulating. After repair of defects, replace the insulation equal to original without cost to Owner.
- D. Install all duct insulation without sagging, and repair all tears and punctures without cost to Owner.
- E. No thermal insulation required on casings, plenums, or ducts that have an acoustical lining, or on ducts that terminate exposed to the room they serve.
- F. Do not cover equipment name plates with insulation.
- G. See Section B15050, paragraph 3.07, Identification.

END OF SECTION

SECTION B15500

HVAC BASIC PIPING REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

Provide all piping, valves, fittings, pipe hangers, supports, anchors, sway bracing, vibration dampeners, flexible joints, specialties, etc., as specified and as schematically shown on the BID DOCUMENTS.

1.02 RELATED WORK

B15010 - Basic HVAC General Requirement

B15050 - Basic HVAC Materials and Methods

1.03 WORK INCLUDED IN THIS SECTION

2.01 Pipe, Water, Fittings, and Valves

2.02 Pipe, Hangers, and Supports

2.03 Strainers

2.04 Thermometers (Stem)

2.05 Gauges

3.01 Pipe and Fitting Installation

3.02 Steam Systems

3.03 Water Systems

3.04 Venting Hot Water Systems

PART 2 – PRODUCTS

A. Fittings:

1. Steam Fittings: 2" and under, standard malleable or cast iron screwed, 2-1/2" and over, standard seamless steel long radius welding fittings.
2. Condensate Return Fittings: Extra heavy fittings.
3. Unions: 2" and under, 150 lb. standard malleable iron screwed, brass seat. Grinnell #463, or other approved.
4. Flanges: 2-1/2" and over, 150 lb. weld neck, flat faced flanges. All flange faces shall conform to valves specified.
5. Gasket: All sizes to be full faced 1/16" Cranite, or other approved.
6. Bolting: All bolting shall consist of heat treated alloy steel studs and nuts. Crane triplex or other approved, conforming to ASTM Specification A-193, Grades BC and B7 bolting.

B. Valves: All gate, globe, and check valves shall be Milwaukee Valve or Crane.

1. Gate Valves: 2" and under, 150 lb. brass, screwed with rising stem, Milwaukee #1151 or Crane #431UB. 2-1/2" and over, 125 lb. cast iron, flanged ends, with brass trim and rising stem, Milwaukee #F2885M or Crane 465-1/2. 6" and larger shall be equipped with 3/4" bypass piping.
2. Globe Valves: 2" and under, 200 lb. brass, screwed, with Nitra-hard plug-type disc, renewable body seat ring, and rising stem, Milwaukee #592A or Crane 212P. 2-1/2" and over, 125 lb. cast iron, flanged ends, with brass trim, Milwaukee #F2981M or Crane #351.
3. Check Valves: 2" and under, 200 lb. brass, screwed swing check, Milwaukee #508 or Crane #36. 2-1/2" and over, 125 lb. Ferro steel, flanged swing check valves, bronze trimmed with renewable seats, Milwaukee #F2974M or Crane #373.

2.02 PIPE, WATER, FITTINGS, AND VALVES

- A. Hot, Cold, Chilled, and Condenser Water Pipe: 4" and under, standard weight, continuous weld, ASTM A-53, Grade F. 5" thru 10", standard weight, ERW ASTM A-53, Grade B. 12" and up, .375" wall, ERW ASTM A-53, Grade B. All piping shall be provided with a factory applied protective coating.

B. Fittings:

1. Water System Fittings: 2" and under, standard malleable or cast iron screwed. 2-1/2" and over, standard seamless steel long radius welding fittings.
2. Unions: 2" and under, 150 lb. standard malleable iron screwed, brass seat, Grinnell #463, or other approved.
3. Flanges: 2-1/2" and over, 150 lb. weld neck flat faced flanges. All flange faces shall conform to valves specified.
4. Gasket: All sizes to be full faced 1/16" Cranite, or other approved.
5. Bolting: All bolting shall consist of heat treated alloy steel studs and nuts. Crane triplex or other approved, conforming to ASTM Specification A-193, Grades BC and B7 bolting.

- C. Valves: All gate, globe, and check valves shall be Milwaukee Valve or Crane. All valves shall be suitable for use when circulating antifreeze solution, cleaning solutions or cooling tower chemicals.

1. Gate Valves: 2" and under, 150 lb. brass, screwed with rising stem, Milwaukee #1151 or Crane 431UB. 2-1/2" and over, 125 lb. cast iron, flanged ends, with brass trim and rising stem, Milwaukee #F2885M or Crane #465-1/2.
2. Globe Valves: 2" and under, 200 lb. brass, screwed, with Nitra-hard plug-type disc, renewable body seat ring, and rising stem, Milwaukee #592A or Crane #212P. 2-1/2" and over, 125 lb. iron body flanged, Milwaukee #F2981 or Crane 351.

3. Check Valves (Spring Type): Check valves for all pump discharge lines shall be MUESSCO wafer type 101-AP ductile iron with bronze disc, stainless steel stem, stainless steel spring, spring loaded, silent type, 125 lb. ASA flanged.
4. Check Valves (Swing Type): 2" and under, 200 lb. brass, screwed swing check, Milwaukee #508 or Crane #36. 2-1/2" and above, 125 lb. Ferro steel, flanged swing check valves, bronze trimmed with renewable seats, Milwaukee #F2974M or Crane #373.
5. Stop or Balancing Valves: All valves indicated as "Stop or Balancing Valves" on the drawings shall be ball valves through 2", and butterfly-type for valves 2-1/2" and above.
 - a. 2" and under, 150 lb. cast bronze 2-piece ball valve with stainless steel ball, 350°F reinforced Teflon seals and packing, stainless steel lever handle with vinyl grip, Milwaukee #BA100 or Crane #9302.
 - b. 2-1/2" and above, 175 DeZurik, Crane #44 Quartermaster, Grinnell, Centerline, Keystone Fig. 212, or Milwaukee #ML123E iron body butterfly valves with 250°F double rubber seat, corrosion resistant bearings, #416 stainless steel shaft, aluminum bronze disc pinned to lever through 6" and an enclosed worm gear actuator on 2-1/2" and above. Valves for equipment isolation shall have lug style bodies and shall provide bubble tight shutoff at full rated pressure. Valves shall be installed with flat side of disc on higher static pressure side of the valve.
6. Flow Metering Stop Valves: All valves indicated as "Flow Metering Stop Valve" shall be flow set valve packages as manufactured by Flow Design, Inc. in sizes from 1/2" to 4" consisting of two (2) valves as follows:
 - a. Flow measuring valve (F), installed on entering side of equipment, shall consist of a 400 lb. rated ball valve with bronze body, plated ball, Teflon seats, vinyl grip handle, and integral venturi section with pressure - temperature taps.
 - b. Flow setting valve (S), installed on leaving side of equipment, shall consist of a 300 lb. rated bronze body butterfly valve assembly with stainless steel disc, viton seats, vinyl grip handle, memory stops, and integral pressure - temperature taps.
 - c. The above valves shall be installed in the following locations as shown on the drawings:
 - (1) Hot water coils
 - (2) Chilled water coils
 - (3) Secondary pipe loops
 - (4) Pumps
 - (5) Main loops and branches

2.03 PIPE, HANGERS, AND SUPPORTS

- A. Provide Grinnell, Fee Mason, or Elcen adjustable hangers, special floor pipe supports, spring hangers, saddles, anchors, clamps, rods, miscellaneous iron supports and appurtenances as required. Provide any miscellaneous iron for hanger supports that may be required in

addition to the building structure. All work shall conform to ASA Code B31.1 and MSS Standard Practice SP-58.

- B. Where pipes are supported from structural steel, use "C" clamps (Fig. 88) for pipes through 2". For pipes 2-1/2" and up, use beam clamps (Fig. 229), or welded attachment (Fig. 66).
- C. Where hangers are supported from existing beams, or concrete slabs of sufficient thickness, provide Phillips concrete fasteners, or expansion cases (Fig. 117).
- D. Suspend all steam and hot water mains thru 3" from clevis-type hangers (Fig. 260) with pipe covering saddles. Suspend all steam and hot water piping from 4" through 12" from clevis-type roller hangers (Fig. 181) with pipe covering saddles.
- E. Suspend all cold water, chilled water, and condenser water piping from clevis-type hangers (Fig. 260). At each chilled water hanger, provide an 18" long section of calcium silicate pipe covering, cover with a white fire retardant vapor barrier jacket and insert an insulation protection shield (Fig. 167) between the insulation and the hangers.
- F. Spacing of hangers shall not exceed the following schedule. This Contractor shall provide any additional steel members required to maintain the spacing. Provide hangers adjacent to concentrated loads such as valves, pumps, flanges, etc.

PIPE SIZE-IN.	HANGER SPACING-FT.	ROD SIZE-IN.
1	7	3/8
1-1/2	9	3/8
2	10	3/8
2-1/2	11	1/2
3	12	1/2
4	14	5/8
6	17	5/8

- G. Provide rods complete with adjusting and locking nuts.

2.04 STRAINERS, WATER

- A. Y-Type Strainers: 2" and under, 250 lb. iron body, screwed, Keckley Style A with 1/16" perforated monel screen, 2-1/2" and above, 250 lb, iron body, flanged, Keckley Style B, with a monel screen and the following perforation:

Through 4" size: 1/16"
5" and Up: 1/8"

2.05 THERMOMETERS (STEM)

- A. Provide Terice BX9 Series, adjustable angle, industrial type, red appearing mercury in glass thermometers, Duro, Ashcroft, Marshalltown, or Weiss manufactured to the following specifications:

Scale: 9" size with white background and black marking.

Case: Die cast aluminum and clear acrylic plastic lens.

Stem: Aluminum installed with minimum 2" extension into pipe.

Accuracy: Within 1% of range.

Wells: Brass with 2" extension for insulation.

B. Location: Each thermometer shall be placed so that a good sample of water is taken. Locate thermometers in accessible locations for close visual observations. All thermometers shall be adjusted so that they are easily read from the floor or nearest platform.

C. Line Designation	° F/Div.	Range (°F)
Low Pressure Steam	2	30 - 300
Chilled Water	1	0 - 100
Condensate	2	30 - 300
Hot Water	2	30 - 240

2.06 GAUGES

A. Provide Trerice 500X, Duro, Ashcroft, Marshalltown, or Weiss 6" diameter dial duragage precision pressure gauge with white face and black numbers.

B. Gauge to be provided with stainless steel movement, bronze socket, and tube, solid front enclosure and 1/4" isolating globe valve (200 lb.) fittings and gauge cocks.

C. Select gauges so that the normal operating pressure is at the midpoint of the scale.

D. Line Designation	PSI/Div.	Range (PSI)
Low Pressure Steam	0.5	0 - 60
Primary Pumps	1	0 - 160
Secondary Pumps	1	0 - 160
City Water	1	0 - 160
Expansion Tank	1	0 - 160

PART 3 - EXECUTION

3.01 PIPE AND FITTINGS INSTALLATION

A. Pipe welding shall comply with the provisions of the latest revision of the ASME Boiler and Pressure Vessel Code, and the ANSI Code for Pressure Piping B31.1, or such state or local requirements as may supplement codes mentioned above.

B. Each Manufacturer, or Contractor, shall be responsible for the quality of welding done by his organization, and shall repair or replace any work not in accordance with these specifications.

C. Maintain sizes and locations indicated with no changes to be made unless approved by the A/E. Follow the A/E's directions in locating the pipe runs before locating openings in floor slabs and walls.

- D. Welding is required on all piping located in building overhangs, underground piping, all piping 2-1/2" and over, and permitted on all, or part, of other piping in lieu of screwed joints.
- E. All stop and balancing valves shall be located for ease of accessibility. Consult the A/E about relocating valves that would be inaccessible if installed as shown.
- F. Pipe, valves, fittings, etc., shall be hydrostatically tested in accordance with ANSI Code for Pressure Piping B31.1.
- G. All welding fittings shall be as manufactured by Ladish, Tube Turn, or Midwest. Branch connections sized under 1/2 the main pipe diameter may be made with intersection welds with no projection of the small pipe into the larger pipe.
- H. Unions, Victaulic couplings and flanges shall be provided where valves, control equipment, etc., are installed in continuous runs of piping. Unions shall be provided in all screwed piping where required for disassembly, or for convenience in making repairs.
- I. All piping shall be cleaned out before installation by blowing out with compressed air, or by other approved method. Provide temporary plugs, or caps, for all open ends of pipe when work is not being carried on to completion.
- J. Welding of galvanized pipe or fittings will not be acceptable.
- K. Provide steel pipe sleeves with minimum wall thickness of 1/4" for all pipes passing through beams and walls of concrete, brick, tile, or masonry, and 22 gauge galvanized iron sleeves for pipes passing through other parts of construction. Provide steel pipe for all sleeves penetrating floors. Set sleeves 2" above floors and caulk so no water leakage can occur between sleeves and floors. Furnish each sleeve having inside diameter 1" larger than outside diameter of each uninsulated pipe and 1" larger than outside diameter of insulated piping, unless the wall or floor is a fire wall, in which case, only the pipe shall penetrate.

Wherever pipes penetrate sound barriers, smoke partitions, or fire rated floors or walls, fill opening around pipe with U.S.G. Thermofiber Felt and Firecode Gypsum Cement, Dow Corning Fire Stop Sealant, or equivalent material, equal to the rating of the assembly penetrated.

- L. On all pipes passing through floors, walls, and ceilings, provide chrome plated brass escutcheons of approved design and finish having outside diameter to cover sleeved openings and inside diameter to fit pipe. Securely fasten in place to floors, walls, and ceilings.
- M. Wherever copper, brass, or bronze piping systems are connected to steel or iron piping systems, this connection shall be made with dielectric isolators.

3.02 STEAM SYSTEMS

- A. Mains and returns to be graded down in direction of flow not less than 1" in 40'.
- B. Horizontal branch connections from mains to risers, and from risers to equipment, in which condensate travels in opposite direction to steam shall be graded not less than 1" in 5'.

- C. Where horizontal steam mains are reduced in size in the run, install eccentric fittings to prevent lodgment of water.
- D. Provide drip connections for pocketed sections of all steam piping to properly remove the condensate, whether or not shown on plans.
- E. Provide drip pockets at bottom of all risers and at drip connections to mains. All drip pockets shall be full size of pipe up to 4", and 4" for larger sizes. Provide 1" valved drain on all drip pockets. Provide a 1/2" test connection between trap and valve on discharge side of trap. Piping shall be arranged so that test connections may be used for a manual blow-off, or to test conditions on each side of trap. Provide strainer ahead of all traps.

3.03 WATER SYSTEMS

- A. Mains to be graded up in direction of flow, not less than 1" in 100', or run dead level where space is limited.
- B. Install 3/4" Crane #58 drain valves, with hose threads, removable cap, and disc material suitable for 210°F water, at bottom of all coils, radiation, and at all low points in the system on piping up to 4" size. Install 2" globe valves on all piping 5" and up unless shown differently on the drawings, and pipe 2" drains to nearest drain. Provide a cap on all drain lines above ceilings. Install air chambers and manual air vents at all high points of the system.

3.04 VENTING HOT WATER SYSTEMS

- A. After the system has been cleaned, close all air vents except the vent at the bottom of the Airtrol tank vent fitting and begin filling the system. Leave Airtrol tank vent fitting open until water runs freely from it, and then close tightly. Do not open this vent again until system has to be drained. Vent all heating coils, radiation, and high points of the system. Feed more water to the system to provide at least 4 pounds per square inch pressure at the highest point of the system.
- B. After the system has been completely filled, start all circulating pumps to circulate and dislodge small air bubbles. Stop all circulating pumps and heat water in the system up to at least 220°F, and start circulating pumps. Stop circulating pumps and again vent entire system.

END OF SECTION

SECTION B15750

MECHANICAL HEAT TRANSFER EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

Provide equipment required to transfer heat from the heating medium to areas requiring heating, or from the cooling medium to areas requiring cooling as shown on the BID DOCUMENTS.

1.02 RELATED WORK

B15010 - Basic HVAC General Requirements

B15050 - Basic HVAC Materials and Methods

1.03 WORK INCLUDED IN THIS SECTION

2.01 Coils, Hot Water

2.02 Pumps, Circulating

3.01 Installation, General

PART 2 - PRODUCTS

2.01 COILS, HOT WATER

A. Provide copper (0.024) tube with aluminum fin air heating coils of sizes, rows, and ARI certified capacities as shown on drawings, complete with vertical headers and horizontal tubes, or serpentine type coil, with flanged metal or sheet metal drive slip casings.

B. Coils shall be furnished with air handling units, or located in central fan systems or used as booster coils suspended from ceiling hangers. Connect to flow and return with automatic valves, balancing valves, manual air vents, and drains as shown or required.

2.02 PUMPS, CIRCULATING

A. Provide Bell & Gossett or TACO circulating pumps with capacities as indicated on the drawings in the following models:

1. Side suction, in-line
2. Side suction, in-line booster.

B. All pumps shall be cast iron, bronze, fitted for 175 psi working pressure and 225°F operating temperature. In-line booster pumps shall be designed for 125 psi working pressure. Pumps shall be back pullout design to allow for servicing without disturbing piping, motor or required shaft alignment.

C. Provide tapped and plugged openings for vents and drains and for suction and discharge gauge connections.

- D. Bearing assemblies shall be as follows:
1. Series 80 and 90 in-line pumps shall use NEMA JM frame motors with regreasable bearings
- E. Impeller shall be single or double suction enclosed type made of bronze, hydraulically and dynamically balanced, keyed and locked to a carbon steel shaft protected by a replaceable bronze shaft sleeve.
- F. Mechanical seal shall be single unbalanced type with Buna N/carbon rotating element and ceramic stationary seat.
- G. Base mounted coupled pumps shall be coupled with a Woods Sure-Flex spacer type or with extended hub to allow for pump servicing. Furnish with a coupling guard. In-line pumps shall be spring coupled.
- H. Motor shall meet NEMA specifications and shall be non-overloading over the entire pump curve. See Section B15050: Codes and Standards.
- I. Each pump and motor is to be provided with a nameplate giving the manufacturer's name, serial number of pump, capacity in GPM and head in feet at design condition, horsepower, voltage, frequency, speed and full load current.
- J. Contractor shall install the pumps in strict accordance with manufacturer's instructions to avoid any stress and misalignment. Mount base mounted pumps on concrete base and grout pump base after installation. Pumps shall be completely removable for servicing and replacement.
- K. Manufacturer to provide start-up service to verify proper wiring, rotation, base setting, alignment, lubrication and amperage draw. Service shall include capacity check of each pump, which is to be submitted directly to the Engineer indicating GPM, suction and discharge pressure and actual amperage draw. Manufacturer is to provide replacement of impellers or trimming of impellers to meet capacity requirements indicated on the plans at no additional cost to the owner.
- L. Provide one spare seal and casing gasket for each pump to owner.

PART 3 - EXECUTION

3.01 GENERAL, INSTALLATION

All installations shall be done in accordance with manufacturer's instructions and as shown on the drawings.

END OF SECTION

SECTION B15880

AIR DISTRIBUTION

PART 1 - GENERAL

1.01 DESCRIPTION

Provide ductwork, accessories, dampers, louvers, grilles, and all equipment related to air distribution and exhaust air ventilation as shown on the BID DOCUMENTS.

1.02 RELATED WORK

B15010 - Basic HVAC General Requirements

B15050 - Basic HVAC Materials and Methods

1.03 WORK INCLUDED IN THIS SECTION

2.01 Dampers, Volume

2.02 Dampers, Fire

2.03 Ductwork, Flexible

2.04 Inspection, Access, Doors

3.01 Installation, Equipment

3.02 Installation, Ductwork

1.04 DESIGN CONDITIONS

A. The entire sheet metal installation shall be fabricated of prime sheets of galvanized iron, and shall be installed in accordance with the latest editions of the HVAC DUCT CONSTRUCTION STANDARDS as prepared by SMACNA, INC., or as herein specified otherwise. The editions shall serve as a guide for minimum requirements of the installation except as herein specified otherwise. Install the ducts, risers, etc. as indicated on drawings making all necessary changes in cross sections, offsets, etc., whether or not the same is specifically indicated. If ducts cannot be run as shown on the drawings, this contractor is to install the ducts between required points by any path available, subject to the approval of the A/E.

B. All ductwork shall be constructed to the following minimum SMACNA pressure standards:

1. All supply, return, and exhaust ductwork, connected to fans whose total fan design static pressure is less than 1", shall be fabricated to 1" W.G. SMACNA standards. All ductwork shall be sealed to SMACNA Seal Class B. No snap lock seams will be accepted.
2. All supply, return, and exhaust ductwork, connected to fans whose total fan design static pressure is greater than 1", shall be fabricated to 2" W.G. SMACNA standards. All ductwork shall be sealed to SMACNA Seal Class A. No snap lock seams will be accepted.

3. All supply ductwork for variable volume systems shall be fabricated to 3" W.G. SMACNA standards up to the variable volume control boxes. All ductwork shall be sealed to SMACNA Seal Class A. No snap lock seam will be accepted.
 4. SMACNA Seal Class B shall be all transverse joints and longitudinal seams, Seal Class A shall be all transverse joints, longitudinal seams and duct wall penetrations.
- C. Ductwork shall not be hung or supported from metal roof decking. Provide necessary support from top chord of joist or structural members.

PART 2 - PRODUCTS

2.01 DAMPERS, VOLUME

- A. Provide dampers, whether indicated or not, in every supply, return, and exhaust branch from main trunk duct fitted with locking devices for adjusting the air delivery.
- B. Provide elevated dial regulators for insulated ducts.

2.02 DAMPERS, FIRE

- A. For all fire dampers, Greenheck, Phillips, or Ruskin each with a reusable UL listed 165°F fusible link. See Section B15050: Codes and Specifications. All dampers shall be dynamic rated with fan systems on, and shall comply with UL555.
- B. Installed in all ductwork piercing rated walls, floors, or ceilings, or as required by Wisconsin Department of Industry, Labor, and Human Relations.
- C. Factory constructed in accordance with and shall bear an approved UL label, if required.
- D. Greenheck Model DFD-150 for rectangular low pressure ductwork with fire resistance rating 1-1/2 hour.
- E. Greenheck Model DFD-350 for rectangular low pressure ductwork with fire resistance rating three (3) hour.
- F. Greenheck Model DFD-350 for rectangular low pressure transfer air openings in walls with, or without transfer grilles and for fire resistance rating three (3) hour.
- G. Greenheck Model DFD-150 CR or CO for round and oval ductwork with fire resistance rating 1-1/2 hour.
- H. Greenheck Model DFD-350 CR or CO for round and oval ductwork with fire resistance rating 3 hour.
- I. Pressure drop through the retracted damper shall not exceed .04" W.C. at a velocity of 2,000 FPM. Provide type B damper.
- J. All fire dampers to be installed per UL555 installation instructions.
- K. Provide gasketed access doors at each fire damper for access to fusible links.

- L. This Contractor shall be responsible for providing the proper fire resistive rating for each as called for in Chapter 64 of the Wisconsin Administrative Code.

2.03 DUCTWORK, FLEXIBLE

- A. Provide Clevaflex type SFA, Genflex SFR-30a, or Therma Flex M-KE insulated ducts suitable for 6" positive or negative pressure, and 4000 fpm where indicated on the drawings. Ducts shall contain an aluminum inner duct, 1" thick 3/4 lb. density insulation and 0.004" seamless vapor barrier jacket. Provide factory installed compression clamps on each end with spin-in straight fittings equipped with volume dampers. Ducts shall be installed as follows:
 - 1. As final connection from duct to ceiling diffuser where the total length of flexible duct shall not exceed 24 inches.
 - 2. Where indicated as a branch run out from the main duct it shall be fully extended to a maximum length of seven (7) feet and supported to prevent excessive sagging.
 - 3. Splicing of flexible duct shall not be allowed.
- B. Flexible duct and insulation shall be fire resistive and shall have a flame spread of 25 or less, and smoke developed rating of 50 or less.

2.04 INSPECTION, ACCESS, DOORS

- A. Provide Ventlok insulated access doors where shown on the drawings, or where required, for easy access to all equipment. Doors shall be equipped with Series 100 latches on all doors less than 4 square feet in area, and Series 300 on all larger doors. Seal all doors with sponge rubber gaskets.
- B. Provide double cam access doors at all booster coils and fire dampers. The door shall be at least 18" wide, unless duct size is less, and shall be at least 75% of the damper or coil height.

PART 3 - EXECUTION

3.01 INSTALLATION, EQUIPMENT

Install in accordance with manufacturer's instructions.

3.02 INSTALLATION, DUCTWORK

- A. Seal all low velocity ductwork corner joints with Hard Cast #601 Iron Grip. Cover the corner openings with tape and mastic if the openings are too large to be sealed with mastic only such that the total duct leakage of the system does not exceed 5% of the total design volume. See paragraph 1.04 Design Conditions this section for duct sealing requirements.
- B. Where long sweep fittings cannot be installed, provide SMACNA Approved spilt runner adjustable single thickness blade turning vanes in all square and rectangular elbows and set for the proper angles. Blades shall be 2" apart with 1" extension on leaving air side or as described in SMACNA.

- C. Provide 45 degree entry converging tee boot fittings at all straight tap-in connections to the trunk duct where long radius takeoffs cannot be physically installed. Provide conical fittings at round duct takeoffs to trunk duct.
- D. This Contractor shall coordinate all work with the air balance and testing agency. (See Tests: Section B15050.) Furnish and install all volume dampers in locations required by the agency to adequately balance the system.
- E. Increase sizes of ducts lined with sound insulation so free area will correspond to dimensions shown on drawings.
- F. Install flanged booster coils with an access door on the entering side of the booster coil.
- G. Install all supply ductwork tight to back of diffuser or grille to avoid leakage around diffuser or grille inlet which may cause marking of ducts, walls, or ceilings.
- H. Sleeves, Openings, Cutting, Patching, and Drilling: See Section B15050.
- I. Ductwork supported with threaded rod shall be provided with adjusting and locking nut. After ductwork is completed, adjusted and insulated as required, this contractor shall cut off excess support rod and grind smooth.

END OF SECTION

SECTION 15900
FACILITY MANAGEMENT AND CONTROL SYSTEM (FMCS)

Note to Bidders: This section is based on open, interoperable system technologies.

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, equipment, and service necessary for a complete and operating Facility Management and Control System (FMCS), utilizing Direct Digital Controls as shown on the drawings and as described herein. Drawings are diagrammatic only. The FMCS shall be capable of total integration of the facility infrastructure systems with user access to all system data either locally over a secure Intranet within the building or by remote access by a standard Web Browser over the Internet. This shall include HVAC control, electrical, gas and water metering, energy management, alarm monitoring, security and personnel access control, fire-life safety systems, and all trending, reporting and maintenance management functions related to normal building operations all as indicated on the drawings or elsewhere in this specification.
- B. All labor, material, equipment and software not specifically referred to herein or on the plans, that are required to meet the functional intent of this specification, shall be provided without additional cost to the Owner.

1.2 SYSTEM DESCRIPTION and APPROVED VENDORS.

- A. The entire Facility Management and Control System (FMCS) shall be comprised of a network of interoperable, stand-alone digital controllers communicating on an open protocol communication network to a host computer within the facility (when specified) and communicating via the internet to a host computer in a remote location. The FMCS shall communicate to third party systems such as chillers, boilers, air handling systems, energy metering systems, other energy management systems, access control systems, fire-life safety systems and other building management related devices with open, interoperable communication capabilities.
- B. This shall be an extension of the existing system previously supplied by Environmental Systems Inc that serves the third floor. Please contact Environmental Systems Inc. at 262-544-8860.

1.3 SUBMITTAL

- A. Eight copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers catalog data sheets and installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams, software descriptions, calculations, and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings. A complete written Sequence of Operation as well as a hard copy graphical depiction of the application control programs shall also be included with the submittal package.
- B. Submittal shall also include a trunk cable schematic diagram depicting the Graphical User Interface (GUI) computer, control panel locations and a description of the communication type, media and protocol.
- C. Submittal shall also include a complete point list of all connected points to the DDC system.
- D. Upon completion of the work, provide a complete set of 'as-built' drawings and application software on magnetic floppy disk media or compact disk. Drawings shall be provided as AutoCAD™ or Visio™

compatible files. Eight copies of the 'as-built' drawings shall be provided in addition to the documents on magnetic floppy disk media or compact disk.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Division 15, Mechanical:

1. Providing taps and installation of wells in piping for control system sensors and flow measurement devices.
2. Installation of any control system dampers.

B. Division 16, Electrical:

1. Providing motor starters and disconnect switches (unless otherwise noted).
2. Power wiring and conduit (unless otherwise noted).
3. Provision, installation and wiring of smoke detectors (unless otherwise noted).

1.5 AGENCY AND CODE APPROVALS

A. All products of the FMCS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided with the submittal package. Systems or products not currently offering the following approvals are not acceptable.

1. UL-916; Energy Management Systems
2. ULC; UL - Canadian Standards Association
3. FCC, Part 15, Subpart J, Class A Computing Devices

1.6 SOFTWARE LICENSE AGREEMENT

A. The Owner shall sign a copy of the manufacturer's standard software and firmware licensing agreement as a condition of this contract. Such license shall grant use of all programs and application software to Owner as defined by the manufacturer's license agreement, but shall protect manufacturer's rights to disclosure of trade secrets contained within such software.

1.7 DELIVERY, STORAGE AND HANDLING

A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.8 JOB CONDITIONS

A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the Work will be carried out in an orderly fashion. It shall be this Contractor's responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers, and structural and architectural features.

1.9 QUALITY ASSURANCE

A. The Manufacturer of the FMCS digital controllers shall provide documentation supporting compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation and Servicing). Product literature provided by the FMCS digital controller manufacturer shall contain the ISO-9001 Certification Mark from the applicable registrar.

B. All components and systems shall be year 2000 (Y2K) compliant.

1.10 SPECIFICATION NOMENCLATURE

A. Acronyms used in this specification are as follows:

FMCS	Facility Management and Control System
NAC	Network Area Controller
IDC	Interoperable Digital Controller
IBC	Interoperable BACnet Controller
GUI	Graphical User Interface
WBI	Web Browser Interface
POT	Portable Operator's Terminal
PMI	Power Measurement Interface
DDC	Direct Digital Controls
LAN	Local Area Network
WAN	Wide Area Network
OOT	Object Oriented Technology
PICS	Product Interoperability Compliance Statement

PART 2 MATERIALS

2.1 GENERAL

- A. The Facility Management Control System (FMCS) shall be comprised of a network of interoperable, stand-alone digital controllers, a computer system, graphical user interface software, portable operator terminals, printers, network devices and other devices as specified herein. All controllers and software within FMCS shall be Year 2000 compliant and shall be supported by compliance documentation from the manufacturer.
- B. The installed system shall provide secure password access to all features, functions and data contained in the overall FMCS.

2.2 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate both the ANSI/ASHRAE Standard 135-1995 BACnet and LonWorks technology communication protocols in one open, interoperable system.
- B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. In addition, adherence to industry standards including ANSI / ASHRAE™ Standard 135-1995, BACnet and LonMark to assure interoperability between all system components is required. For each LonWorks device that does not have LonMark certification, the device supplier must provide an XIF file for the device. For each BACnet device, the device supplier must provide a PICS document showing the installed device's compliance level. Minimum compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet.
- C. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.
- D. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open DataBase Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on a supplier-installed server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable.

- E. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network. Systems employing a "flat" single tiered architecture shall not be acceptable.
 - 1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
 - 2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

2.3 NETWORKS

- A. The Local Area Network (LAN) shall be either a 10 or 100 Megabits/sec Ethernet network supporting BACnet, Java, XML, HTTP, and CORBA IIOP for maximum flexibility for integration of building data with enterprise information systems and providing support for multiple Network Area Controllers (NACs), user workstations and, if specified, a local host computer system.

2.4 NETWORK ACCESS

A. Remote Access.

- 1. For Local Area Network installations, provide access to the LAN from a remote location, via the Internet. The owner shall provide a connection to the Internet to enable this access via high speed cable modem, asynchronous digital subscriber line (ADSL) modem, ISDN line, T1 Line or via the customer's Intranet to a corporate server providing access to an Internet Service Provider (ISP). Owner agrees to pay monthly access charges for connection and ISP.
- 2. Where no Local Area Network exists, FMCS supplier shall provide the following:
 - a. 8 Port Ethernet hub (3Com, or equal)
 - b. Ethernet router (Cisco or equal)

The owner shall provide a connection to the Internet to enable this access via high-speed cable modem, asynchronous digital subscriber line (ADSL) modem, ISDN line or T1 Line. Owner agrees to pay monthly access charges for connection and ISP

2.5 NETWORK AREA CONTROLLER (NAC)—ONE (1) REQUIRED TO BE MOUNTED NEAR HEAT EXCHANGER

- A. The Network Area Controller (NAC) shall provide the interface between the LAN the field control devices, and provide global supervisory control functions over the control devices connected to the NAC. It shall be capable of executing application control programs to provide:
 - 1. Calendar functions
 - 2. Scheduling
 - 3. Trending
 - 4. Alarm monitoring and routing
 - 5. Time synchronization
 - 6. Integration of LonWorks controller data and BACnet controller data
 - 7. Network Management functions for all LonWorks based devices

- B. The Network Area Controller must provide the following hardware features as a minimum:
1. One Ethernet Port -10 / 100 Mbps
 2. One RS-232 port
 3. One LonWorks Interface Port – 78KB FTT-10A
 4. Battery Backup
 5. Flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1 gigabyte storage capacity)
 6. The NAC must be capable of operation over a temperature range of 0 to 55°C
 7. The NAC must be capable of withstanding storage temperatures of between 0 and 70°C
 8. The NAC must be capable of operation over a humidity range of 5 to 95% RH, non-condensing
- C. The NAC shall provide multiple user access to the system and support for ODBC or SQL. A database resident on the NAC shall be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write data stored within it.
- D. The NAC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.
- E. Event Alarm Notification and actions
1. The NAC shall provide alarm recognition, storage; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers.
 2. The NAC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
 3. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but limited to:
 - a. To alarm
 - b. Return to normal
 - c. To fault
 4. Provide for the creation of an unlimited number of alarm classes for the purpose of routing types and or classes of alarms, i.e.: security, HVAC, Fire, etc.
 5. Provide timed (schedule) routing of alarms by class, object, group, or node.
 6. Provide alarm generation from binary object “runtime” and /or event counts for equipment maintenance. The user shall be able to reset runtime or event count values with appropriate password control.
- F. Control equipment and network failures shall be treated as alarms and annunciated.
- G. Alarms shall be annunciated in any of the following manners as defined by the user:
1. Screen message text
 2. Email of the complete alarm message to multiple recipients. Provide the ability to route and email alarms based on:
 - a. Day of week
 - b. Time of day

- c. Recipient
 - 3. Pagers via paging services that initiate a page on receipt of email message
 - 4. Graphic with flashing alarm object(s)
 - 5. Printed message, routed directly to a dedicated alarm printer
- H. The following shall be recorded by the NAC for each alarm (at a minimum):
 - 1. Time and date
 - 2. Location (building, floor, zone, office number, etc.)
 - 3. Equipment (air handler #, accessway, etc.)
 - 4. Acknowledge time, date, and user who issued acknowledgement.
 - 5. Number of occurrences since last acknowledgement.
- I. Alarm actions may be initiated by user defined programmable objects created for that purpose.
- J. Defined users shall be given proper access to acknowledge any alarm, or specific types or classes of alarms defined by the user.
- K. A log of all alarms shall be maintained by the NAC and/or a server (if configured in the system) and shall be available for review by the user.
- L. Provide a “query” feature to allow review of specific alarms by user defined parameters.
- M. A separate log for system alerts (controller failures, network failures, etc.) shall be provided and available for review by the user.
- N. An Error Log to record invalid property changes or commands shall be provided and available for review by the user.

2.6 Data Collection and Storage

- A. The NAC shall have the ability to collect data for any property of any object and store this data for future use.
- B. The data collection shall be performed by log objects, resident in the NAC that shall have, at a minimum, the following configurable properties:
 - 1. Designating the log as interval or deviation.
 - 2. For interval logs, the object shall be configured for time of day, day of week and the sample collection interval.
 - 3. For deviation logs, the object shall be configured for the deviation of a variable to a fixed value. This value, when reached, will initiate logging of the object.
 - 4. For all logs, provide the ability to set the maximum number of data stores for the log and to set whether the log will stop collecting when full, or rollover the data on a first-in, first-out basis.
 - 5. Each log shall have the ability to have its data cleared on a time-based event or by a user-defined event or action.
- C. All log data shall be stored in a relational database in the NAC and the data shall be accessed from a server (if the system is so configured) or a standard Web Browser.
- D. All log data, when accessed from a server, shall be capable of being manipulated using standard SQL statements.

- E. All log data shall be available to the user in the following data formats:
 - 1. HTML
 - 2. XML
 - 3. Plain Text
 - 4. Comma or tab separated values
- F. Systems that do not provide log data in HTML and XML formats at a minimum shall not be acceptable.
- G. The NAC shall have the ability to archive it's log data either locally (to itself), or remotely to a server or other NAC on the network. Provide the ability to configure the following archiving properties, at a minimum:
 - 1. Archive on time of day
 - 2. Archive on user-defined number of data stores in the log (buffer size)
 - 3. Archive when log has reached it's user-defined capacity of data stores
 - 4. Provide ability to clear logs once archived

2.7 AUDIT LOG

- A. Provide and maintain an Audit Log that tracks all activities performed on the NAC. Provide the ability to specify a buffer size for the log and the ability to archive log based on time or when the log has reached it's user-defined buffer size. Provide the ability to archive the log locally (to the NAC), to another NAC on the network, or to a server. For each log entry, provide the following data:
 - 1. Time and date
 - 2. User ID
 - 3. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

2.8 DATABASE BACKUP AND STORAGE

- A. The NAC shall have the ability to automatically backup its database. The database shall be backed up based on a user-defined time interval.
- B. Copies of the current database and, at the most recently saved database shall be stored in the NAC. The age of the most recently saved database is dependent on the user-defined database save interval.
- C. The NAC database shall be stored, at a minimum, in XML format to allow for user viewing and editing, if desired. Other formats are acceptable as well, as long as XML format is supported.

Note to Bidders: Direct Digital Controllers conforming to BACnet, ANSI/ASHRAE Standard 135-1995 specification may be used.

2.9 INTEROPERABLE BACnet CONTROLLER (IBC)

- A. Controls shall be microprocessor based Interoperable BACnet Controllers (IBC) in accordance with the ANSI/ASHRAE Standard 135-1995. IBCs shall be provided for Unit Ventilators, Fan Coils, Heat Pumps, Variable Air Volume (VAV) Terminals and other applications as shown on the drawings. The application control program shall be resident within the same enclosure as the input/output circuitry, which translates the sensor signals. The system supplier must provide a PICS document showing the installed systems compliance level to the ANSI/ASHRAE Standard 135-1995. Minimum compliance is Level 3.
- B. The IBCs shall communicate with the NAC via an Ethernet connection at a baud rate of not less than 10 Mbps.
- C. The IBC Sensor shall connect directly to the IBC and shall not utilize any of the I/O points of the controller. The IBC Sensor shall provide a two-wire connection to the controller that is polarity and wire type insensitive. The IBC Sensor shall provide a communications jack for connection to the BACnet communication trunk to which the IBC controller is connected. The IBC Sensor, the connected controller, and all other devices on the BACnet bus shall be accessible by the POT.
- D. All IBCs shall be fully application programmable and shall at all times maintain their BACnet Level 3 compliance. Controllers offering application selection only (non-programmable), require a 10% spare point capacity to be provided for all applications. All control sequences within or programmed into the IBC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery, to be retained.

2.10 WEB BROWSER CLIENTS

- A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer™ or Netscape Navigator™. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.
- B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the FMCS, shall not be acceptable.
- C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
- D. The Web browser client shall support at a minimum, the following functions:
 - 1. User log-on identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
 - 2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.

3. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
4. Storage of the graphical screens shall be in the Network Area Controller (NAC), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
5. Real-time values displayed on a Web page shall update automatically without requiring a manual “refresh” of the Web page.
6. User’s shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:
 - a. Modify common application objects, such as schedules, calendars, and set points in a graphical manner.
 1. Schedule times will be adjusted using a graphical slider, without requiring any keyboard entry from the operator.
 2. Holidays shall be set by using a graphical calendar, without requiring any keyboard entry from the operator.
 - b. Commands to start and stop binary objects shall be done by right-clicking the selected object and selecting the appropriate command from the pop-up menu. No entry of text shall be required.
 - c. View logs and charts
 - d. View and acknowledge alarms
7. The system shall provide the capability to specify a user’s (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to just their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator.
8. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

2.11 SYSTEM PROGRAMMING

- A. The Graphical User Interface software (GUI) shall provide the ability to perform system programming and graphic display engineering as part of a complete software package. Access to the programming functions and features of the GUI shall be through password access as assigned by the system administrator.
- B. A library of control, application, and graphic objects shall be provided to enable the creation of all applications and user interface screens. Applications are to be created by selecting the desired control objects from the library, dragging or pasting them on the screen, and linking them together using a built in graphical connection tool. Completed applications may be stored in the library for future use. Graphical User Interface screens shall be created in the same fashion. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide “real-time” data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems requiring separate software tools or processes to create applications and user interface display shall not be acceptable.
- C. Programming Methods

1. Provide the capability to copy objects from the supplied libraries, or from a user-defined library to the user's application. Objects shall be linked by a graphical linking scheme by dragging a link from one object to another. Object links will support one-to-one, many-to-one, or one-to-many relationships. Linked objects shall maintain their connections to other objects regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification. Links will vary in color depending on the type of link; i.e., internal, external, hardware, etc.
2. Configuration of each object will be done through the object's property sheet using fill-in the blank fields, list boxes, and selection buttons. Use of custom programming, scripting language, or a manufacturer-specific procedural language for configuration will not be accepted.
3. The software shall provide the ability to view the logic in a monitor mode. When on-line, the monitor mode shall provide the ability to view the logic in real time for easy diagnosis of the logic execution. When off-line (debug), the monitor mode shall allow the user to set values to inputs and monitor the logic for diagnosing execution before it is applied to the system.
4. All programming shall be done in real-time. Systems requiring the uploading, editing, and downloading of database objects shall not be allowed.
5. The system shall support object duplication within a customer's database. An application, once configured, can be copied and pasted for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

2.12 OBJECT LIBRARIES

- A. A standard library of objects shall be included for development and setup of application logic, user interface displays, system services, and communication networks.
- B. The objects in this library shall be capable of being copied and pasted into the user's database and shall be organized according to their function. In addition, the user shall have the capability to group objects created in their application and store the new instances of these objects in a user-defined library.
- C. In addition to the standard libraries specified here, the supplier of the system shall maintain an on-line accessible (over the Internet) library, available to all registered users to provide new or updated objects and applications as they are developed.
- D. All control objects shall conform to the control objects specified in the BACnet specification.
- E. The library shall include applications or objects for the following functions, at a minimum:
 1. Scheduling Object. The schedule must conform to the schedule object as defined in the BACnet specification, providing 7-day plus holiday & temporary scheduling features and a minimum of 10 on/off events per day. Data entry to be by graphical sliders to speed creation and selection of on-off events.
 2. Calendar Object. . The calendar must conform to the calendar object as defined in the BACnet specification, providing 12-month calendar features to allow for holiday or special event data entry. Data entry to be by graphical "point-and-click" selection. This object must be "linkable" to any or all scheduling objects for effective event control.
 3. Duty Cycling Object. Provide a universal duty cycle object to allow repetitive on/off time control of equipment as an energy conserving measure. Any number of these objects may be created to control equipment at varying intervals

4. Temperature Override Object. Provide a temperature override object that is capable of overriding equipment turned off by other energy saving programs (scheduling, duty cycling etc.) to maintain occupant comfort or for equipment freeze protection.
 5. Start-Stop Time Optimization Object. Provide a start-stop time optimization object to provide the capability of starting equipment just early enough to bring space conditions to desired conditions by the scheduled occupancy time. Also, allow equipment to be stopped before the scheduled un-occupancy time just far enough ahead to take advantage of the building's "flywheel" effect for energy savings. Provide automatic tuning of all start / stop time object properties based on the previous day's performance.
 6. Demand Limiting Object. Provide a comprehensive demand-limiting object that is capable of controlling demand for any selected energy utility (electric, oil, and gas). The object shall provide the capability of monitoring a demand value and predicting (by use of a sliding window prediction algorithm) the demand at the end of the user defined interval period (1-60 minutes). This object shall also accommodate a utility meter time sync pulse for fixed interval demand control. Upon a prediction that will exceed the user defined demand limit (supply a minimum of 6 per day), the demand limiting object shall issue shed commands to either turn off user specified loads or modify equipment set points to effect the desired energy reduction. If the list of sheddable equipment is not enough to reduce the demand to below the set point, a message shall be displayed on the users screen (as an alarm) instructing the user to take manual actions to maintain the desired demand. The shed lists are specified by the user and shall be selectable to be shed in either a fixed or rotating order to control which equipment is shed the most often. Upon suitable reductions in demand, the demand-limiting object shall restore the equipment that was shed in the reverse order in which it was shed. Each sheddable object shall have a minimum and maximum shed time property to effect both equipment protection and occupant comfort.
- F. The library shall include control objects for the following functions. All control objects shall conform to the objects as specified in the BACnet specification.
1. Analog Input Object - Minimum requirement is to comply with the BACnet standard for data sharing. Allow high, low and failure limits to be assigned for alarming. Also, provide a time delay filter property to prevent nuisance alarms caused by temporary excursions above or below the user defined alarm limits.
 2. Analog Output Object - Minimum requirement is to comply with the BACnet standard for data sharing.
 3. Binary Input Object - Minimum requirement is to comply with the BACnet standard for data sharing. The user must be able to specify either input condition for alarming. This object must also include the capability to record equipment run-time by counting the amount of time the hardware input is in an "on" condition. The user must be able to specify either input condition as the "on" condition.
 4. Binary Output Object - Minimum requirement is to comply with the BACnet standard for data sharing. Properties to enable minimum on and off times for equipment protection as well as interstart delay must be provided. The BACnet Command Prioritization priority scheme shall be incorporated to allow multiple control applications to execute commands on this object with the highest priority command being invoked. Provide sixteen levels of priority as a minimum. Systems not employing the BACnet method of contention resolution shall not be acceptable.
 5. PID Control Loop Object - Minimum requirement is to comply with the BACnet standard for data sharing. Each individual property must be adjustable as well as to be disabled to allow proportional control only, or proportional with integral control, as well as proportional, integral and derivative control.

6. Comparison Object - Allow a minimum of two analog objects to be compared to select either the highest, lowest, or equality between the two linked inputs. Also, allow limits to be applied to the output value for alarm generation.
 7. Math Object - Allow a minimum of four analog objects to be tested for the minimum or maximum, or the sum, difference, or average of linked objects. Also, allow limits to be applied to the output value for alarm generation.
 8. Custom Programming Objects - Provide a blank object template for the creation of new custom objects to meet specific user application requirements. This object must provide a simple BASIC-like programming language that is used to define object behavior. Provide a library of functions including math and logic functions, string manipulation, and e-mail as a minimum. Also, provide a comprehensive on-line debug tool to allow complete testing of the new object. Allow new objects to be stored in the library for re-use.
 9. Interlock Object - Provide an interlock object that provides a means of coordination of objects within a piece of equipment such as an Air Handler or other similar types of equipment. An example is to link the return fan to the supply fan such that when the supply fan is started, the return fan object is also started automatically without the user having to issue separate commands or to link each object to a schedule object. In addition, the control loops, damper objects, and alarm monitoring (such as return air, supply air, and mixed air temperature objects) will be inhibited from alarming during a user-defined period after startup to allow for stabilization. When the air handler is stopped, the interlocked return fan is also stopped, the outside air damper is closed, and other related objects within the air handler unit are inhibited from alarming thereby eliminating nuisance alarms during the off period.
 10. Temperature Override Object - Provide an object whose purpose is to provide the capability of overriding a binary output to an "On" state in the event a user specified high or low limit value is exceeded. This object is to be linked to the desired binary output object as well as to an analog object for temperature monitoring, to cause the override to be enabled. This object will execute a Start command at the Temperature Override level of start/stop command priority unless changed by the user.
 11. Composite Object - Provide a container object that allows a collection of objects representing an application to be encapsulated to protect the application from tampering, or to more easily represent large applications. This object must have the ability to allow the user to select the appropriate parameters of the "contained" application that are represented on the graphical shell of this container.
- G. The object library shall include objects to support the integration of devices connected to the Network Area Controller (NAC). At a minimum, provide the following as part of the standard library included with the programming software:
1. LonMark/LonWorks devices. These devices shall include, but not be limited to, devices for control of HVAC, lighting, access, and metering. Provide LonMark manufacturer-specific objects to facilitate simple integration of these devices. All network variables defined in the LonMark profile shall be supported. Information (type and function) regarding network variables not defined in the LonMark profile shall be provided by the device manufacturer.
 2. For devices not conforming to the LonMark standard, provide a dynamic object that can be assigned to the device based on network variable information provided by the device manufacturer. Device manufacturer shall provide an XIF file and documentation for the device to facilitate device integration.
 3. For BACnet devices, provide the following objects at a minimum:

- a. BACnet AI
 - b. BACnet AO
 - c. BACnet BI
 - d. BACnet BO
 - e. BACnet Device
4. For each BACnet object, provide the ability to assign the object to a BACnet device and object's instance number.

2.13 **LEGACY SYSTEM INTEGRATION (Alternate Bid #2 Items B, C, D)**

- A. The Network Area Controller shall support the integration of device data from the existing control system. The connection to the existing system shall be via an RS-232 connection between the Network Area Controller and the existing control system.
- B. Provide alternate price to replace NCM 3 and 4 in the CCB Building with new Network controllers integrated to the server supplied in the base bid. Network controllers shall communicate via N2 bus to the existing Johnson controls devices on the trunks served by NCM3 and NCM 4. Provide floor plans and graphics for each system served by the existing NCM'S per the following description.
- C. **NCM-3** Replace NCM 3 with the necessary network controllers with an N2 bus to integrate to the existing field controllers. Provide graphical user interface for this system to include graphics and trending and time of day programming for AHU-1, 01, 7, 12, 13, S-27, S-41,. Provide graphics for heat exchangers that are on the 2nd floor and units that serve JUV 5th floor. Provide graphical user interface for NO2 system, Snow Melt system, Steam valve system, Basement chiller system, 5th floor labs and 66 vav boxes.
- D. **NCM-4** Replace NCM 4 with the necessary network controllers with an N2 bus to integrate to the existing field controllers. Provide graphical user interface for this system to include graphics, trending, and time of day programming for AHU1,2,3 and vertical chiller plant.
- E. The owner, and/or the existing control system representative shall ensure that the existing system's database is setup to make all data to be integrated into the FMCS available at the RS-232 port. Any modifications to the existing system database to accomplish this shall be the responsibility of the owner.
- F. Provide the required objects in the library, included with the Graphical User Interface programming software, to support the integration of the existing system data into the FMCS. Objects provided shall include at a minimum:
 1. LEGACY SYSTEM Generic AI Object
 2. LEGACY SYSTEM Generic AO Object
 3. LEGACY SYSTEM Generic BO Object
 4. LEGACY SYSTEM Generic BI Object
- G. All scheduling, alarming, logging and global supervisory control functions (demand limiting, etc.), of the existing system devices, shall be performed by the Network Area Controller. Integration of the existing system's schedules, alarms, logs, etc. is neither required nor desired.

2.14 **GRAPHICAL USER INTERFACE COMPUTER HARDWARE (DESKTOP)Not required owner provided**

- A. The desktop computer shall be an Intel Pentium based computer (minimum processing speed of 400 Mhz with 256 MB RAM and a 10-gigabyte minimum hard drive). It shall include a 32X CD-ROM drive, 3.5" floppy drive, a 100 MB Zip drive, 2-parallel ports, 2-asynchronous serial ports and 2-USB ports. A minimum 17", 28-dot pitch SVGA (1024 x 768) color monitor with a minimum 80 Hz refresh rate shall also be included.
- B. A system printer shall be provided. Printer shall be laser type with a minimum 600 x 600-dpi resolution and rated for 8 PPM print speed minimum.

2.15 GRAPHICAL USER INTERFACE COMPUTER HARDWARE (LAPTOP COMPUTER) not required owner provided

- A. The laptop computer shall consist of an Intel Pentium based laptop computer (minimum processing speed of 200 Mhz with 128 MB RAM and a 2-gigabyte minimum hard drive). It shall include a CD-ROM drive, a 3.5" floppy drive and appropriate connectors and cables for communication connection to the NAC, Ethernet, LonWorks or BACnet networks.

2.16 OTHER CONTROL SYSTEM HARDWARE

- A. Temperature Control Air Compressor (when required): A duplex air compressor system (two compressors mounted on one tank) shall be furnished and installed by the temperature control contractor. Air compressor system shall be sized to fit the pneumatic control system, to insure no more than 33% run time. The tank shall be sized for a maximum of 6 starts per hour. An automatic alternator shall be connected to the motors and pressure switches, in a 'lead-lag' manner, and shall alternate compressor operation after each on-off cycle. Alternator shall be further connected to energize the 'lag' operation after each on-off cycle. Alternator shall be further connected to energize the 'lag' compressor at the setting of the lower pressure switch if the "lead" compressor fails or is disabled for service. Air compressor system shall include a refrigerated air dryer sized for the capacity of the air compressor. Accessories such as filters, pressure regulators, valves, spring isolators, automatic tank drain etc. shall also be furnished for a complete operating system.
- B. Motorized Control Dampers (where furnished by the Temperature Control sub-contractor): Dampers shall be black enamel finish or galvanized, with nylon bearings. Blade edge and tip seals shall be included for all dampers. Blades shall be 16-gauge minimum and 6 inches wide maximum and frame shall be of welded channel iron. Dampers with both dimensions less than 18 inches may have strap iron frames.
- C. Control Damper Actuators (where furnished by the Temperature Control sub-contractor): Two-position or proportional electric actuators shall be direct-mount type sized to provide a minimum of 5 in-lb torque per square foot of damper area. Damper actuators shall be spring return type. Provide one actuator per damper minimum. Pneumatic actuators shall be sized to provide a minimum of 5 in-lb torque per square foot of damper area and shall include positive positioning pneumatic relays when sequenced with other actuators or when control action is to be proportional.
- D. Control Valves: Control valves shall be 2-way or 3-way pattern as shown constructed for tight shutoff and shall operate satisfactorily against system pressures and differentials. Two-position valves shall be 'line' size. Proportional control valves shall be sized for a maximum pressure drop of 5.0 psi at rated flow (except as may be noted on the drawings). Valves with sizes up to and including 2 inches shall be "screwed" configuration and 2-1/2 inch and larger valves shall be "flanged" configuration. Electrically controlled valves shall include spring return type actuators sized for tight shut-off against system pressures and furnished with integral switches for indication of valve position (open-closed). Pneumatically actuators for valves, when utilized, shall be sized for tight shut-off against system pressures. Three-way butterfly valves, when utilized, shall include a separate actuator for each butterfly segment.

- E. Wall Mount Room Thermostats: Each room thermostat shall provide temperature indication to the digital controller, provide the capability for a software-limited set point adjustment and operation override capability. An integral LCD shall annunciate current room temperature and set point as well as override status indication. In addition, the thermostat shall include a port for connection of the portable operator's terminal described elsewhere in this specification.
- F. Duct Mount, Pipe Mount and Outside Air Temperature Sensors: 10,000-ohm thermistor temperature sensors with an accuracy of $\pm 0.2^{\circ}\text{C}$. Outside air sensors shall include an integral sun shield.
- G. Current Sensitive Switches: Solid state, split core current switch that operates when the current level (sensed by the internal current transformer) exceeds the adjustable trip point. Current switch to include an integral LED for indication of trip condition and a current level below trip set point.
- H. Power Monitoring Interface: The Power Measurement Interface (PMI) device shall include the appropriate current and potential (voltage) transformers. The PMI shall be certified under UL-3111. The PMI shall perform continuous true RMS measurement based on 32 samples-per-cycle sampling on all voltage and current signals. The PMI shall provide outputs to the FMCS based on the measurement and calculation of the following parameters: (a) current for each phase and average of all three phases, (b) kW for each phase and total of all three phases, (c) power factor for each phase and all three phases, (d) percent voltage unbalance and (e) percent current unbalance. These output values shall be hard-wired inputs to the FMCS or shall be communicated to the FMCS over the open-protocol LAN.
- I. Water Flow Meters (when required): Water flow meters shall be axial turbine style flow meters which translate liquid motion into electronic output signals proportional to the flow sensed. Flow sensing turbine rotors shall be non-metallic and not impaired by magnetic drag. Flow meters shall be 'insertion' type complete with 'hot-tap' isolation valves to enable sensor removal without water supply system shutdown. Accuracy shall be $\pm 2\%$ of actual reading from 0.4 to 20 feet per second flow velocities.
- J. Temperature Control Panels: Furnish temperature control panels of code gauge steel with locking doors for mounting all devices as shown. Control panels shall meet all requirements of Title 24, California Administrative Code. All electrical devices within a control panel shall be factory wired. All external wiring shall be connected to terminal strips mounted within the panel. Provide engraved phenolic nameplates identifying all devices mounted on the face of control panels. A complete set of 'as-built' control drawings (relating to the controls within that panel) shall be furnished within each control panel.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the temperature control system manufacturer or its exclusive factory authorized installing contracting field office (representative). The installing office shall have a minimum of five years of installation experience with the manufacturer and shall provide documentation in submittal package verifying longevity of the installing company's relationship with the manufacturer. Supervision, calibration and checkout of the system shall be by the employees of the local exclusive factory authorized temperature control contracting field office (branch or representative).
- B. Install system and materials in accordance with manufacturer's instructions, and as detailed on the project drawing set.
- C. Drawings of temperature control systems are diagrammatic only and any apparatus not shown, such as relays, accessories, etc., but required to make the system operative to the complete satisfaction of the Architect shall be furnished and installed without additional cost.

- D. Line and low voltage electrical connections to control equipment shown specified or shown on the control diagrams shall be furnished and installed by the Temperature Control sub-contractor in accordance with these specifications.
- E. Equipment furnished by the HVAC Contractor that is normally wired before installation shall be furnished completely wired. Control wiring normally performed in the field will be furnished and installed by the Temperature Control sub-contractor.
- F. All control devices mounted on the face of control panels shall be clearly identified as to function and system served with permanently engraved phenolic labels.

3.2 WIRING

- A. All electrical control wiring and power wiring to the control panels shall be the responsibility of the FMCS contractor.
- B. The electrical contractor (Div. 16) shall furnish all power wiring to electrical starters and motors.
- C. All wiring shall be in accordance with the Project Electrical Specifications (Division 16), the National Electrical Code and any applicable local codes. All FMCS wiring shall be installed in the conduit types specified in the Project Electrical Specifications (Division 16) unless otherwise allowed by the National Electrical Code or applicable local codes. Where FMCS plenum rated cable wiring is allowed it shall be run parallel to or at right angles to the structure, properly supported and installed in a neat and workmanlike manner.

3.3 WARRANTY

- A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.
- B. Within this period, upon notice by the Owner, any defects in the FMCS due to faulty materials, methods of installation or workmanship shall be promptly (within 48 hours after receipt of notice) repaired or replaced by the Temperature Control sub-contractor at no expense to the Owner

3.4 WARRANTY ACCESS

- A. The Owner shall grant to the Temperature Control sub-contractor, reasonable access to the FMCS during the warranty period. The owner shall allow the contractor to access the FMCS from a remote location for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period.

3.5 ACCEPTANCE TESTING

- A. Upon completion of the installation, the Temperature Control sub-contractor shall load all system software and start-up the system. The Temperature Control sub-contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.
- B. The Temperature Control sub-contractor shall perform tests to verify proper performance of components, routines, and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the DDC system operation.
- C. Upon completion of the performance tests described above, repeat these tests, point by point as described in the validation log above in presence of Owner's Representative, as required. Properly schedule these tests so testing is complete at a time directed by the Owner's Representative. Do not delay tests so as to prevent delay of occupancy permits or building occupancy.
- D. System Acceptance: Satisfactory completion is when the Temperature Control sub-contractor has performed successfully all the required testing to show performance compliance with the requirements

of the Contract Documents to the satisfaction of the Owner's Representative. System acceptance shall be contingent upon completion and review of all corrected deficiencies.

3.6 OPERATOR INSTRUCTION, TRAINING

- A. During system commissioning and at such time acceptable performance of the FMCS hardware and software has been established the Temperature Control sub-contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.
- B. The Temperature Control sub-contractor shall provide 40 hours of instruction to the owner's designated personnel on the operation of the FMCS and describe its intended use with respect to the programmed functions specified. Operator orientation of the FMCS shall include, but not be limited to; the overall operation program, equipment functions (both individually and as part of the total integrated system), commands, systems generation, advisories, and appropriate operator intervention required in responding to the System's operation.
- C. The training shall be in three sessions as follows:
 - 1. Initial Training: One day session (8 hours) after system is started up and at least one week before first acceptance test. Manual shall have been submitted at least two weeks prior to training so that the owners' personnel can start to familiarize themselves with the system before classroom instruction begins.
 - 2. First Follow-Up Training: Two days (16 hours total) approximately two weeks after initial training, and before Formal Acceptance. These sessions will deal with more advanced topics and answer questions.
 - 3. Warranty Follow Up: Two days (16 hours total) in no less than 4 hour increments, to be scheduled at the request of the owner during the one year warranty period. These sessions shall cover topics as requested by the owner such as; how to add additional points, create and gather data for trends, graphic screen generation or modification of control routines.

PART 4 SEQUENCES OF OPERATION

4.1 SUMMARY

- A. For each system listed, provide the sequence of operation as stated in this section.

PART 5 POINT LISTS

5.1 SUMMARY

- A. The points in the following table shall be accessible from the Graphical User Interface (GUI) and/or the Web browser interface (WBI). The supplier of the IDC and IBC devices shall ensure that the points listed in this table are accessible on their respective networks, by the Network Area Controller (NAC).
- B. The following abbreviations apply to the point table to indicate what level of functionality must be provided:
 - 1. D = Display only
 - 2. M = Modify value
 - 3. A = Alarm

4. L = Log
5. S = Schedule
6. GC = Global supervisory control routine such as demand limiting

System	AHU-1 (Serving 4 th and 5 th floors)					
Point	D	M	A	L	S	GC
Circulating Pumps (P-1 & P-2) on 2 nd floor		X	X			

END OF SECTION

SECTION B15950

AUTOMATIC TEMPERATURE CONTROL WORK

PART 1 - GENERAL

1.01 DESCRIPTION

Provide Stafa hybrid DDC and pneumatic system of temperature control in accordance with the Bid Documents and installed by equipment manufacturer and guaranteed direct to the owner for one (1) year from date of acceptance.

1.02 RELATED WORK

B15010 - Basic Mechanical General Requirements

B15050 - Basic HVAC Materials and Methods

B15990 - Testing, Adjusting, and Balancing

1.03 WORK INCLUDED IN THIS SECTION

2.01 Air Piping

2.02 Wiring

2.03 Thermostats

2.04 Control Cabinet Enclosures

2.05 Automatic Control Valves

3.01 Circulating Pump Control

3.02 Occupied/Unoccupied Control

3.03 Testing, Adjusting, and Balancing Coordination

1.04 SHOP DRAWINGS

Submit the required copies of shop drawings which will indicate schematically the locations of all controls with their ranges and settings given. Each schematic drawing shall be fully described by typewritten sequence of operation.

PART 2 - PRODUCTS

2.01 AIR PIPING

A. In exposed areas, such as storage rooms, equipment rooms, and rooms without ceilings, all pneumatic air piping shall be either hard drawn seamless metallic tubing, or polyethylene tubing, installed within a metallic raceway of either thin wall conduit (EMT), aluminum troughing with a snap-on cover or wiremold.

B. Bare polyethylene tubing is acceptable for air piping in concealed areas above ceilings.

C. All air piping shall be installed in a neat manner, run either parallel or perpendicular to the existing building lines and securely fastened to fixed members of the building structure at sufficient intervals to avoid excessive freedom of movement.

D. All tubing installed in poured concrete, or concrete block walls shall be metallic tubing.

- E. All air piping located in finished areas shall be run concealed within walls or ceilings. All cutting and patching of existing surfaces and finishes shall be included.
- F. Connection point to steam valves shall have 6" copper whip to protect polyethylene tubing from coming in contact with steam valves.

2.02 WIRING

- A. See (Electrical) in Section B15050.
- B. All wiring located in finished areas shall be run concealed within walls or ceilings. All cutting and patching shall be included.
- C. See Section B15050: Codes and Standards.

2.03 THERMOSTATS: SEE SECTION B15900

2.04 CONTROL CABINET ENCLOSURES

- A. All control cabinets shall be constructed with extruded aluminum alloy frames. All corners shall be securely riveted and supported by internal angle brackets. Internal butt joints around the door shall provide a 1/2" overlap seal around the cabinet frame. The cabinet shall have a removable face and back panel. The panels shall be made of aluminum bonded on both sides of plywood core. The face panel shall be held in place with continuous solid retaining bars. The panel hinges shall be run the entire height of the panel. A key locking latch shall be provided on all cabinets to insure only authorized access. All cabinets shall be Underwriters' Laboratories, Inc. listed for line voltage applications.
- B. All temperature and humidity indication, as called for in the control sequences, shall be installed on the face of the cabinet with a flush mounted 3-1/2" dial type thermometer chosen to match the transmitter range. Provide name tags to describe each reading.

2.05 AUTOMATIC CONTROL VALVES

- A. All valve operators are to be fully proportional, unless otherwise specified. All operators are to fail safe, in either a normally open, or normally closed position in the event of control power failure.
- B. All radiator, fin pipe, or convector valves shall have operators fully concealed behind the cover. Valves 2" and smaller shall be of the screwed type.
- C. All valves shall be equipped with throttling plugs to provide linear flow characteristics. All operators shall be sized to insure smooth modulating of the valves.
- D. All water valves shall be sized for a maximum of 3 psi pressure drop, or as specifically sized on the drawings.
- E. All steam valves shall be sized for a maximum of 3 psi pressure drop, or as specifically sized on the drawings.

PART 3 - EXECUTION

3.01 CIRCULATING PUMP CONTROL

The heating system circulating pumps piped in parallel shall start through a pressure electric switch to operate continuously whenever the outside temperature is below 65°F, to provide heating during heating season. Above 65°F outside the circulating pumps shall operate continuously only on the day cycle, or when the chilled water pump is operating, to provide reheat control for air conditioning. Provide a Hawkeye current based flow detection system across each pump to sound an alarm to the DDC building system in the event that either pump fails.

3.02 OCCUPIED/UNOCCUPIED CONTROL

Occupied/unoccupied zone control, where required, shall be accomplished via software of the DDC building management system.

3.03 TESTING, ADJUSTING, AND BALANCING COORDINATION

This Contractor shall assist the Balancing Agency by completing all control work as follows:

1. Verify that all control components are installed in accordance with project requirements and are functional.
2. Verify that all controlling instruments are calibrated and set for design operating conditions.
3. Calibrate room thermostats after installation, and before the thermostat control verification tests are performed. The balancing agency shall prove the accuracy of final settings by taking temperature readings. The readings shall be in a typical conditioned space for each separately controlled zone.
4. Allow sufficient time in the project to provide assistance and instruction to the balancing agency in the proper use and setting of control components.

END OF SECTION

SECTION B15990

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All work shall be bid as an integral part of the Mechanical Contractor's total contract.

1.02 RELATED WORK

- B15010 - Basic HVAC General Requirements
- B15050 - Basic HVAC Materials and Methods
- B15950 - Automatic Temperature Control Work

1.03 WORK INCLUDED IN THIS SECTION

- 3.01 Hydronic Balancing
- 3.02 Air Balance
- 3.03 Reports
- 3.04 Equipment and Procedures
- 3.05 Guarantee

1.04 GENERAL SCOPE

- A. This Contractor shall be an independent hydronic and air testing agency, meeting the following minimum requirements:
1. All work performed in this section shall be in accordance with Wisconsin Administrative Code ILHR 64.53.
 2. The Contractor shall be certified as a member of Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or have at least three (3) years of independent practice.
 3. Upon request, provide a list of projects completed by the Contractor indicating building square foot areas, air quantities in CFM, and types of air systems that are similar in scope to this project.
 4. The Contractor shall specialize in the testing, adjusting, and balancing of heating, ventilating, and air conditioning systems and all work shall be done under the direct supervision of a qualified heating and air conditioning Engineer employed by the Contractor.
 5. This Contractor shall not be associated with the same Contractor installing the hydronic, or air system.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.01 HYDRONIC BALANCING

- A. The Mechanical Contractor shall fill and vent the entire system ready for balancing. This Contractor shall check all systems completely. The following minimum requirements shall serve as a guide check:
1. Verify system pressures, air venting, correct water circulation through boilers, chillers, towers, pumps, coils, piping, etc.
 2. Check and verify cleanliness of the system and its chemical condition.
 3. Check all temperature controls for setting and operation. Request the assistance of the controls contractor to verify the settings and to assist in operating the system as herein requested.
 4. Check the accuracy of the thermostat settings by taking at least 20% of all temperature readings in a typical space for each separately controlled zone. See Section B15950.
- B. After the system has been prepared as stated above, proceed to provide these minimum requirements:
1. Check water flow rates through equipment by pressure drops, flow meters, curves, or amperage on the following equipment:
 - a) Pumps
 - b) Coils
 - c) Flow Meters
 2. Advise the A/E immediately of any unusual conditions which will affect the balancing of the system.
 3. Adjust all flows, and mark all balancing valve settings with permanent indicating marks. Highlight all indicating marks with over-spray of paint.
- C. When the temperature is below 15°F outside, and after proper notification by the A/E, this Contractor shall recheck the heating system at no additional cost to the Owner.
- D. When air conditioning is required, and after proper notification by the A/E, this Contractor shall recheck the chilled water system at no additional cost to the owner.

3.02 AIR BALANCE

This Contractor shall prepare all air systems for balancing in the following manner:

1. Open all existing volume dampers to open position. Inspect all fire and smoke positions.
2. Check all filters, automatic damper positions, and fan rotations.

3. Test and adjust blower speeds, running amperage, and adjust the system for design CFM. Make allowances for excess air at the central fan systems for duct leakage. Record leakage value in report.
4. Install Venlok instrument test openings and make pitot tube traverse of all main and branch supply, return, and exhaust ducts.
5. Test static pressures at various points at all central fan systems.
6. Adjust all zones to provide proper design CFM for supply, return, and exhaust.
7. Test and adjust all air diffusers, grilles, and outlets to within +5% of design requirements.
8. Test and adjust air velocities in each room and adjust to minimize air drafts.
9. Check all operating controls for setting and operation.
10. Test the system with mixing dampers in the minimum outside air position, 50% open and 100% open.
11. Test for possible air stratification on the central fan systems and advise the Ventilating Contractor of baffles, or other devices, required to minimize this condition.
12. Mark the setting of the volume damper with an over-spray of paint to highlight the position of the arm.
13. Balance variable air volume boxes to minimum and maximum setting and record in Balancing Report.

3.03 REPORTS

- A. Report all finally adjusted test data and information on standard AABC report forms. Where such forms are unavailable, the Contractor shall develop printed, or typewritten forms on standard sheet sizes. Enclose all reports in a vinyl covered folder of the type which will allow reports to be inserted or removed as required. Submit four (4) copies of the report to the A/E for review.
- B. Report data shall include the following minimum data:
 1. Instruments used and their calibration dates.
 2. Fan design CFM and static pressure.
 3. Outlet and inlet total design CFM and static pressures.
 4. Actual fan CFM and static pressure.
 5. Outlet and inlet actual total CFM and static pressures.
 6. Fan and motor nameplate data, actual RPM fan and motor, amps, BHP, pulleys, and belt sizes.

7. Complete fan profiles at all conditions of CFM, maximum and minimum volume with 100% outside air and minimum outside air.
8. Duct traverse sheets with all traverses included.
9. VAV box design and actual CFM at maximum and minimum CFM.

3.04 EQUIPMENT AND PROCEDURES

- A. The Contractor shall provide his own, or rented, instruments necessary to effect a complete water and air balance. All instruments shall have been calibrated within the previous three (3) months, and certification of the calibration shall be sent to the A/E upon request.
- B. The Mechanical or Ventilating Contractor shall replace any fixed and/or adjustable sheaves with new fixed sheaves and belt drives as necessary to achieve the design air quantities. All V-belt drives shall be inspected, and any drive with an unbalanced belt loading shall be replaced with a matched set of belts. All work shall be done at no additional cost to the owner.
- C. The Ventilating Contractor shall provide all additional volume dampers, turning vanes, and baffles as required to air balance the new system.
- D. The Mechanical Contractor shall provide all balancing valves, thermometers, pressure gauges, chemical cleaners, and shall fill all systems with water prior to water balancing.

3.05 GUARANTEE

The Contractor shall guarantee that the system will be tested, adjusted, and balanced to the values as set forth on the plans and specifications; and that all data reported is accurate and can be verified at the project.

END OF SECTION

SECTION C15010

BASIC FIRE PROTECTION GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Applicable requirements of instruction to bidders, conditions of contract and of Sections listed under related Sections of this Division apply to all work specified in this Division 15000.

1.02 RELATED SECTIONS OF THIS DIVISION

C15010 - Basic Fire Protection General Requirements

C15050 - Basic Fire Protection Materials and Methods

C15400 - Fire Protection Systems

1.03 RELATED WORK OF OTHER SECTIONS OR DIVISIONS

Division 1

A15000 - Plumbing

B15000 - HVAC

16000 - Electrical

1.04 WORK INCLUDED IN THIS SECTION

1.05 Work Not Included In This Section

1.06 Reference Standards

1.07 General Requirements

1.08 Visiting the Premises

1.09 Codes and Regulations

1.10 Discrepancies

1.11 Certifications

1.12 Workmanship and Materials

1.13 Manufacturer's Recommendations

1.14 Design Criteria

2.01 Submitted Data and Shop Drawings

2.02 Maintenance Manuals

3.01 Openings, Cutting, and Repairing

3.02 Cleaning Equipment and Materials

3.03 Cleanup

3.04 Record Drawings

3.05 Protection

3.06 Guarantee

1.05 WORK NOT INCLUDED IN THIS SECTION

- A. Temporary Utilities and Services (Refer to Division 1 Requirements)
- B. Electrical, Line Voltage Wiring
- C. Painting (unless specified otherwise)

1.06 REFERENCE STANDARDS

NFPA 72 Installation, maintenance and use of protective signaling systems

Refer to 15060A for pipe and fitting reference standards.

NFPA 13 Installation of sprinkler systems.

1.07 GENERAL REQUIREMENTS

- A. This is a Performance Specification for a contractor Design/Build Fire Sprinkler System remodeling. This fire protection contractor shall be the engineer of record as well as the contractor for the fire sprinkler system and related components. This section of the specifications is intended to establish a standard and a level of quality for bidding purposes and for construction. This Section of the work shall be responsible for preparing installation drawings, complete code-compliant design, engineering and construction coordination with other trades, hydraulic calculations, and submission of same to local, State, and insurance agencies having jurisdiction. Refer to Plumbing Plans for area to be remodeled. Refer to Architectural reflected ceiling plans for preferred sprinkler locations/patterns.
- B. In all exposed structure ceilings, sprinkler piping shall be installed as concealed as possible to ensure an unobtrusive, aesthetically appealing installation. Refer to structural plans and coordinate piping locations and purlin and beam penetrations prior to construction.
- C. Obtain information on conditions affecting work at building, including the following:
 - 1. Complete information as to details of building constructions, pipe and equipment layout, in order to install and revise existing system to clear structural work and piping of equipment of other trades.
 - 2. Accessibility: Minor deviations from the drawings may be made to allow for better and more coordinate accessibility. Changes of magnitude which may affect the work of other Contractors shall not be made without authorized approval.
 - 3. Storage Space: Stored materials shall be located so as to facilitate prompt inspection. See Conditions of Contract.
- D. On all conditions affecting work, obtain at building conditions of structure and surfaces to support pipe and equipment.
 - 1. Examine details of building construction in order to install system to clear all structural work and finished work.
 - 2. Examine electrical, heating and ventilating and special equipment and piping layouts and specifications.

1.08 VISITING THE PREMISES

- A. The Contractor, before submitting his bid on the work, must visit the site and familiarize himself with all visible existing conditions.
- B. As a result of having visited the premises, the Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions.
- C. The submission of a bid will be considered an acknowledgment on the part of the bidder of his visitation to the site.

1.09 CODES AND REGULATIONS

- A. Design, materials and installation shall comply with National Fire Protection Association (NFPA) Standards, State and local codes, local Fire Chief or Fire Marshall.
- B. Inspection and approval of detailed plans of installation with insurance approval shall be submitted to Architect prior to installation.

1.10 DISCREPANCIES

- A. The drawings and specifications are intended to cooperate. Any materials, equipment or systems related to this Section and exhibited on the Architectural and Fire Protection Drawings, but not mentioned in the Specifications are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings. In the event of differences in the requirements between drawings, specifications, NFPA, State and Local codes or insurance agency, the more stringent requirement shall apply.

1.11 CERTIFICATIONS

- A. Fire protection system components shall be UL listed and labeled. All components shall be Factory Mutual approved with the exception of sprinkler heads, double check valves and air compressors.

1.12 WORKMANSHIP AND MATERIALS

- A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent who will be constantly in charge of the erection of the work until completed and accepted.
- B. Unless otherwise hereinafter specified, all materials and equipment under this Division of the Specifications shall be new, or best grade and as listed in printed catalogs of the manufacturer. Each article of its kind shall be the standard product of a single manufacturer.
- C. All manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating.
- D. Reference to standards are intended to be the latest revision of the standard specified.
- E. Promptly inspect all shipments to insure that the materials being received are undamaged and comply with specifications.

1.13 MANUFACTURER'S RECOMMENDATIONS

- A. Equipment installed under this Division of the Specifications shall be installed according to manufacturers' recommendations.

1.14 DESIGN CRITERIA

- A. Remove existing sprinklers & piping from the area to be remodeled.
- B. Design and install a fully operational, code compliant, approved, complete hydraulically designed automatic sprinkler system for entire remodeling area and as needed outside the remodeling area due to HVAC work, as indicated on plumbing drawings.
- C. Water Supply: (Existing Fire Pump System)
 - 1. Existing Fire Pump Capacity: 1,000 GPM.
 - 2. Existing Fire Pump suction pressure at 0 GPM = 62 PSI.

3. Existing Fire Pump suction pressure at 1,578 GPM flowing = 48 PSI, (150% of Fire Pump rated capacity).

Verify all design criteria prior to installation drawing preparation and calculation. Perform flow tests if required for positive verification.

PART 2 – PRODUCTS

2.01 SUBMITTED DATA AND SHOP DRAWINGS

- A. General: Refer to Division 1 requirements. Five (5) copies of each of brochures, shop drawings and material lists as required by the specifications, shall be prepared and submitted to the Architect for review within 30 days after award of the Contract. No work indicated on any one shop drawing shall be started until such drawings have been reviewed by the A/E.
- B. This contractor shall review all the shop drawings for complete compliance to the drawings and the specifications before submitting the drawings to the A/E. The contractor's review shall verify the following:
 1. All items requiring submittal are included in first submittal.
 2. Equipment being submitted was specified.
 3. Quantities submitted are correct.
 4. Sizes and capacities are as specified.
 5. Electrical characteristics have been checked with the electrical contractor, or verified at the site.

Any deviations from the drawings or the specifications shall be pointed out and provided with an explanation with the submittal.

- C. The contractor shall stamp the shop drawings with his own review stamp, or submit a separate statement that the enclosed shop drawings have been reviewed in accordance with the specifications. The shop drawings shall not be reviewed without the contractor's review stamp or written statement.
- D. Final review of the drawings by the A/E or his representative shall not relieve the contractor from the responsibility of complying with the requirements of the drawings and specifications.
- E. Submittal Data:
 1. Submit complete brochures giving names of manufacturers and catalog figure numbers, trade names, technical data and requested information of each item listed as follows:
 - a. Sprinklers
 - b. Tags, Labels and Signs
 - c. Installation Drawings and Calculations
 - d. Spare Sprinkler Cabinet.
 2. Submit shop drawings and detail description of items which are not manufactured and which have to be specifically fabricated.
 3. Submit a list of all material as specified; not covered by brochures or shop drawings.
 4. Submittal data shall be referenced to section and paragraph numbers of the specifications and to fixture and equipment numbers listed or scheduled and shall be assembled in

numerical order of the specification paragraphs. Submittals shall be bound in sets between cover and all sets within a section shall be identical.

5. Where equipment manufacturers named as equivalent or approved equal are proposed for use by the Contractor, he shall be responsible to coordinate the change with all trades affected. He shall submit for approval 1/4 inch scale working drawings of equipment rooms plan and section.
6. Prior to start of work, Contractor shall obtain approval of installation drawings from Owner's Insurance Company, Local Authorities having jurisdiction and Architect/Engineer.

2.02 MAINTENANCE MANUALS

- A. Maintenance manuals, instructional data and operating instructions for equipment and materials in this Section shall be assembled by trade and delivered to the following:
 - Three (3) copies to the Owner

PART 3 – EXECUTION

3.01 OPENINGS, CUTTING, AND REPAIRING

- A. This Contractor shall cooperate with the work to be done under other Sections in providing information as to openings required in walls and floors for all piping and equipment, including sleeves where required.
- B. Any drilling or cutting required for the performance of work under this Section shall be the responsibility of this Contractor and the cost thereof shall be borne by him.
- C. It shall be the responsibility of this Contractor to ascertain that all chases and openings are properly located.
- D. This Contractor shall provide and patch all wall, floor and ceiling openings for installation of Fire Protection equipment in the existing building, unless this work is specifically mentioned to be done by another Contractor.
- E. This Contractor shall remove and replace suspended ceiling tiles and supports as required to install new Fire Protection work. This Contractor shall pay for repair of any unnecessary damage.
- F. Finished conditions shall be not less than existing conditions.

3.02 CLEANING EQUIPMENT AND MATERIALS

- A. Provide for the safety and good condition of all materials and equipment until final acceptance by the Owner. Protect all materials and equipment from damage. Provide adequate and proper storage facilities during the progress of the work.
- B. All piping, finished surfaces and equipment shall have all grease, adhesive labels and foreign materials removed.

3.03 CLEANUP

- A. Remove from the premises all unused material and debris resulting from the performance of work under this section. Refer to Division 1 requirements.

3.04 RECORD DRAWINGS

- A. Record drawings, showing dimensions, locations of all piping, plugged outlets and equipment shall be kept up-to-date. Master copy shall be kept on the job. No fire protection progress

payments will be approved unless record drawings are up-to-date. Refer to project record drawings under Division 1 General Conditions.

3.05 PROTECTION

- A. Open ends of all piping must be effectively closed and kept closed during construction.

3.06 GUARANTEE

- A. All materials and equipment provided and/or installed under this Section of the Specifications shall be guaranteed for a period of one year from the date of acceptance of the work by the Owner. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without any cost to the Owner. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the entire satisfaction of the Owner.
- B. In the event of occupancy by the Owner prior to final acceptance of the project, the guarantee date for equipment placed in operation shall be mutually agreed to by the Contractor and the Owner's representative.

End of Section C15010

SECTION C15050

BASIC FIRE PROTECTION MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED SECTIONS OF THIS DIVISION

C15010 - Basic Fire Protection General Requirements

C15400 - Fire Protection Systems

1.02 WORK INCLUDED IN THIS SECTION

2.01 Sleeving and Fire Stopping

2.02 Hangers and Inserts

2.03 Identification

2.04 Escutcheons

2.05 Electric Wiring

3.01 Installation

3.02 Hanger Support and Spacing

3.03 Tests

PART 2 - PRODUCTS

2.01 SLEEVING AND FIRE STOPPING

A. All penetrations of walls, floors, or roofs shall be done by use of sleeves manufactured for that purpose. Sleeves in concrete, masonry, or precast concrete shall be Schedule 40 steel pipe. All other sleeves to be #22 gauge galvanized steel.

B. Installation:

1. Provide clearance of 1/2" around piping.

2. Each sleeve to pass through entire floor, wall, or roof construction and end to be set flush with surrounding surface in which it is installed; sleeves through floors must project 2" above finished floor.

3. Fire rated floor and wall penetrations: Fill opening between pipe and sleeve with Nelson CLK or Tremco or 3M Fire Stop material. Fire and smoke rating of sealant shall match rating of wall or floor being penetrated.

2.02 HANGERS AND INSERTS

A. Vertical support and bracing for steel risers shall be by use of carbon steel riser clamps at every floor and braced laterally at every floor or midspan, B-Line B3373, Grinnell 261.

B. Horizontal lines shall have hangers and rods adequate for size, material, and service. Total weight of equipment, including valves, fittings, pipe, pipe contents, and insulation, are not to exceed the limits indicated.

Hanger Rod Sizes (Per NFPA-13, Table 2-6.4)

1" to 4" = 3/8" diameter rod

5" to 8" = 1/2" diameter rod

- C. All supports, guides, brackets, and braces shall be adequately fastened to the structure. No work shall be supported from any structural bridging angles.
- D. Pipe Hangers and Supports:
 - 1. Swivel Ring, UL listed specifically for Fire Protection, all sizes.
 - 2. Multiple or Tapeze Hangers:
 - a. Steel strut channels by B-Line or Grinnell.
 - 3. Floor Support:
 - a. Carbon steel pipe saddle, stand and bolted floor flange.
- E. Beam Clamps:
 - 1. MSS SP-69 Types 19 and 23 malleable black iron clamp for attachment to beam flange to 0.62 inches thick with a retaining ring and threaded rod of 3/8, 1/2 and 5/8 inch diameter. Furnish with a hardened steel cup point set screw. B-Line B3036L/B3034, Grinnell 86/92.
 - 2. MSS SP-69 Type 28 or Type 29 forged steel jaw type clamp with a tie rod to lock clamp in place, suitable for rod sizes to 1-1/2" diameter. B-Line B3054, Grinnell 228.
- F. All anchors, hangers, and supports to be designed to meet local structural requirements and Architect's approval.
- G. All hangers of one type shall be catalog items of one manufacturer.
- H. No pipes shall be hung or supported by other pipe or ductwork.

2.03 IDENTIFICATION

- A. Identification of all systems and valves shall be by means of purchased signs that shall indicate portions controlled by each valve or riser, list design criteria, valve duty, etc. in conformance with NFPA and F.M. standards.
- B. Signs shall be 0.022 aluminum, red and white Argco Trim-Line or approved equivalent.

2.04 ESCUTCHEONS

- A. Provide on all pipe passing through finished floor, walls, and ceilings with outside diameter sufficient to cover sleeved openings and inside diameter to fit snugly around pipe.

2.05 ELECTRIC WIRING

- A. All line voltage wiring shall be by Electrical Contractor; Fire Protection Contractor shall furnish wiring diagrams to Electrical Contractor for electric equipment furnished.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. As per NFPA rules and regulations and insurance carrier recommendations.
- B. Cutting and boring through structural members shall be done only when approved by and under supervision of Architect and/or Structural Engineer.
- C. Size, apply and install supports and anchors in compliance with manufacturer's recommendations.
- D. Install supports to provide for free expansion of the piping system. Support all piping from the structure using concrete inserts, beam clamps, ceiling plates, wall brackets, or floor stands.

- E. Coordinate hanger and support installation to properly group piping of all trades.
- F. Perform welding in accordance with standards of the American Welding Society.

3.02 HANGER AND SUPPORT SPACING

- A. Place hanger within 12 inches of each horizontal elbow, valve, strainer, or similar piping specialty item.
- B. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers.
- C. Support riser piping independently of connected horizontal piping.
- D. Space hangers for pipe as follows (NFPA-13, Table 4-14.2.2.1):

<u>Pipe Material</u>	<u>Pipe Size</u>	<u>Maximum Horizontal Spacing</u>	<u>Maximum Vertical Spacing</u>
Steel	1/2" through 1-1/4"	12' 0"	15' 0"
Steel	1-1/2" through 8"	15' 0"	15' 0"

3.03 TESTS

- A. Conducted as required in accordance with NFPA Standards.
- B. Test piping in sections or entire system as required by sequence of construction. Do not conceal pipe until it has been successfully tested. If required for the additional pressure load under test, provide temporary restraints at fittings or expansion joints. Entire test must be witnessed by the **Architect's** representative.
- C. Use clean water and remove air from the piping being tested where possible. Measure and record test pressure at the high point in the system.
- D. Test system at 200 psi for 2 hours showing no leakage. Where system design is in excess of 150 psig, test at a pressure 50 psig above system design pressure.
- E. All pressure tests are to be documented on NFPA Contractor's Material and Test Certificate forms.

End of Section C15050

SECTION C15400
FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.01 RELATED SECTIONS OF THIS DIVISION

C15010 - Basic Fire Protection General Requirements

C15050 - Basic Fire Protection Materials and Methods

1.02 WORK INCLUDED IN THIS SECTION

1.03 Kind and Quality of Materials

2.01 Pipe and Fitting Materials

2.02 Valves

2.03 Sprinklers and Cabinets

3.01 Installation

3.02 Valving

3.03 Protection of Finished Work

1.03 KIND AND QUALITY OF MATERIALS

A. Materials, appliances, and fixtures to be new, of best quality and grade, in strict accordance with specification requirements.

PART 2 - PRODUCTS

2.01 PIPE AND FITTING MATERIALS

A. Pipe and pipe fittings are to conform to the appropriate commercial standards or Federal or American Society for Testing Materials specifications listed.

B. Overhead Distribution: Black steel pipe; 2" and under Allied Super 40, ASTM A135/A795, Type E, Grade A (or American Tube Dyna-Thread-40 equivalent). 2-1/2" and larger Allied Super Flo ASTM 795, Type E, Grade A (or American Tube Dyna-Flow-10 equivalent).

C. Malleable Iron Class 150 ASTM A197/ANSI B16.3 or cast iron Class A, ASTM A126 threaded fittings and pipe ends for 1" thru 2" sizes. Victaulic (Central or Gruvlok) couplings and mechanical grooved end fittings with EPDM gaskets for sizes 2 1/2 inch and larger. Gaskets for mechanical joints on dry systems shall be EPDM, flush seal.

D. Absolutely no threading of Schedule 10 or thin wall pipe and no plastic pipe allowed.

E. Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.

F. Unions and Flanges:

1. 2" and smaller steel: ASTM A197/ANSI B16.3 malleable iron unions with brass seats. Use black malleable iron on black steel piping and galvanized malleable iron on galvanized steel piping.

2. 2-1/2" and larger: ASTM A181 or A105, Class 150, grade 1 hot forged steel flanges of threaded, welding neck, or slip-on pattern on black steel and threaded only on galvanized steel. ANSI B16.1 or ANSI B16.5, Class 150 cast iron threaded flanges. Use raised face flanges ANSI B16.5 for mating with other raised face flanges or equipment with flat ring

or full face gaskets. Use ANSI B16.1 flat face flanges with full face gaskets for mating with other flat face flanges on equipment.

2.02 VALVES

- A. Valve manufacturers: Kennedy, Milwaukee, Nibco, Stockham, Central, Watts.
 - 1. Drain valves shall be NIBCO KT65-UL, Milwaukee #536, bronze globe type, or Milwaukee #5361 angle globe.
 - 2. Valves shall be suitable for tamper-switch installation on main and floor control valves.

2.03 SPRINKLERS AND CABINET

- A. New sprinklers as manufactured by Viking, Star, Central, or approved equal.
- B. Sprinklers:
 - 1. Suspended Ceilings: Viking Micromatic Model "M" recessed pendant, polished chrome finish. Sprinkler with Viking Model E-1, recessed, white enamel finish escutcheon.
 - 2. Exposed Areas without Ceilings: Viking Model "M" upright, bronze.
 - 3. Sidewall Sprinklers: Viking Model "M", chrome finish.
 - 4. Flexible Sprinkler Connector: Commercial Ceiling Flexhead by Flexhead Industries Series 205/205-SS.
- C. Use Quick Response Sprinklers where applicable.
- D. Select fusible link temperature rating to not exceed maximum ambient temperature rating allowed under normal conditions at installed location. Provide ordinary temperature (165°) fusible link except at skylights, sealed display windows, attics and roof spaces, over cooking equipment, adjacent to diffusers, unit heaters, uninsulated heating pipes or ducts, or where other heat sources exist.
- E. Cabinets: Furnish and install one (1) red enameled steel sprinkler cabinet having spare sprinklers, which include all types and ratings installed. Also include a special wrench for removal and installation. Cabinet to be wall mounted; install on wall next to sprinkler riser or as directed by Building Maintenance. Quantity of heads as per NFPA 13, 2-2.7.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install piping so that system can be drained. Where possible, slope to main drain valve. Slope dry pipe and preaction systems subject to freezing at minimum 1/4"/10' on mains and 1/2"/10' on branches. Where piping not susceptible to freezing cannot be fully drained, install nipple and cap for drainage of less than 5 gallons or valve/nipple/cap for drainage over 5 gallons. Pipe main drain valves to grade or to air gap sewer.
- B. Sprinklers: Locate sprinkler heads as indicated on fire protection plan and reflected ceiling plan maintaining minimum clearances from obstructions, ceilings and walls. Install sprinkler heads level in locations not subject to spray pattern interference. Where sprinklers are to be installed in suspended ceilings, sprinklers shall be located in the center of 2' x 2' tiles and in the center of 2' x 2' half of 2' x 4' tiles.

3.02 VALVING

- A. Valving: Approved type test valves, control valves, and drain valves at points required throughout system. All points of system shall be able to be drained through drain valves. All drain valves shall be exposed to view below ceilings of mechanical or storage spaces.

3.03 PROTECTION OF FINISHED WORK

- A. Repair, replace, and pay for breakage of glass, patching, and repairing of all damage to finished work caused by this Section of the work.

End of Section C15400

SECTION 16001

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

- A. All requirements of Division 1 govern work under this Section.

1.02 GENERAL PROVISIONS

- A. In general, the work includes: Electrical work and the kindred materials and operations as indicated on the drawings and as specified in the following articles of Section 16000, 16100, 16515, 16722, 16751 and 16950.
- B. Job Information: Obtain at building including:
 - 1. Conditions affecting this Section of the Work.
 - 2. Accessibility
 - 3. Storage space.

1.03 GENERAL REQUIREMENTS

- A. This Section of the Specifications applies to all electrical work. The General Conditions, Supplementary Conditions, Summary of the Work, Instructions to Bidders and all Sections of the Conditions of the Contract form a part of these specifications and the Contractor shall consult them in detail. Electrical work indicated in other Sections of the Specifications to be done by the Electrical Contractor shall be included in the Work of this Section.

1.04 DEFINITIONS

- A. Certain terms used herein; on the drawings; and in the contract documents, shall be defined as follows:
- B. Provide: Furnish and install complete and ready for service.
- C. Exposed: Exposed to view in any room, hallway, passageway, or outside.
- D. Approval: The approval of the Architect in writing or by signed rubber stamp applied to drawings, illustrations, etc.

1.05 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. These specifications and attendant drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material necessary for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.

1.06 DRAWINGS

- A. The Electrical drawings do not attempt to show the complete details of building construction which affect the electrical installation. The Contractor shall refer to the architectural, civil, structural and mechanical drawings for additional details which affect the proper installation of this work. The Contractor is cautioned that diagrams showing electrical connections

and/or circuiting are diagrammatic only and must not be used for obtaining lineal runs of wire to conduit. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.

1.07 MATERIAL AND EQUIPMENT

- A. All material and equipment shall be new and of the quality used for the purpose in good commercial practice, and shall be standard product of reputable manufacturers. Each major component of equipment shall have the manufacturer's name, catalog number, and capacity or rating on a nameplate, securely affixed on the equipment in a conspicuous place.

1.08 SUBSTITUTION AND APPROVAL OF MATERIAL

- A. See Instructions to Bidders.
- B. Such requests shall be accompanied by three copies of all necessary illustrations, cuts, drawings and descriptions of material proposed for substitution and shall fully describe all points in which it differs from the articles specified. Two copies will be retained by the Architect and one copy returned to the Contractor with approval or revisions indicated thereon.

1.09 DAMAGE TO OTHER WORK

- A. The Electrical Contractor will be held rigidly responsible for all damages to the work of his own or any other trade resulting from the execution of his work. It shall be the Contractor's responsibility to adequately protect his work at all times. All damages resulting from his operations shall be repaired or the damaged portions replaced by the party originally performing the work, (to the entire satisfaction of the Architect), and all cost thereof shall be borne by the Contractor responsible for the damage.

1.10 COOPERATION WITH OTHER TRADES

- A. This Contractor shall completely cooperate with all other trades in the matter of planning and executing of the work. Every reasonable effort shall be made to prevent conflict and interferences as to space requirements, dimensions, locations, openings, sleeving or other matters which tend to delay or obstruct the work of any trade.

1.11 NEGLIGENCE

- A. Should the Contractor fail to provide materials, templates, etc., or other necessary information causing delay or expense to another party, he shall pay the actual amount of the damages to the party who sustained the loss.

1.12 FIELD CHANGES

- A. Should any change in drawings or specifications be required to comply with local regulations and/or field conditions, the Contractor shall refer same to Architect for approval before any work which deviates from the original requirements of the drawings and specifications is started. In the event of disagreements as to the necessity of such changes, the decision of the Architect shall be final.

1.13 CUTTING AND PATCHING IN NEW CONSTRUCTION

- A. As necessary and with approval to permit the installation of conduit or any part of the work

under this branch. Any cost caused by defective or ill-timed work shall be by the party responsible therefor. Patching of holes, openings, etc. resulting from the work of this branch shall be furnished by this contractor.

- B. See Division 1 for additional requirements.
- C. See also “Demolition, Renovation, and Disposition of Existing Equipment” in this Section.

1.14 COMPLETION DATES

- A. This Contractor shall be in a position to meet all completion dates established by the Architect and shall furnish all labor of all classes required to meet such schedules and completion dates.

1.15 STANDARDS, CODES AND PERMITS

- A. All work shall be installed in accordance with National, State and Local electrical codes, laws, ordinances and regulations. Comply with all applicable OSHA regulations.
- B. All materials shall have a U.L. label where a U.L. standards and/or test exists.
- C. Prepare and submit to all authorities having jurisdiction, for their approval, all applications and working drawings required by them.
- D. Secure and pay for all permits and licenses required.

1.16 CLEAN-UP

- A. This Contractor shall at all times keep the premises free from excessive accumulation of waste material or rubbish resulting from his work, including tools, scaffolding and surplus materials, and he shall leave his work broom clean or its equivalent.
- B. In case of dispute, Architect may order the removal of such rubbish and charge the cost to the responsible contractor as determined by the Architect. At the time of final clean-up all fixtures and equipment shall be thoroughly cleaned and left in proper condition for their intended use.

1.17 TESTS

- A. The Contractor shall provide all instrumentation, labor and conduct all tests required by the Architect. All tests shall be made before any circuit or item of equipment is permanently energized. Circuits shall be phased out and loads shall be distributed as evenly as possible on all phases. All phase conductors shall be entirely free from grounds and short circuits. All instrumentation and personnel required for testing shall be provided by the Contractor and all tests shall be conducted in the presence of the Architect or his authorized representative.
- B. System Tests:
 - 1. The following tests are required prior to energization of the electrical system:
 - a. Secondary feeders shall have an insulation resistance test utilizing a megger applying a test potential of 500 volts DC minimum.
 - b. Establish secondary phase to ground voltages.
 - c. Establish proper phase relationship and motor rotation.
 - 2. The following tests are required under normal load condition:

- a. Record secondary phase to phase and phase to ground voltages and phase currents at all major equipment, apparatus, and on all secondary feeders. Voltage readings shall be taken at line side terminals of distribution centers and panelboards.
 - b. Confirm proper phase relationship and motor rotation.
 - c. Confirm load balance at distribution centers and panels. Rebalance load if necessary such that the minimum unbalance between phases shall not exceed 7-1/2%.
 - d. Confirm operation of all electrically operated apparatus, such as circuit breakers, transfer switches, etc., by exercising same under load.
 - e. Record all settings and calibrations of circuit breakers, transfer switches, transformers, meters, timing devices, etc.
- C. Records:
1. All test data obtained by the E.C. or manufacturer/supplier shall be recorded and filed with the maintenance manual as part of permanent job records. Test data shall include identification of instruments employed (field test only), condition of test (time, date, weather, etc.), parameters of test, personnel conducting test, and any pertinent information or conditions noted during the test.

1.18 SHOP DRAWINGS

- A. Submit to Engineer for review, copies of manufacturer's shop drawings and/or equipment brochure depicting:
 1. Lighting Fixtures
 2. Panelboards
 3. Occupancy Sensors
 4. Fire Alarm System Devices
 5. Telecommunications Equipment and Cabling
 6. Wiring Devices
 7. Other materials at the request of the Engineer
- B. See Section 01300.
- C. Shop drawings shall bear the Contractor's stamp indicating approval.
- D. Any equipment fabrication prior to shop drawing review shall be at the Contractor's risk.

1.19 WORKMANSHIP

- A. The installation of all work shall be made so that its several component parts will function as a workable system complete with all accessories necessary for its operation, and shall be left with all equipment properly adjusted and in working order. The work shall be executed in conformity with the best accepted standard practice of the trade so as to contribute to efficiency and appearance. It shall also be executed so that the installation will conform and adjust itself to the building structure, its equipment and its usage.

1.20 DRAWINGS OF OTHER TRADES

- A. The Contractor shall consult the drawings of the work for the various other trades; field

layouts of the parties performing the work of the other trades; their shop drawings, and he shall be governed accordingly in laying out his work.

- B. Specifically examine shop drawings to confirm voltage, current characteristics, and other wiring requirements for utilization equipment. Bring any discrepancies to the attention of the A/E.

1.21 FIELD MEASUREMENTS

- A. The Contractor shall take all field measurements necessary for his work and shall assume the full responsibility for their accuracy.

1.22 STRUCTURAL INTERFERENCES

- A. Should any structural interferences prevent the installation of the outlets, running of conduits, etc., at points shown on drawings, the necessary minor deviation therefrom, as determined by the Architect, may be permitted. Minor changes in the position of the outlets or equipment if decided upon before any work has been done by the Contractor shall be made without additional charge.

1.23 EXAMINATION OF PLANS, SPECIFICATIONS AND SITE

- A. Before submitting a bid, the Contractor shall visit the site and familiarize himself with all features of the building and site which may affect the execution of his work. No extra payment will be allowed for the failure to obtain this information. If in the opinion of the Contractor there are omissions or errors in the plans or specifications, the Contractor shall clarify these points with the Architect before submitting his bid. In lieu of written clarification by addendum, resolve all conflicts in favor of the greater quantity or better quality.

1.24 GUARANTEE

- A. The Contractor shall unconditionally guarantee his work and all components thereof, excluding lamps, for a period of one year from the date of his final payment. He shall remedy any defects in workmanship and repair or replace any faulty equipment which shall appear within the guarantee period to the entire satisfaction of the Architect at no additional charge.

1.25 TEMPORARY WIRING AND SERVICE

- A. No temporary electrical service is required on this project. The existing electrical distribution system in the Dane County City-County Building shall provide any power required for construction.
- B. All contractors shall provide and maintain their own extension cords and additional lamps as required to perform his work properly. Contractors requiring temporary connections to 3 phase power service and single phase feeders for other than lighting and small fractional horsepower motorized tools shall make arrangement with the Electrical Contractor. Contractors requiring lighting outside of the building shall make their own arrangements with the Electrical Contractor and pay all costs for installation, maintenance and removal. Contractors requiring electrical equipment over one HP, including welders, hoists, heaters and coolers shall make their own arrangements for such service beyond the main switch and shall pay all costs thereof.

- C. No permanent electrical equipment or wiring shall be used for temporary connections, unless authorized by this Section, upon signed order and with approval by the Architect in behalf of the Owner. Such approvals shall not shorten guarantee period.
- D. Electrical energy to be paid for by owner.

1.26 ELECTRICAL SERVICE

- A. The existing electrical service in the Dane County City-County Building shall remain as is.
 - 1. The building has a 208Y/120-volt, 3-phase, 4-wire service for general lighting and receptacle loads.
 - 2. The building also has a 480-volt electrical service that is used for large HVAC loads.
 - 3. Refer to the electrical drawings for partial one line riser diagrams and the work involved on the project.

1.27 BRANCH CIRCUIT WIRING

- A. See plans for general arrangement of circuits, conduit runs, and ratings of branch circuits and special circuits.
- B. Provide everything necessary to comply with the general scheme shown, including all types of control.
- C. Circuit numbers as shown on plans are for contractor to plan his wiring and for estimating purposes. These numbers are not necessarily consecutive numbers of the panelboard breakers. Balanced load on bus is to be the determining factor in arrangement of circuits. Balance loading to within 7 1/2%.
- D. Minimum size of lighting system branch circuit conductors to be #12 AWG.
- E. Conductors terminating at wired outlets shall extend at least eight (8) inches beyond outlet box conduit fitting.
- F. 120 volt circuit home runs greater than 50 feet in length shall have #10 AWG minimum size between panel and first receptacle or fixture outlet.

1.28 MOTOR WIRING

- A. Unless otherwise indicated on the drawings or elsewhere in these specifications, all motors shall be furnished by others.
- B. Motors shall be set in place by others and the associated motor starters and controllers shall be turned over to this Contractor for erection and line voltage power wiring.
- C. Any contractor supplying starters and controllers that are not part of this contract shall index same and provide this Contractor with instructions as to proper location in sufficient time to permit the installation of a concealed raceway system.
- D. Where this Contractor is required to provide control wiring, the Contractor supplying the controllers shall provide all necessary and required wiring diagrams for proper installation.
- E. Low voltage (less than 115 volts) control wiring shall be by others, unless noted elsewhere in the specifications except that this Contractor shall extend circuit to associated transformers, wire and connect to same.

- F. This Contractor shall examine the plans and specifications of other sections and shall include in his bid all control wiring, as referenced to be performed by Section 16001.
- G. Required disconnect switches furnished by other sections shall be installed by Section 16001. Furthermore, this Contractor shall provide all disconnect switches required by code that are not furnished by other sections.

1.29 SPECIAL OUTLETS

- A. General: Furnish and install outlets, wiring and receptacles accordingly, at locations required by equipment serviced or otherwise as directed. Extend wiring to outlets on equipment and make final connection.

1.30 IDENTIFICATION

- A. General:
 - 1. Materials and equipment installed under this Section shall be clearly identified as listed below.
 - 2. Locate identification conspicuously.
 - 3. Terminology to be approved by Architect.
 - 4. See plans for any additional items to be identified.
 - 5. Loads such as motors shall be described by function rather than by the system of arbitrary number as shown on electrical plans.
 - 6. Use abbreviations sparingly.
- B. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely screwed or riveted to the following equipment. Size 1" x 4" with 3/8" high letters; unless space available dictates differently.
 - 1. Each panelboard, contactor, time switch, starter or disconnect switch. Locate on inside cover of panels.
 - 2. Each feeder at all accessible locations.
 - 3. Each end of empty conduit runs to indicate the intended use of the conduit and the location of opposite end. Use room numbers that are permanently assigned.
- C. Typewritten Directory: Each panelboard both new and existing shall be provided with a typewritten directory attached to the inside of panel door and covered with clear plastic indicating load served and rooms served by each protective device in the respective panel. Spares and spaces shall be clearly identified.
- D. Switch Station:
 - 1. All key switches shall be engraved indicating controlled item.
 - 2. All remote switches shall be engraved indicating controlled item.
- E. Conductor Identification:
 - 1. Identify each conductor at each wiring device, connector or splice point with permanently attached wrap-around adhesive markers as manufactured by Brady Co. or 3M.
 - 2. This identification shall include branch circuit number, control circuit, or any other appropriate number or lettering that will expedite future tracing and trouble shooting.

1.31 LOCATIONS OF OUTLETS AND WIRING DEVICES

A. Outlets:

1. Locations of outlets and electrical equipment on the drawings are approximate only. Unless otherwise indicated on the drawings or established in the specifications, the exact locations of electrical outlets shall be established in the field by directive from the Architect. Generally, outlets shall be located as required for proper installation of equipment served and otherwise locations shall be established by construction or code requirements and such as to be coordinated with equipment of other trades.
2. This Section shall consult with the Architect and refer to all details, sections, elevations and equipment plans and the plans of other trades for exact location.
3. The Architect reserves the right to make reasonable changes in the location of outlets, apparatus or equipment up to the time of roughing in. Such changes as directed shall be made by the Contractor without additional compensation.
4. Dimensions taken by scale shall not be used to establish rough-in locations.

B. Wiring Devices:

1. The approximate location of wiring devices are indicated on the drawings; the specific location shall be determined in accordance with "Location of Outlets" of these specifications and as follows.
2. This Section is referred to equipment plans, equipment shop drawings, elevation drawings and other detail or dimensional drawings, and he shall consult with the Architect before installation of proceeding with any work dependent upon this information.
3. Generally, wiring devices shall be located as follows:
 - a. Wall receptacles shall generally be centered 15" above the finished floor and 6" above surface of built-in counters and tables where same abuts wall and 4" above backsplashes if counters are so equipped.
 - b. Special purpose receptacles shall be located as required by equipment served.
 - c. Switches shall be centered 48" above finished floor on latch side of door opening with edge of plate not more than 12" from door frame, except as noted on the drawings.
 - d. In hazardous areas, the location of wiring devices shall be established by Code requirements which shall take precedence over conflicting information on the drawings or included herein.

1.32 TELEPHONE SYSTEM

- A. Refer to the electrical specification section 16751 – Telecommunication Distribution System for detailed information on the telephone system.
- B. Dane County is currently using a VOIP (voice over internet protocol) telephone system so all telephone cabling will be using same cabling used for data.
- C. Telephone instruments, switching equipment, wiring, terminal blocks, and other accessories

shall be furnished and installed by the Owner (Dane County)

- D. This Contractor shall supply all required conduit, sleeves, and service fittings for the telephone system.
- E. All conduits shall be complete with fish wire by this Contractor, and all telephone outlets shall be fed by a minimum 3/4" conduit.
- F. All telephone boxes shall be two gang boxes with one gang plaster cover.
- G. Verify all phone locations with the Architect in the field.

1.33 DEMOLITION, RENOVATION AND DISPOSITION OF EXISTING EQUIPMENT

- A. This Contractor shall note that portions of the existing building will remain in service during portions of the construction period. Areas of the building will be vacated as required to facilitate construction. This Contractor shall proceed with the completion of his work in such a manner as to cause the least possible interference with the Owner's operation. All work required in the existing building shall be done in a manner and time acceptable to the Owner.
- B. Outages and other work rendering existing equipment inoperative shall be held to a minimum - prior arrangements for each shall be made with the Owner and shall be acceptable as to time and duration.
- C. Electrical equipment in conflict with construction shall be removed and/or relocated as indicated on the drawings, as directed or required. This Contractor shall remove all electrical equipment released from service as a result of construction, and no equipment removed shall be reused, except as specifically directed on the drawings or elsewhere herein. All electrical equipment removed during construction shall be presented to the Owner for his acceptance or rejection. Materials rejected by the Owner become the Contractor's property and shall be removed from the site.
- D. This Contractor shall be responsible for the work of other trades as may be necessary to facilitate the installation of electrical work in the existing building. Such work necessary that is normally done by other trades and is not covered as a part of other divisions of the work shall be done under the direction and at the expense of the Electrical Contractor. This work shall include but is not limited to cutting, patching, and all work necessary and required to leave existing building in condition acceptable to the Architect.
- E. Any existing circuits or equipment not shown on the drawings and which are logically expected to be continued in service and which may be interrupted or disturbed during construction shall be reconnected in an approved manner. In addition, any existing circuit or equipment which may require relocations or rerouting, as a result of construction, shall be considered a part of the work of this branch and shall be done by this contractor with no additional compensation.
- F. All coring that is required for electrical work shall be by this Contractor.
- G. All new conduit and wiring shall be concealed where possible to do so without extensive cutting and patching. All exposed work shall be run in wiremold and installed only where approved by Architect. Routing shall be subject to Architects approval. Make use of all standard wiremold colors to match surfaces as closely as possible.

- H. All ballasts and lamps removed during the project, unless part of fixtures claimed by the Owner, become the Contractor's property and he shall dispose of them in accordance with applicable DNR and EPA regulations.

1.34 SEALING AND FIREPROOFING

- A. Sealing and fireproofing of openings between conduit, cable tray, wireway, trough, cablebus, busduct, etc. and fire rated surfaces shall be the responsibility of the contractor whose work penetrates the opening.
- B. Sealing and fireproofing shall use materials and methods complying with ASTM E814 requirements appropriate to the rating of the material penetrated.
- C. Materials by Dow-Corning, 3M, Specified Technologies, Inc., and Chase-Foam are acceptable if in accordance with (B) above.
- D. Submit manufacturer's penetration details to authority having jurisdiction. Details shall confirm method's compliance with ASTM E814.
- E. Include copies of penetration details in Project Operation and Maintenance Manuals.

1.35 ALTERNATE BIDS

- A. See Section 01030 for descriptions of alternates required.

END OF SECTION

SECTION 16100

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SCOPE

- A. All requirements of Division 1 govern work under this Section.

1.02 REFERENCES

- A. National Electrical Manufacturer's Association (NEMA).
- B. Underwriters Laboratories, Inc. (UL).
- C. American Society for Testing and Materials (ASTM).
- D. National Fire Protection Association (NFPA).

1.03 SUBMITTALS

- A. Product Data
 - 1. Submit for disconnects, motor starters, panelboards, circuit breakers, overcurrent protective devices, transformers, and mini-power centers.
 - 2. Product data sheets with printed installation instructions.
- B. Shop Drawings:
 - 1. Submit for motor starters.
 - 2. Show enclosure dimensions, nameplate nomenclature, electrical ratings, and thermal unit schedule.
 - 3. Wiring diagrams and schematics.
- C. Approval of equipment supplied in this section is contingent upon Contractor verification of available fault current from electric utility.
 - 1. Notify ENGINEER if available fault current is higher than specified equipment.
- D. Submit in accordance with Section 01340.
- E. Operation and Maintenance (O&M) Data:
 - 1. Maintenance data for materials and products for inclusion in Operating and Maintenance specified in Section 01730.
 - 2. Submit in accordance with Section 01340 and 01730.
- F. Test Results:
 - 1. Report of field tests and observations certified by Contractor.

1.04 QUALITY ASSURANCE

- A. Items provided under this section shall be listed and labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).
 - 1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.
 - 2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article

100.

- B. Regulatory Requirements:
 - 1. National Electrical Code: Components and installation shall comply with NFPA 70.
 - 2. Local codes and ordinances.

PART 2 - PRODUCTS

2.01 ELECTRICAL METALLIC TUBING (EMT) INTERMEDIATE METALLIC CONDUIT (IMC) GALVANIZED RIGID STEEL CONDUITS (GRS)

- A. Manufacturers:
 - 1. Allied Steel
 - 2. Omega
 - 3. Wheatland
 - 4. Columbia
- B. Manufacturer's standard lengths and size.
- C. Protected inside and out by hot-dipped galvanized or electrogalvanized coating.
- D. Minimum size: 3/4 inch, except as follows:
 - 1. Conduit for lighting switch legs containing switched conductors only may be 1/2 inch.
 - 2. As noted on drawings.
- E. Do not use aluminum conduit.

2.02 PLASTIC CONDUIT (PVC)

- A. Manufacturers:
 - 1. Carlon.
 - 2. Genova.
 - 3. Certainteed.
- B. Standard lengths and sizes.
- C. Schedule 40 or 80, heavy wall rigid plastic (PVC) conduit manufactured to NEMA TC2 standards, UL listed, and as required by NEC.
- D. Rated for 90EC cable.
- E. Minimum size: 2" inches.

2.03 FLEXIBLE CONDUIT

- A. Manufacturers:
 - 1. Triangle PWC, Inc.
 - 2. Anaconda
 - 3. Flexsteel
 - 4. American Flexible Conduit

- B. Galvanized flexible steel.
- C. Standard conduit sizes.
- D. Minimum Size: 1/2 inch.

2.04 LIQUIDTIGHT FLEXIBLE CONDUIT

- A. Manufacturers:
 - 1. O-Z/Gedney Company
 - 2. American Flexible Conduit
 - 3. Flex-Guard, Inc.
 - 4. Liquatite
 - 5. Anaconda
- B. Galvanized flexible steel.
- C. Standard conduit sizes.
- D. Minimum Size: 1/2 inch.
- E. Heavy wall PVC jacket.

2.05 FITTINGS

- A. Manufacturers:
 - 1. Appleton Electric Company.
 - 2. Steel City, American Electric.
 - 3. Oz-Gedney Co.
- B. Steel or malleable iron, zinc galvanized or cadmium plated.
- C. Do not use set screw or indentor type fittings.
- D. Do not use aluminum or die cast fitting.
- E. EMT IMC and GRS Connectors and Couplings:
 - 1. Threaded.
 - 2. Gland compression type.
 - 3. Insulated throat.
 - 4. Rain and concrete type.
- F. Flexible Conduit Connectors and Couplings:
 - 1. Threaded.
 - 2. Insulated throat.
 - 3. Grounding type.
 - 4. Gland compression type.
- G. Liquidtight Flexible Conduit Fittings:
 - 1. Liquidtight.
 - 2. Insulated throat.
 - 3. Threaded.

4. Gland compression type.
 5. Grounding type.
- H. Expansion Joints:
1. Conduit expansion fittings complete with copper bonding jumper, Crouse-Hinds Type XJ.
 2. Conduit expansion/deflection fittings with copper bonding jumper, Crouse-Hinds Type XD.
- I. Seals:
1. Wall entrance, Appleton Type FSK or FSC.
- J. Drain Fittings:
1. Automatic Drain Breather:
 - a. Explosionproof.
 - i. Safe for Class I, Groups C and D.
 - b. Capable of passing minimum 25 cc water/minimum and minimum 0.05 cubic foot air/minimum at atmospheric pressure.
 2. Condensate Drain:
 - a. Conduit outlet body, Type T.
 - b. Threaded, galvanized plug with 3/16 inch drilled holed through plug.

2.06 SURFACE METAL RACEWAY

- A. Manufacturers:
1. Wiremold Co.
 2. Hubbell Co.
 3. Steel City, American Electric
- B. General:
1. Wiremold Series 500 series or equal.
 2. Base and cover section to accommodate pulling conductors through raceway.
 3. capable of being over painted.
 4. Full complement of fitting must be available.
- C. The use of surface raceways shall be minimized on the project. Surface raceway shall only be used where installing new devices on existing walls that are not being furred out or where conduit cannot be installed in an existing wall
- D. Any use of surface raceway shall be approved by the Architect prior to installation.

2.07 WIRES, CABLES, AND CONNECTORS

- A. Manufacturers:
1. Wire and Cable:
 - a. Continental
 - b. Southwire.
 - c. Rome Cable.

- d. Houston Wire and Cable.
 - e. Beldon.
 - f. Dekoron.
 - g. Royal
 - h. South
 - i. General
- 2. Connectors:
 - a. Burndy.
 - b. Thomas and Betts.
 - c. Blackburn, American Electric.
 - 3. Electrical Tape:
 - a. 3M Scotch Brand.
 - b. Plymouth.
 - c. or equal.
- B. Copper wire only.
- C. 600 v insulation (ASTM standard compounds) and color code conductors for low voltage (secondary feeders and branch circuits) as required by NEC.
- 1. Type THWN-2 Stranded: Single conductor No. 12 AWG minimum for branch circuit and feeder conductors size No. 8 AWG and smaller.
 - 2. Type XHHW-2 Stranded: Single conductor for branch circuits, feeders and service conductors larger than No. 8 AWG.
 - 3. Provide grounding conductor with same insulation as circuit conductors when run with circuit conductors.
 - 4. Type THWN-2 Stranded: Single conductor No. 12 AWG minimum for 120 v control wiring and No. 14 AWG minimum for graphic indication, nonshielded instrumentation and other control wiring operating at less than 120 v unless otherwise noted on Drawings.
 - a. Provide high density polyethylene jacketed multi-wire cable assemblies in underground conduit or duct.
- D. Joints, Taps, and Splices:
- 1. Joints, Taps, and Splices in Conductors No. 10 AWG and Smaller: UL listed compression spring-type solderless connectors with plastic cover.
 - 2. Joints, Taps, and Splices in Conductors No. 8 AWG and Larger: Solderless two or four-bolt compression type connectors of type that will not loosen under vibration or normal strains.
 - 3. Terminations: Compression-type crimp lugs.

2.08 BOXES

- A. Manufacturer:
- 1. Interior Outlet Boxes:
 - a. Appleton Electric Company.

- b. Raco.
 - c. Steel City, American Electric.
 - 2. Weatherproof Outlet Boxes:
 - a. Appleton Electric Company.
 - b. Crouse-Hinds Company.
 - c. O-Z/Gedney company.
 - d. Perfect-Line, American Electric.
 - 3. Junction and Pull Boxes:
 - a. Hoffman Engineering Company.
 - b. Keystone Columbia, Inc.
 - c. Electromate.
- B. Outlet Boxes - Flush Mounted:
 - 1. Wall Outlets: Square corner, galvanized masonry type with internally mounted ears or 4-inches square with raised cover having square corners and internally mounted ears.
 - 2. Ceiling Lighting Fixture Outlet Boxes: 4-inch square galvanized box with raised cover set flush with finished surface, complete with 3/8 inch fixture stud.
- C. Outlet Boxes - Surface Mounted:
 - 1. General Use: 4-inches square with raised device cover.
 - 2. Weatherproof: Cast galvanized with threaded hub.
 - 3. Safety outlet enclosure - Tay Mac Co. - Verify outlet configuration.
 - 4. Hazardous Locations: Cast galvanized approved for classification of area.
- D. Junction and Pull Boxes:
 - 1. Fabricate from code gauge galvanized steel, with covers held in-place by corrosion resistant machine screws.
 - 2. Size as required by code for number of conduits and conductors entering and leaving box.
 - 3. Provide with welded seams where applicable, and equipment with corrosion resistant nuts, bolts, screws, and washers.
 - 4. Finish with rust inhibiting primer.

2.09 FIRE RATED THROUGH FLOOR FITTINGS

- A. Manufacturers:
 - 1. Hubbell Electric Co.
 - 2. Square D.
 - 3. Steel City, American Electric.
- B. Rating:
 - 1. Floor fittings requiring penetration of floor slab listed by UL and have UL fire rating of 2 hours.
- C. Floor Service Pedestal:

1. Painted textured aluminum surface.
 2. 2 to 8 gangs of service capacity and suitable for:
 - a. Duplex receptacles 15 or 20-amp.
 - b. Single twist lock receptacle 20-or 30-amp.
 - c. Communication/data outlet (2/gang).
 - d. 1-inch ID protective bushing for cables.
 - e. Furniture feed plate suitable for 3/4-inch flexible metal conduit connection.
- D. Junction Boxes in Ceiling Space Below Floor:
1. Suitable to accommodate separate services of power and communications.
 2. Code approved for plenum space when applicable.
- E. Raceways through Floor:
1. Provide separation of power and low voltage.
 2. For 2-inch core holes:
 - a. 3/4 inch raceway for communication.
 - b. 1/2 inch raceway for power.
 - c. Heat Transfer: .11 square inch of copper cross section maximum for both.
 3. For 3-inch core holes:
 - a. 1-1/4 inch raceway for communication.
 - b. 1/2 inch raceway for power.
 - c. Heat Transfer: .16 square inch of copper cross section maximum for both.
- F. Abandonment Plates:
1. Maintain same UL listed fire rating.
 2. Packaged, identified, and turned over to OWNER.

2.10 WIRING DEVICES

- A. Manufacturers:
1. Hubbell Wiring Device Division.
 2. Pass and Seymour, Inc.
 3. Leviton
 4. Cooper Wiring Devices
- B. Fabricated Devices:
1. Factory-fabricated, specification grade wiring devices in type, color, and electrical rating for service indicated. Ivory color or as selected by ENGINEER OR OWNER.
 2. Wiring devices of one manufacturer.
 3. See Drawing symbol schedule for identification of device type.
- C. Switches:
1. General Use Lighting Switches: 20 amp toggle, equal to Hubbell No. 1221-I series.
 2. Switches controlling equipment, operation of which is not evident from switch position, shall include flush neon pilot light in conjunction with proper switch. Each

switch shall be complete with engraved plate to identify equipment being controlled (white letters on black, 1/8 inch high minimum).

D. Receptacles:

1. General use duplex receptacles: NEMA No. 5-20R, grounding type, 20 amp Hubbell No. 5362 Specification Grade.
2. Special purpose receptacles as shown on Drawings and schedules.
3. Receptacles supplied from standby emergency system to have red face.
4. GFI receptacles shall be Hubbell GFR5352IA

E. Wiring Device Plates and Covers:

1. Wall plates for wiring devices with ganging and cut-outs as indicated, provided with metal screws for securing plates to devices, screw heads colored to match finish of plate.
2. Plates for Flush Mounted Devices: Equal to Sierra P line specifications grade Type No. 430 brushed stainless steel.
3. Telephone outlet configuration to match telephone outlet jack or cable.
4. Device plates for surface mounted Type FS or FD boxes to be Type FSK galvanized steel.
5. Device plates for surface mounted, 4-inch square bossed to be ½ inch raised galvanized steel covers.
6. Weatherproof outlet enclosure for exterior devices or devices in damp locations to be marked galvanized gray cast malleable with gasketed lift cover plate as shown on Drawings. Suitable for wet locations while in use. Enclosure must be gasketed. Provide Intermatic WP1010MC, WP1010HMC, or WP1030MC with appropriate mounting base(s) and inserts.

2.11 MOTOR STARTERS

A. Manufacturers:

1. Allen Bradley
2. Eaton/Cutler-Hammer
3. Siemens
4. Square D
5. General Electric

B. Manual Starters:

1. Minimum short circuit withstand rating in combination with motor circuit protective device shall be 10,000 symmetrical amps or as indicated on Drawings.

C. Manual Motor Starter Construction:

1. Quick make and break toggle action.
2. Double break silver alloy contacts.
3. 1-piece melting alloy type thermal overload units.
4. Starter inoperative unless thermal unit in position.
5. Padlock provision.

6. Pilot light.
 7. NEMA standards for size and horsepower rating.
- D. Magnetic Starters:
1. Minimum short circuit withstand rating in combination with motor circuit protective device shall be 22,000 symmetrical amps or as indicated on Drawings.
- E. Magnetic Motor Starter Construction:
1. Mounted in vertical position, gravity dropout.
 2. Double break silver alloy contacts.
 3. Molded coil.
 4. Contacts and/or coil replacement without removing starter from enclosure or power wiring from starter.
 5. Straight-through wiring.
 6. Overload Relay:
 - a. 1-piece thermal unit construction.
 - b. One melting alloy type overload relay per phase, manually reset.
 - c. Interchangeable thermal units.
 - d. Thermal units must be in-place to operate starter.
 - e. Replaceable overload relay circuit contacts.
 - f. Trip at 6 times LRC in 20 seconds.
 7. Overload relay submersible pumps and hermetically sealed motors.
 - a. Same as above except trip at 6 times LRC in 3 to 5 seconds.
 8. NEMA standards for size and horsepower rating.
 9. NEMA Size 1 minimum.
- F. 2-Speed Motor Starters:
1. Provide separate winding type with two 3-pole starters unless otherwise specified.
 2. For remote 2-stage thermostat control, provide cutout of low speed signal on high speed operation.
- G. Reduced Voltage Motor Starter Construction:
1. Closed transition autotransformer type.
 2. 2-coil construction with 50%, 65%, and 80% starting voltage taps.
 3. Additional as applicable.
- H. Combination Starter:
1. Fusible Motor circuit protector type.
 2. Three-pole, three-phase NEMA size as indicated with three melting alloy overload relays.
 3. Hand-Off-Auto selector switch.
- I. Control Circuits:
1. Voltage not to exceed 120 v.
 2. Control transformer mounted in starter enclosure.

3. Fuses on one secondary line.
4. One secondary line grounded.
5. Transformer sized for device, accessories connected thereto, and 25% extra capacity minimum.

J. Controls:

1. Reset button mounted in enclosure cover.
2. Heavy duty, oiltight green push to test pilot lights mounted in enclosure cover when indicated.
3. Heavy duty, oiltight pushbuttons and selector switches mounted in enclosure when indicated.
4. 6-digit type elapsed time meters in tenths of hour mounted in enclosure cover when indicated.

K. Enclosures:

1. Manual Starters:
 - a. General purpose flush mounted in finished areas.
 - b. NEMA 1 surface in unfinished areas.
 - c. NEMA 4 outdoors and wet locations.
2. Magnetic Starters:
 - a. NEMA 12 indoors.
 - b. NEMA 4 outdoors and wet locations.

2.12 MOTOR AND CIRCUIT DISCONNECTS

A. Manufacturers:

1. Eaton/Cutler-Hammer
2. Siemens
3. Square D
4. Allen Bradley
5. General Electric

B. Enclosed Circuit Breaker Construction:

1. Dual cover interlock.
2. External trip indication.
3. Provisions for control circuit interlock.
4. Padlock provisions for padlock in Off position.
5. Handle attached to box, not cover.
6. Handle position indicates On, Off or Tripped.
7. Provisions for insulated or groundable neutral.

C. Safety Switches:

1. NEMA heavy duty Type HD.
2. Dual cover interlock.
3. Visible blades.

4. Provisions for control circuit interlock.
 5. Pin type hinges.
 6. Tin plated current carrying parts.
 7. Quick make and break operator mechanism.
 8. Handle attached to box, not cover.
 9. Handle position indication, On in up position and Off in down position.
 10. Padlock provisions for up to 3 padlocks in Off position.
 11. UL listed lugs for type and size of wire specified.
 12. Spring reinforced fuse clips for Class R fuses.
 13. Provisions for insulated or groundable neutral.
 14. UL listed short circuit rating 200,000 RMS amp with Class R fuses.
- D. Enclosures:
1. Indoor: NEMA 1 code gauge steel with rust inhibiting primer and baked enamel finish.
 2. Outdoor: NEMA 3R code gauge zinc coated steel with baked enamel finish.

2.13 FUSES

- A. Manufacturers:
1. Bussmann
 2. Gould Shawmut
 3. Littlefuse
 4. Brush
- B. 250 v. Fuses:
1. Class RK-1, 1-end rejection or to fit mountings specified, 1/10 to 600 amps, 200,000-amp interrupting rating.
 - a. Gould Shawmut Tri-Onic TR-R, dual element, time delay with short circuit protection for motor, transformer, welder, feeder, and main service protection.
- C. 600v Fuses:
1. Class RK-1, 1-end rejection or to fit mountings specified, 1/10 to 600 amps, 200,000-amp interrupting rating.
 - a. Gould Shawmut Tri-Onic TR-R, dual element, time delay with short circuit protection for motor, transformer, welder, feeder and main service protection.
 2. Class L, bolt-in 601 to 6,000 amps, 200,000-amp interrupting rating.
 - a. Gould Shawmut A48Y, time delay for overload and short circuit protection for motor, transformer, feeder, and main service protection.
 3. Class CC, fast acting, single element, 1/10 to 30 amps, 200,000-amp interrupting rating.
 - a. Gould Shawmut ATDR, UL listed for motor control circuits, lighting ballasts, control transformers, and street lighting fixtures.
- D. Spare Fuses:

1. 10%, minimum of 3, of each type and rating of installed fuses.

2.14 PANELBOARDS

A. Manufacturers:

1. Square D only to match building standard.

B. Panelboard Ratings:

1. UL listed short circuit rating (integral equipment rating):
 - a. Up to 240 v: 10,000 RMS symmetrical amp minimum.
 - b. Up to 480 v. 14,000 RMS symmetrical amp minimum.
 - c. As shown on Drawings.

C. Panelboard Construction:

1. Main breaker or main lugs only, per panelboard schedule.
2. Molded case circuit breakers.
3. Terminals:
 - a. UL listed for type or wire specified.
 - b. Anti-turn solderless compression type.
4. Bussing:
 - a. Distributed phase sequence type.
 - b. 225 amps, 98% conductivity hard drawn copper or as shown on panelboard schedule or Drawings.
 - c. Copper.
 - d. Mounting hardware behind usable space.
5. Gutters adequate for wire size used, 4-inch minimum.
6. Boxes:
 - a. Code gauge galvanized steel.
 - b. Without knockouts.
7. Fronts:
 - a. Panel front cover shall have piano hinge to allow access to wiring gutters without removal of panel trim. Hinged trim held in place with screw fasteners. Door shall be built into trim, which allows access to breakers as well as to hinged trim screw fasteners. Breaker access door shall have the following features:
 - i. Concealed piano hinge.
 - ii. Flush stainless steel cylinder tumbler type locks with spring loaded door pulls.
 - iii. Locks keyed alike.
 - iv. Rust inhibiting primer, baked enamel finish.
 - v. Dead front safety type.
 - vi. Concealed hinges and trim clamps..
 - vii. Circuit Directory:

- viii. Suitable for complete descriptions.
- ix. Clear plastic cover.
- 8. Typewritten card inside panel door.
- 9. Special features as shown on Drawings.
- 10. Code gauge steel.
- 11. Engraved laminated nameplate in accordance with Section 16001.

2.15 MOLDED CASE CIRCUIT BREAKERS

A. Manufacturers:

- 1. Square D

B. Permanent Trip Circuit Breakers:

1. Lighting Panel Circuit Breakers:

- a. Thermal and magnetic protection.
- b. Single-handle common trip, 2 and 3 poles (handle ties not acceptable).
- c. Bolt-on type unless otherwise noted on Drawings.
- d. Quick make and break toggle action.
- e. Handle trip indication.
- f. Handle position indication, On, Off, and Tripped centered.
- g. UL listed for type of wire specified.
- h. UL listed short circuit rating (integrated equipment rating).
 - i. Up to 240 v: 10,000 RMS symmetrical amp minimum.
 - ii. Up to 480 v: 14,000 RMS symmetrical amp minimum.
- i. UL SWDL switching duty on 120 v. circuits for switched circuits.
- j. Switch neutral common trip per NEC 514-5 for fuel pumps.

2. Power Panel Circuit Breakers:

- a. Thermal and magnetic protection.
- b. Magnetic protection only in combination with motor starters and motor circuit protectors (MCP).
- c. Single magnetic trip adjustment.
- d. Single-handle common trip, 2 and 3 poles (handle ties not acceptable).
- e. Push-to-trip test button.
- f. Bolt-on type.
- g. Quick make and break toggle action.
- h. Handle trip indication.
- i. Handle position indication, On, Off, and Tripped centered.
- j. UL listed for type of wire specified.
- k. UL listed short circuit rating (integrated equipment rating).
 - i. Up to 240 v: 10,000 RMS symmetrical amp minimum.
 - ii. Up to 480 v: 14,000 RMS symmetrical amp minimum.

2.16 GROUND-FAULT CIRCUIT INTERRUPTER RECEPTACLES (GFCI)

- A. Ratings:
 - 1. 120 vac.
 - 2. 20 amp.
- B. Tripping Requirement:
 - 1. UL Class A.
- C. Construction:
 - 1. Shallow depth.
 - 2. Line and load terminal screws.
 - 3. Noise suppression.
 - 4. Feed through.
 - 5. Standard duplex wall plates shall fit.
 - 6. NEMA 5-20R configuration.
- D. Meet requirements of UL 943 ground-fault circuit interrupters.

2.17 GROUNDING AND BONDING

- A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, more stringent requirements and greater size, rating, and quantity indications govern.
- B. Conductor Materials: Copper.
- C. Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
- D. Equipment Grounding Conductor: Green insulated.
- E. Grounding Electrode Conductor: Stranded cable.
- F. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B3.
 - 2. Assembly of Stranded Conductors: ASTM B8.
 - 3. Tinned Conductors: ASTM B33.
- G. Ground Bus: Bar annealed copper bars of rectangular cross section.
- H. Braided Bonding Jumpers: Copper tape, braided No. 30 gage bar copper wire, terminated with copper ferules.
- I. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inches thick and 2 inches wide, except as indicated.
- J. Connector Products
 - 1. General: Listed and labeled as grounding connectors for materials used.
 - 2. Pressure Connectors: High-conductivity-plated units.
 - 3. Bolted Clamps: Heavy-duty units listed for application.
 - 4. Exothermic Welded Connections: Provide in kit form and select for specific types,

sizes, and combinations of conductors and other items to be connected.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install products in accordance with NEC, manufacturer's instructions, applicable standards, and recognized industry practices to ensure products serve intended function.

3.02 CONDUITS AND CONDUIT FITTINGS

- A. Complete conduit installation prior to installing cables.
- B. Unless specifically indicated otherwise on Drawings, use rigid galvanized steel conduit for general wiring.
- C. Provide watertight conduit system where installed in wet places, underground or where buried in masonry or concrete.
- D. EMT conduit may be used for conduit sizes up to 4 inches.
- E. Conduit shall be run concealed except exposed surface conduit may be installed where noted on Drawings or where concealment found to be impractical or impossible, and only with approval of ENGINEER.
- F. Continuous from outlet to outlet and from outlets to cabinets, junction or pull boxes.
- G. Enter and secure to boxes ensuring electrical continuity from point of service to outlets.
- H. Conduit runs extending through areas of different temperature or atmospheric conditions or partly indoors and partly outdoors shall be sealed, drained, and installed in manner preventing drainage of condensed or entrapped moisture into cabinets, motors or equipment enclosures.
- I. Run conduits within concrete structures parallel to each other and spaced on center of at least three times conduit trade diameter with minimum 2-inch concrete covering. Conduits over 1 inch may not be installed in slab without approval of ENGINEER.
- J. Run exposed conduits parallel to or at right angles with lines of building.
- K. Route conduit runs above suspended acoustical ceilings not interfering with tile panel removals.
- L. Secure conduit in-place with not less than 1 malleable corrosionproof alloy strap or hanger per 8 feet of conduit.
 - 1. Do not use perforated strapping.
- M. Connections to Motors and Equipment Subject to Vibration:
 - 1. Flexible steel conduit not over 3 feet long or where exposed in mechanical and utility areas and not subjected to moisture, dirt, and fumes.
 - 2. Liquidtight flexible conduit not over 3 feet long where exposed in finished areas or where subject to moisture, dirt, fumes, oil, corrosive atmosphere, exposed or concealed, with connectors to ensure liquidtight, permanently grounded connection. Locate where least subject to physical abuse.
- N. Use double lock nuts and insulated bushings with threads fully engaged.

- O. Connectors at fixture bodies and boxes shall be rigidly secured with galvanized lock nut and bushing.
- P. Cap conduits after installation to prevent entry of debris.
- Q. Install conduit expansion fittings complete with bonding jumper in following locations.
 - 1. Conduit runs crossing structural expansion joint.
 - 2. Conduit runs attached to two separate structures.
 - 3. Conduit runs where movement perpendicular to axis of conduit may be encountered.
- R. Install 4 feet-0 inch to 6 feet-0 inch flexible steel conduit drops from independent junction box mounted above ceiling and accessible from below ceiling to recessed ceiling mounted equipment. Allow for positioning of equipment to tile increments.
- S. Negotiate beams and changes in ceiling heights with LB conduit fittings on outside corners and ells on inside corners. Arrange bends and offsets in parallel conduits to present neat symmetrical appearance.
- T. In precast areas, run conduits in insulation space or in floor topping without crossing conduits, using 3/4 in. maximum conduit size.
- U. Core drill through reinforced concrete with approval of ENGINEER.
- V. Split, crushed or scarred conduit not acceptable.
- W. Do not route over boiler, incinerator or other high temperature equipment.
- X. Flexible metal conduit can only be used for final connections to motors, transformers, or to light fixtures above suspended ceilings.

3.03 SURFACE METAL RACEWAY

- A. Mount to surface with No. 8 flathead fasteners or approved support clips.
- B. Do not pinch wires.
- C. Remove metal burrs and sharp edges.
- D. Provide bushing.
- E. Install in accordance with manufacturer's recommendations.
- F. Provide covers where two lengths come together.

3.04 WIRE AND CABLE

- A. Run wire and cable in conduit unless otherwise indicated on Drawings.
- B. On branch circuits, use standard colors.
- C. Each tap, joint or splice in conductors No. 8 AWG and larger shall be taped with 2 half-lap layers of vinyl plastic electrical tape and finish wrap of color coding tape, where required by code.
- D. Run ground wire with power circuits; conduit shall not be grounding path.
- E. Color Coding: Conductors for lighting and power wiring as indicated below.

<u>Phase</u>	<u>208/120v</u>	<u>480/277v</u>
A	Black	Brown
B	Red	Orange
C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

3.05 BOXES

- A. Install knockout closures to cap unused knockout holes where blanks have been removed.
- B. Locate boxes to ensure accessibility of electrical wiring.
- C. Secure boxes rigidly to subsurface upon which being mounted or solidly embed boxes in concrete or masonry. Do not support from conduit.
- D. Do not burn holes, use knockout punches or saw.
- E. Provide outlet box accessories as required for each installation such as mounting brackets, fixture study, cable clamps, and metal straps for supporting outlet boxes compatible with outlet boxes being used and meeting requirements of individual wiring situations.
- F. Location of outlets and equipment shown on Drawings is approximate. Verify exact location.
- G. Minor modification in location of outlets and equipment is considered incidental up to distance of 10 feet with no additional compensation, provided notification of modification is given prior to roughing in of outlet.
- H. Flush outlets shall have edges or plaster flush with finished wall or ceiling surfaces so plates can be drawn tightly to wall or ceiling surfaces.
- I. Mounting heights:
 1. Shall conform to ADA guidelines.
 2. In general, unless otherwise shown on Drawings:
 - a. Switches: 48 inches above floor to top of box.
 - b. AC Receptacles and Telephone Outlets: 15 inches above floor to bottom of box or 6 inches above counters, counter backsplashes in finished areas; 48 inches to top of box above floor in unfinished areas.
 - c. Wall Bracket Lighting Fixtures: 8 inches above mirrors or 6 feet-6 inches above floor.
 - d. Pushbuttons: 48 inches above floor to top of box.
 - e. Motor Starters and Disconnect Switches: 60 inches above floor.
 - i. Thermostats: 48 inches above floor.
 - f. Bells and Horns: 8 feet-0 inches above floor.
 - g. Clocks: 8 ft.-0 inches above floor.
 - h. Fire Alarm visual signals 80" above floor.
 - i. Emergency Battery Units: 8 ft. - 0 inches above floor or 12" below ceiling.
- J. Do not install boxes back to back or through wall. Offset outlet boxes on opposite sides of wall, minimum 12 inches.

- K. Where emergency switches occur adjacent to normal light switches, install in separate boxes in accordance with NEC and device plate color coding separation.
- L. Light Fixture Outlet Boxes:
 - 1. Securely mount with approved type bar hangers spanning structural members to support weight of fixture.
 - 2. Do not support from conduit.
 - 3. Equip with 3/8-inches fixture stud and tapped fixture ears.

3.06 FIRE RATED THROUGH FLOOR FITTINGS

- A. Spacing and location as noted on Drawing.
- B. Install in accordance with manufacturer's instructions.

3.07 WIRING DEVICES

- A. Do not install devices until wiring is complete.
- B. Do not use terminals on wiring devices (hot or neutral) for feed-through connections, looped or otherwise. Make circuit connections by using wire connectors and pigtails.
- C. Install gasket plates for devices or system components having light emitting features such as switch with pilot light and dome lights. Where installed on rough textured surfaces, seal with black self-adhesive polyfoam.
- D. Ground receptacles with insulated green ground wire from device ground screw to bolted outlet box connection or as shown on Drawings.
- E. Wrap wiring devices with insulating tape.
- F. Install emergency switches which occur adjacent to normal light switches in separate boxes to maintain systems isolation in accordance with NEC.

3.08 MOTOR STARTERS

- A. Examine area to receive motor starters to ensure adequate clearance for starter installation.
- B. Anchor firmly to wall or structural surface.

3.09 MOTOR AND CIRCUIT DISCONNECTS.

- A. Locate disconnect switches as shown on Drawings and required by NEC.
- B. Provide control circuit interlock as required by NEC.

3.10 OVERCURRENT PROTECTIVE DEVICES.

- A. Install fuses just prior to energizing equipment.
- B. Locate circuit breakers as shown on Drawings.
- C. Install GFCI receptacles as required by NEC.

3.11 PANELBOARDS

- A. Flush or surface mount as specified on drawings and schedules.

- B. Support panel cabinets independently to structure with no weight bearing on conduits.
- C. Install recessed panelboards to allow cover to be drawn tight against wall to provide neat appearance.
- D. Install panelboards so top breaker is not higher than 6 feet-0 inches above floor.
- E. Adjacent panel cabinets shall be same size and mounted in horizontal alignment.
- F. Install typewritten directory in each panelboard, accurately indicating rooms or equipment being served after final circuit changes have been made to balance circuit loads.
- G. Install four spare 1 inch conduits from top of each flush mounted panelboard to area above ceiling for future use. On flush mounted panelboards located on first and higher level floors, provide two spare 1 inch conduits from bottom of panelboard to ceiling area of floor below for future use.

3.12 GROUNDING AND BONDING

- A. Application
 - 1. Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.
 - a. Install separate insulated equipment grounding conductors with circuit conductors. Raceway may be used as equipment ground conductor where feasible in non-hazardous areas and permitted by NEC for lighting circuits. Install insulated equipment ground conductor in nonmetallic raceways unless designated for telephone or data cables.
 - 2. Underground Conductors: Bare tinned, stranded copper except otherwise indicated.
 - 3. Signal and Communications: For telephone, alarm, instrumentation and communication systems, provide #4 AWG minimum green insulated copper conductor in raceway from grounding electrode system to each terminal cabinet or central equipment location.
 - 4. Ground separately derived systems required by NEC to be grounded in accordance with NEC paragraph 250-26.
 - 5. Metal Poles Supporting Outdoor Lighting Fixtures: Ground pole to grounding electrode as indicated in addition to separate equipment grounding conductor run with supply branch circuit.
 - 6. Connections to Lighting Protection System: Bond grounding conductors or grounding conductor conduits to lighting protection down conductors or grounding conductors in compliance with NFPA 78.
- B. Installation
 - 1. General: Ground electrical systems and equipment in accordance with NEC requirements except where Drawings or Specifications exceed NEC requirements.
 - 2. Ground Rods:
 - a. Locate minimum of one-rod length from each other and at least same distance from any other grounding electrode.
 - b. Interconnect ground rods with bare conductors buried at least 24 inches below grade.

- c. Connect bare-cable ground conductors to ground rods by means of exothermic welds except as otherwise indicated.
 - d. Make connections without damaging copper coating or exposing steel.
 - e. Use 3/4-inch by 10-foot ground rods except as otherwise indicated.
 - f. Drive rods until tops are 6 inches below finished floor or final grade except as otherwise indicated.
3. Metallic Water Service Pipe:
- a. Provide insulated copper ground conductors, sized as indicated, in conduit from building main service equipment, or ground bus, to main metallic water service entrances to building.
 - b. Connect ground conductors to street side of main metallic water service pipes by means of ground clamps.
 - c. Bond ground conductor conduit to conductor at each end.
4. Braided-Type Bonding Jumpers:
- a. Use elsewhere for flexible bonding and grounding connections.
5. Route grounding conductors along shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.
- C. Connections
1. General: Make connections to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
- a. Use electroplated or hot-tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.
 - b. Make connections with clean bare metal at points of contact.
 - c. Aluminum to steel connections: stainless steel separators and mechanical clamps.
 - d. Aluminum to galvanized steel connections: tin-plated copper jumpers and mechanical clamps.
 - e. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.
2. Exothermic Welded Connections:
- a. Use for connections to structural steel and for underground connections except those at test wells.
 - b. Install at connections to ground rods and plate electrodes.
 - c. Comply with manufacturer's written recommendations.
 - d. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
3. Terminations:
- a. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs.
 - b. Where metallic raceways terminate at metallic housings without mechanical

- and electrical connection to housing, terminate each conduit with grounding bushing.
- c. Connect grounding bushings with bare grounding conductor to ground bus in housing.
- d. Bond electrically noncontinuous conduits at both entrances and exist with grounding bushings and bare grounding conductors.

3.13 FIELD QUALITY CONTROL

- A. Control Circuits, Branch Circuits, Feeders, Motor Circuits, and transformers:
 - 1. Megger check to phase-to-phase and phase-to-ground insulation levels.
 - a. Do not megger check solid state equipment.
 - 2. Continuity.
 - 3. Short circuit.
 - 4. Operational check.
- B. Wiring Devices:
 - 1. Test receptacles with Hubbell 5200, Woodhead 1750 or equal tester for correct polarity, proper ground connection, and wiring faults.

3.14 ADJUSTMENT AND CLEANING

- A. Motor Starters and Disconnects:
 - 1. Adjust covers and operating mechanisms for free mechanical movement.
 - 2. Tighten wire and cable connections.
 - 3. Verify overcurrent protection thermal unit size with motor nameplate to provide proper operation and compliance with NEC.
 - 4. Clean interior of enclosures.
 - 5. Touch up scratched or marred surfaces to match original finish.
- B. Circuit Breakers:
 - 1. Adjustable settings shall be set to provide selective coordination, proper operation, and compliance with NEC.
- C. Restore damaged areas on PVC jacketed rigid conduit with spray type touch-up coating compound or as directed by manufacturer.
- D. Pull cleaning plug through conduits to clear of dirt, oil, and moisture.

END OF SECTION

SECTION 16515

LIGHTING

PART 1 - GENERAL

1.01 SCOPE

- A. All requirements of Division 1 govern work under this Section.

1.02 SUMMARY

- A. Section Includes:
1. Interior lighting fixtures.
 2. Exterior lighting fixtures.
 3. Lamps.
 4. Ballasts.
 5. Emergency lighting units.

1.03 REFERENCES

- A. American National Standards Institute (ANSI):
1. C78 Series - Lamps.
 2. C82.2-84 - Fluorescent Lamp Ballasts.
 3. C82.4-85 - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).
 4. ANSI C2-90 - National Safety Code.
- B. Institute of Electrical and Electronics Engineers (IEEE):
1. C62.41-91 - IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
- C. National Fire Protection Association (NFPA):
1. 70-93 - National Electric Code.
- D. Underwriters Laboratory (UL):
1. 844-90 - UL Standard for Safety Electric Lighting Fixtures for Use in Hazardous (Classified) Locations.
 2. 924-90 - UL Standard for Safety Emergency Lighting and Power Equipment.
 3. 935-84 - UL Standard for Safety Florescent-Lamp Ballast.
 4. 1092 (P) - UL Standard for Safety Proposed First Edition of the Standard for Process Control Equipment.
 5. 1570-88 - UL Standard for Safety Florescent Lighting Fixtures.
 6. 1571-91 - UL Standard for Safety Incandescent Lighting Fixtures.
 7. 1572-91 - UL Standard for Safety High Intensity Discharge Lighting Fixtures.
 8. 1573-85 - UL Standard for Safety Stage and Studio Lighting Units.
 9. 1574-87 - UL Standard for Safety Track Lighting Systems.
 10. UL 773-87 - UL Standard for Safety Plug-In, Locking Type Photo controls for Use

with Area Lighting.

1.04 DEFINITIONS

- A. Emergency Lighting Unit: Fixture with integral emergency battery power supply and means for controlling and charging battery. Also known as emergency light set. Emergency units are available with integral lamps only.
- B. Fixture: Complete lighting unit, exit sign, or emergency lighting unit. Fixtures include lamps and parts required to distribute light, position and protect lamps, and connect lamps to power supply. Internal battery powered exit signs and emergency lighting units also include battery and means for controlling and recharging battery. Emergency lighting units are available with and without integral lamp heads and lamps.
- C. Luminaire: Fixture.
- D. Average Life: Time after which 50% will have failed and 50% will have survived under normal conditions.

1.05 SUBMITTALS

- A. Product Data:
 - 1. Describe fixtures, lamps, ballasts, poles, emergency lighting units, and accessories. Arrange product data for fixtures in order of fixture designation. Include data on features and accessories and following information:
 - a. Outline drawings of fixtures indicating dimensions and principal features.
 - b. Electrical ratings and photometric data with specified lamps and certified results of independent laboratory tests.
 - c. Data on batteries and chargers of emergency lighting units.
 - 2. Air and thermal performance data for air handling fixtures. Provide data required to be submitted in Section 15940.
 - 3. Sound performance data for air handling fixtures. Provide certified test reports indicating sound power level and sound transmission class.
- B. Shop Drawings: Detail nonstandard fixtures and indicating dimensions, weights, methods of field assembly, components, features, and accessories.
- C. Samples: Submit sample of fixture if different than specified.
- D. Miscellaneous:
 - 1. For substitutes only, product certifications signed by manufacturers of lighting fixtures certifying that their fixtures comply with specified requirements.
 - 2. Warranty for rechargeable battery.
 - 3. Coordination drawings for fixtures that require coordination with other equipment installed in same space.
- E. Submit in accordance with Section 01340.

1.06 QUALITY ASSURANCE

- A. Items provided under this section shall be listed and labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.
 2. Terms "listed" and "labeled" shall be as defined in National Electric Code, Article 100.
- B. Regulatory Requirements:
1. National Electric Code: Components and installation shall comply with NFPA 70.
 2. Comply with ANSI C2, "National Electrical Safety Code".
- C. Coordinate fixtures mounting hardware and trim with ceiling tile.

1.07 WARRANTY

- A. Requirements:
1. Special Project Warranty Period (Where called for herein.): 10 years, beginning on date of Substantial Completion. Full warranty shall apply for first year of period, and prorata warranty for last 9 years.
 2. Protection of Metal from Corrosion: Warranty against perforation or erosion of finish due to weathering.
 3. Color Retention: Warranty against fading, staining, chalking due to effects of weather and solar radiation.
 4. Furnish extra materials matching products installed, as described below, packaged with protective covering for storage, and identified with labels describing contents. Deliver extra materials to OWNER.
 - a. Lamps: 10 lamps for each 100 of each type and rating installed. Furnish at least 1 of each type.
 - b. Ballasts: 1 for each 100 of each type and rating installed. Furnish at least 1 of each type.

PART 2 - PRODUCTS

2.01 FIXTURES, GENERAL

- A. Comply with requirements specified in Articles below and lighting fixture schedule.

2.02 FIXTURE COMPONENTS, GENERAL

- A. Metal Parts: Free from burrs, sharp corners, and edges.
- B. Sheet Metal Components: Steel, except as indicated. Form and support components to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating and free from light leakage under operating conditions. Arrange to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.
- D. Reflecting Surfaces: Minimum reflectances as follows, except as otherwise indicated:
1. White surfaces: 85%.
 2. Specular Surfaces: 83%.
 3. Diffusing Specular Surfaces: 75%.

- 4. Laminated Silver Metallized Film: 90%.
- E. Exterior Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed fixtures.
- F. Exterior Exposed Hardware Material: Stainless steel.
- G. Lenses, Diffusers, Covers, and Globes: 100% virgin acrylic plastic or water white, annealed crystal glass except as indicated.
 - 1. Plastic: Highly resistant to yellowing and other changes due to aging, exposure to heat and UV radiation.
 - 2. Lens Thickness: 0.125 inches, minimum.
- H. Photoelectric Relay: UL 773.
 - 1. Contact Relays: Single-throw, arranged to fail in the "on" position and factory set to turn light unit on at 1.5 to 3 footcandles and off at 4.5 to 10 footcandles with 15 seconds minimum time delay.
 - 2. Relay Mounting: In fixture housing.

2.03 SUSPENDED FIXTURE SUPPORT COMPONENTS

- A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.
- B. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount single fixture. Finish same as fixture.
- C. Rod Hangers: 3/16-inch diameter cadmium plated, threaded steel rod.
- D. Hook Hanger: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

2.04 FLUORESCENT FIXTURES

- A. Fixtures: Conform to UL 1570.
- B. Ballasts: All fluorescent ballasts shall be electronic type and shall meet the following specs:
 - 1. UL Listed (Class P) sound rating A and CSA certified.
 - 2. Comply with EMI and RFI limits set by the FCC (CFR 47 part 18) or NEMA and not interfere with normal electrical equipment.
 - 3. Meet any applicable standards set forth by ANSI.
 - 4. Be potted or conformal coated in a metallic case and not contain PCBs.
 - 5. Provide normal rated lamp life as stated by lamp manufacturers (i.e. rated life at 3 hour burn time per start).
 - 6. Provide independent test results from an approved testing laboratory for all of the specifications below. This is required for all submitted ballasts.
 - 7. Nominal power factor of .90 or higher.
 - 8. Total harmonic distortion of less than 10% at 120 or 277 volts (universal voltage).
 - 9. Ballast factor 0.70 through 1.2, as shown on the lighting fixture schedule.
 - 10. Frequency of operation shall be 40 kHz - 50 kHz and units shall operate without visible flicker.

11. Ballast efficiency factor shall meet Consortium of Energy Efficiency (www.cee1.org) specifications (adopted by Focus on Energy program).
 12. Multi-lamp ballasts shall operate in parallel so that when one lamp burns out, the other lamps will continue to operate at full light output.
 13. Ballasts shall carry a minimum 5 year warranty with a \$10 replacement labor allowance.
 14. Ballasts shall not be affected by lamp failure.
 15. Ballasts shall be a standard production item.
 16. Ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type and UL Listing.
 17. Ballasts shall withstand line transients as defined in IEEE 587, Category A.
- C. Acceptable ballast manufacturer's names and product lines are as follows:
1. Osram Sylvania – Quicktronic High Efficiency and Quicktronic PROstart.
 2. GE Lighting – Ultramax and UltraStart.
 3. Maxlite – High Efficiency Ballast.
 4. Advance – Optanium.
 5. Universal Lighting Technologies – F32T8.
- D. Manufacturer names are used to develop quality and performance requirements only. All manufacturers and their products shall meet the system performance requirements and this entire specification.
- E. Compact Fluorescent Ballasts (Electronic)
1. Ballasts shall be high power factor, class P, with voltage rating matching the branch circuit voltage.
 2. Ballast factor shall be 0.85 or higher.
 3. Ballast shall have lamp fault shut-off circuitry to prevent starting of a faulty lamp.
 4. Cold-weather ballast must reliably start and operate the lamp in ambient temperatures down to 0°F for the rated life of the lamp.
- F. Dimming Ballasts (Fluorescent)
1. Ballast shall provide continuous, flicker-free dimming from 100% to 5%.
 2. Ballast shall have Total Harmonic Distortion of less than 10%.
 3. Ballast power factor shall be greater than 0.95.
 4. Ballast factor shall be 0.85 or higher for T8 lamps, 0.95 or higher for T5 lamps.
 5. Ballast shall be high frequency electronic type and operate lamps at a frequency above 25kHz for T5 lamps.
 6. Ballast shall have built-in inrush current limiting circuitry, maximum of 7 amps for 120 volts and 3 amps for 277 volts.
 7. Ballast shall have internal fusing.

8. Ballast shall have ultra-quiet operation.
9. Operating temperature shall not exceed 75° C on the case during normal operation.
10. Minimum lamp starting temperature shall be 10°C / 50° F.

2.05 INCANDESCENT FIXTURES

- A. Conform to UL 1571.

2.06 EXIT SIGNS

- A. Conform to UL 924.
 1. Sign Colors: Conform to local code.
- B. Self-Powered Exit Signs (Battery Type): Integral automatic high/low trickle charger in self-contained power pack.
 1. Battery: Sealed, maintenance-free, nickel cadmium type with special project warranty.
- C. Self-Powered Exit Signs (Luminous Source Type): Licensed for public use by U.S. Nuclear Regulatory Commission. signs have solid-state tritium gas energy source and provide legibility in total darkness at 100 feet after 10 years of service.

2.07 EMERGENCY LIGHTING UNITS

- A. Conform to UL 924. Provide self-contained units with following features and additional characteristics as indicated.
 1. Battery: Sealed, maintenance-free, lead-acid type with 10-year nominal life minimum, and special project warranty.
 2. Charger: Minimum 2-rate, fully-automatic, solid-state type, with sealed transfer relay.
 3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80% of nominal or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. Relay disconnects lamps and battery automatically recharges and floats on trickle charge when normal voltage is restored.
 4. Time-Delay Relay: Provide time-delay relay in emergency lighting unit control circuit arranged to hold unit "on" for fixed interval after restoration of power from an outage. Provide adequate time delay to permit HID lamps to restrike and develop output.
 5. Wire Guard: Where indicated, provide heavy chrome plated wire guard arranged to protect lamp heads or fixtures.

2.08 EMERGENCY FLUORESCENT POWER SUPPLY

- A. Conform to UL 924.
- B. Internal Type: Self-contained, modular, battery-inverter unit factory-mounted within fixture body.
 1. Test Switch and LED Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
 2. Battery: Sealed, maintenance-free, nickel-cadmium type, with minimum nominal 10-year life.

3. Charger: Fully-automatic, solid-state, constant-current type.
 4. Operation: Relay automatically turns 2 lamps on when supply circuit voltage drops to 80% of nominal or below. Relay disconnects lamp and battery automatically recharges when normal voltage is restored.
- C. External Type: Self-contained, modular, battery-inverter unit. Exterior fluorescent light fixtures are specified in Section 16525.
1. Test Switch and LED Indicator Light: Visible and accessible without entering ceiling space.
 2. Battery: Sealed, maintenance-free, nickel-cadmium type, with minimum nominal 10-year life.
 3. Charger: Fully-automatic, solid-state, constant-current type.
 4. Operation: Relay automatically turns 2 lamps of associated fixture on when supply circuit voltage drops to 80% or nominal or below. Battery automatically recharges when normal voltage is restored.

2.09 LAMPS

- A. Conform to ANSI C78 series applicable to each type of lamp.

2.10 FINISH

- A. Steel Parts: Manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and defects. Remove fixtures showing evidence of corrosion during project warranty period and replace with new fixtures.
- B. Other Parts: Manufacturer's standard finish.
- C. Verify and provide light fixture finishes as selected by ARCHITECT for all light fixture types. Include colored finish selection tables with product submittals. Upon request submit actual material finish swatches for A/E review.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved submittals.
- B. Support For Recessed and Semirecessed Fixtures: Units may be supported from suspended ceiling support system. Install ceiling system support rods or wires at minimum of four rods or wires per fixture located not more than 6 inches from fixture corners.
1. Fixtures Smaller Than Ceiling Grid: Install minimum of four rods or wires for each fixture and locate at corner of ceiling grid where fixture is located. Do not support fixtures by ceiling acoustical panels.
 2. Fixtures of Sizes Less Than Ceiling Grid: Center in acoustical panel. Support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
 3. Install support clips for recessed fixtures, securely fastened to ceiling grid members, at or near each fixture corners.
- C. Support for Suspended Fixtures: Brace pendants and rods that are 4 feet long or longer to

limit swinging. Support stem mounted single-unit suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.

- D. Lamping: Lamp units according to manufacturer's instructions.

3.02 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Give 7-day notice of dates and times for field tests.
- C. Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source.
- D. Interrupt electrical energy to demonstrate proper operation of emergency lighting installation.
 - 1. Duration of supply.
 - 2. Low battery voltage shut-down.
 - 3. Normal transfer to battery source and retransfer to normal.
 - 4. Low supply voltage transfer.
- E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.03 ADJUSTING AND CLEANING

- A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION

SECTION 16722

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The building (Dane County City-County Building) in Madison has a complete fire alarm system in place. This project will provide a renovated fire alarm system with new devices in the area of remodeling only. The areas outside the scope of work shall remain as is.
- B. The existing fire alarm system within the City/County building is a Simplex 2120 fire alarm control panel that was installed in the early 1980's.
- C. Under a recent project completed in 2007, the fire alarm control panel was upgraded to be a SimplexGrinnell 4100U fire alarm control panel. All new fire alarm devices shall be intelligent, addressable devices that are compatible with the 4100U fire alarm control panel currently installed.
- D. The contractor shall be aware the building does meet the definition of high-rise construction and all fire alarm devices shall contain the ability for digital voice communications. Therefore, speaker/strobe devices will be used instead of horn/strobe devices. Provide any necessary power extender (NAC) panels for the visual notification devices as required.
- E. Provide wiring as required to incorporate these new devices into the existing SimplexGrinnell 4100U fire alarm control panel. Coordinate this work with the Madison sales office of SimplexGrinnell.
- F. The Contractor shall be aware that most of the building will remain occupied during construction of this remodeled area.
 - 1. The Contractor shall be responsible for turning off/turning on the fire alarm system to allow for work to be performed. Also, the Contractor shall be responsible for contacting Dane County building maintenance staff at any time when the fire alarm system is down. This will allow for an announcement to be made to all building occupants.
 - 2. All testing shall be done during non-occupied hours.
 - 3. Extreme care should be taken on the part of the Contractor to reduce or eliminate nuisance tripping of the fire alarm smoke detectors during construction. Extensive nuisance tripping of the fire alarm system cannot be tolerated due to the high volume of occupants in the building.

1.02 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies
 - 1. National Fire Protection Association (NFPA):
 - a. NFPA No. 70 - National Electric Code (NEC).
 - b. NFPA No. 101 - Life Safety Code.
 - 2. Wisconsin Enrolled Building Commercial Building Code 2002.
 - 3. Underwriters Laboratories, Inc.
 - 4. Local codes and ordinances.

- B. Reference Standards:
 - 1. National Fire Protection Association (NFPA):
 - a. NFPA No. 72
 - 2. National Electrical Manufacturer's Association (NEMA).
- C. System equipment to be of one manufacturer and supported by factory trained, established service organization of equipment manufacturer who shall stock parts for equipment supplied.
- D. Equipment must be manufactured by firm actively manufacturing fire alarm systems for minimum of 10 years.
- E. Manufacturer's Services:
 - 1. Manufacturer's representative factory trained service engineer for equipment specified herein shall be present at job site to supervise final adjustment of system after installation complete, equipment startup, and training of OWNER'S personnel for system operation.
 - 2. Manufacturer shall direct services to system and equipment operation, maintenance, troubleshooting, and equipment and system related areas.

1.03 SUBMITTALS

- A. Shop Drawings to include:
 - 1. Data sheets and equipment description.
 - 2. Bill of materials listing components.
 - 3. Component wiring diagrams.
 - 4. System wiring and interconnection diagrams showing all devices – not a typical diagram.
- B. Operation and Maintenance (O & M) Data: Submit in accordance with Division 1. Provide electronic record drawings in Autocad Version 2002 or newer on CD.
- C. Field quality control test results.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Receive equipment at job site, verify applicable components and quantity delivered per invoice.
- B. Handle equipment to prevent internal components damage, breakage, denting, and scoring enclosure and finish.
- C. Do not install damaged equipment.
- D. Store equipment in clean, dry space and protect from dirt, fumes, water, construction debris, and physical damage.
- E. After installation, protect from damage by Work of other trades.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Use of manufacturer's name and model or catalog number is for purpose of establishing

standard of quality, general configuration, and operating characteristics desired only.

2.02 ACCEPTABLE MANUFACTURERS

- A. SimplexGrinnell
- B. Due to the existence of the existing SimplexGrinnell fire alarm control panel, no other manufacturers will be accepted.

2.03 SYSTEM OPERATION

- A. The system operation for the existing SimplexGrinnell 4100U fire alarm control panel shall remain as is with no modifications. This equipment was recently installed

2.04 FIRE ALARM CONTROL PANEL

- A. The fire alarm control panel is an existing SimplexGrinnell 410U addressable FACP. This equipment will remain in place and the fire alarm system shall be extended to the areas of remodeling with compatibility with this fire alarm control panel.

2.05 SMOKE DETECTION

- A. Smoke detectors shall be Photoelectric type, SimplexGrinnell True Alarm Analog Sensing 4098 series.
 - 1. Analog addressable.
 - 2. Light scattering principle.
 - 3. UL magnet test feature.
 - 4. Remote test by control panel command.
 - 5. Dual alarm and power LED.
 - 6. Adjustable sensitivity via panel command.
 - 7. Mounts on 4" octagon or 4" square box with square to round ring.
- B. Duct smoke detector shall be SimplexGrinnell addressable True Alarm Photoelectric Sensor 4098-9755.
 - 1. Analog addressable.
 - 2. For air velocity between 300 and 4000 feet per minute.
 - 3. Sampling tube as required for duct width dimensions.
- C. Isolation module:
 - 1. Automatically isolate wire-to-wire short circuit from SLC loop.
 - 2. Provide one for each 20 addressable/intelligent devices.
 - 3. Amber LED shall flash to indicate activation.
 - 4. Mount on 4 inch square or 4 inch square box with 2 gang ring.

2.06 HEAT DETECTION

- A. Heat detector shall be SimplexGrinnell E-Series Electronic Heat Detector 4098 series
 - 1. Analog addressable fixed plus rate of rise.
 - 2. Dual termistors.
 - 3. Self restoring.

4. Mount on 4" octagon or 4" square box with square to round ring.

2.07 MODULES:

- A. Monitor module
 1. Monitor contact closing devices (Class B).
 2. Addressable.
 3. Mounts on 4" square or 4" square with 2 gang ring.
- B. Control module
 1. Addressable.
 2. DPDT relay contact rated at 3.0A, 30VDC, 0.5A 110VAC.
 3. Mount on 4" square or 4" square with 2 gang ring.
 4. Must be located with 3' of device being controlled.
- C. Isolation module
 1. Automatically isolate wire-to-wire short circuit from SLC loop.
 2. Provide one for each 20 addressable/intelligent devices (Maximum of 25 devices per module).
 3. Amber LED shall flash to indicate activation.
 4. Mount on 4" square or 4" square with 2 gang ring.

2.08 PULL STATIONS

- A. Pull station shall be a SimplexGrinnell 4099-9003
 1. Double action, Push operation, English
 2. Addressable.
 3. Lexan construction.
 4. Key reset.
 5. Within ADA 5lb. pull force.
 6. Includes Braille text on station handle.
 7. Bi-color LED visible through handle of station.
 8. Mount on 4" square with 1 gang ring.

2.09 NOTIFICATION DEVICES - SIGNALS

- A. Speaker/Strobe unit shall be Wheelock Series ET70 addressable speaker/visual notification devices.
 1. Speaker
 - a. High quality voice or tone reproduction with tamps for 1/4, 1/2 , 1 or 2 watts at 25 or 70.7 VRMS.
 2. Strobe
 - a. 15/75cd, 75cd, or 110cd strobe as required (synchronized) (See plans for candela requirements).
 3. Mounts on 4" square or 4" square with 1- or 2-gang ring.
 4. All devices shall be wall-mounted wherever possible. However, where required due

to existing conditions, ceiling mounted speaker/strobe devices shall be allowed to be used.

- B. Strobe unit shall be Wheelock Series RSS visual notification devices mounted to RSSP plates.
 - 1. 15/75cd, 75cd, or 110cd strobe as required (synchronized) (See plans for candela requirements).
 - 2. Mounts on 4" square box or 4" square with 1- or 2-gang ring.
- C. Provide mini-horns where shown on the plans. Mini-horns may be ceiling mounted.

2.10 REMOTE ANNUNCIATOR

- A. Remote annunciator shall be SimplexGrinnell 4603-9101 LCD annunciator.
 - 1. 80 character display.
 - 2. Function switches which can be displayed.
 - 3. Back box furnished with annunciator.

2.11 NOTIFICATION APPLIANCE CIRCUIT PANEL

- A. Notification Appliance Circuit Panel (NAC) shall be SimplexGrinnell 4009 Series
 - 1. Provides four, power-limited NACs with general alarm operation, available as Class B or Class A, each rated 2 A (expandable to eight NACs)
 - a. Includes 8 A power supply/charger
 - b. Follows coded or non-coded alarm input

2.12 MAGNETIC DOOR HOLDERS

- A. Door holder shall be LCN 404SE (Furnished and installed by General Contractor):
 - 1. Closer holder combination
 - 2. 24V DC solenoid

2.13 FLOW, PRESSURE AND TAMPER SWITCHES

- A. Wire and install in accordance with requirements of other specification sections and wire as specified in this section. Provide necessary monitor modules and circuits. Wire and install outdoor sprinkler alarm bell. Flow, pressure, tamper switches and sprinkler alarm bell furnished by others.

2.14 SLAVE FAN RELAY

- A. Slave fan relay shall be SimplexGrinnell model 4090-9002 Relay IAM

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which fire alarm system to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of Work.

3.02 INSTALLATION

- A. Installation of the Fire Alarm/Life Safety System shall be in strict compliance with

manufacturer's recommendations. Consult the manufacturer's Control Panel and Peripheral Equipment installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation.

- B. Power Requirements:
 - 1. The Fire Alarm Control Panel (FACP) and/or Notification Appliance Circuit (NAC) panels shall be connected to a separate 20 ampere, 120 volt dedicated branch circuit labeled as FIRE ALARM.
 - 2. The Control Panel Cabinet shall be grounded securely using a copper grounding conductor.
 - 3. Conduit shall enter into the Fire Alarm Control panel backbox only at those areas of the back box which have factory conduit knockouts.
 - 4. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; an audible and visual trouble signal will be activated until system and its associated field wiring are restored to normal condition.
- C. Cables must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
- D. SLC loops shall be loaded to no more than 75% of their capacity.
- E. Install wiring in accordance with Section 16001 and shall be in accordance with the NEC, NFPA 72 1999, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer. See Article 3.06 FREE AIR CABLING for further requirements.
 - 1. SLC loop shall be 2 #16 shielded FPLR or FPLP cable as required.
 - 2. Signal circuit wiring shall be 2 conductor #14 or 2 conductor #12 FPLR or FPLP cable as required. 2#14 or 2#12 THHN is acceptable if signal circuits are enclosed in listed raceway. Synchronization modules shall be utilized to provide audio and visual synchronization over 2 conductors. Consult loading chart for proper wire gauge and wire length to insure against excessive DC voltage drop. A minimum of 20.5V DC must be available at the last signal of a NAC under full alarm condition.
 - 3. Provide 2 #14 from control panel or door holder power supply to door holders.
- F. Provide all fire alarm system wiring drops to devices within raceways and junction boxes. Where existing conditions prohibit fishing existing walls, so as to avoid excessive cutting and restoration metallic wire mold finished to match existing wall surface shall be permitted where allowed by OWNER/ENGINEER, routing subject to OWNER/ENGINEER approval. Install conduit in accordance with Section 16001 and as shown on Drawings.
- G. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- H. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. Ref: NFPA 72, 1999 2-3.6.1.3.
- I. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished

areas and may be exposed in unfinished areas if approved by Owner/Engineer before installation. All system junction boxes shall be as manufactured by system supplier or painted red and stenciled with fire alarm system designation.

- J. All fire detection and alarm system devices shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas if approved by Owner/Engineer before installation.
- K. All conductor identification shall be labeled in accordance with 16001 at all accessible locations including at control panel, junction boxes and at devices for future tracing and maintenance.
- L. Provide concealed 3/4" conduit and wire to telephone terminal board from main fire alarm control panel.
- M. Coordinate connections with supplier of central station network system.
- N. Provide concealed 3/4" conduit and wire to security panel for monitoring of trouble, supervisory and system alarm.
- O. Provide elevator recall and elevator shunt trip using addressable control modules. Utilizing detector auxiliary contacts is not acceptable and violates NFPA 72, 1999 3-9.2.1. Provide Elevator shunt trip power supervision for integrity per NFPA 72, 1999 3-9.4.4.

3.03 ADJUSTMENT AND CLEANING

- A. Clean system equipment and enclosure of dirt and debris.

3.04 FIELD QUALITY CONTROL

- A. Provide the service of a NICET certified, Level II minimum, factory-trained technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and test for the system.
- B. System shall test free from grounds, opens, and short circuits.
- C. Upon completion of installation of fire alarm equipment, CONTRACTOR shall provide ENGINEER with signed written statement substantially in form as follows.
- D. "The undersigned having been engaged as the CONTRACTOR on the "DANE COUNTY CITY-COUNTY BUILDING" confirms the fire alarm equipment was installed in accordance with wiring diagrams, instructions, and directions provided to us by the manufacturer."

3.05 WARRANTY

- A. All work performed and all material and equipment furnished under this contract shall be from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

3.06 FREE AIR WIRING

- A. All wiring shall be run "free-air", in conduit or in surface raceway. "Free-air" wiring is allowed where it can be completely concealed. If wiring cannot be concealed, it shall be installed in wiremold in finished areas and in conduit in unfinished areas.

- B. Where installed “free-air”, comply with the following:
1. Cable shall run at right angles and be kept clear of other trades work.
 2. Cables shall be supported according to code utilizing bridle rings anchored to ceiling concrete, piping supports or structural steel beams. Rings shall be designed to maintain cables bend to larger than the minimum bend radius (typically 4 x cable diameter).
 3. Supports shall be spaced at a maximum 4-foot interval unless limited by building construction. If cable "sag" at mid-span exceeds 12-inches, another support shall be used.
 4. Cable shall never be laid directly on the ceiling grid.
 5. Cables shall not be attached to or supported by, existing cabling, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit.
 6. A coil of 2 feet in each cable shall be placed in the ceiling at each “free-air” wired fire alarm device. These "service loops" shall be secured at the last cable support before the cable reaches the device and shall be coiled from 100% to 200% of the cable recommended minimum bend radius.
 7. Devices wired with conduit shall be provided with an 8-inch wire tail at each device box and 36-inch wire tails at the FACP and FAAP.
 8. To reduce or eliminate EMI, the following minimum separation distances from $\leq 480V$ Power lines shall be adhered to:
 - a. Twelve (12) inches from power lines of $<5\text{-kVa}$.
 - b. Eighteen (18) inches from high voltage lighting (including fluorescent).
 - c. Thirty-nine (39) inches from power lines of 5-kVa or greater.
 - d. Thirty-nine (39) inches from transformers and motors.
 9. All cable shall be free of tension at both ends. In cases where the cable must bear some stress, Kellem grips shall be used to spread the strain over a longer length of cable.
 10. Manufacturers minimum bend radius specifications shall be observed in all instances. Care should be taken in the use of cable ties to secure and anchor the station cabling. Ties should not be over tightened as to compress the cable jacket. No sharp burrs should remain where excess length of the cable tie has been cut.
 11. All vertical cable extensions to fire alarm devices located below the finished ceiling shall be in conduit.
- C. Contractor shall furnish all required installation tools to facilitate cable pulling without damage to the cable jacket. Such equipment is to include, but not limited to, sheaves, winches, cable reels, cable reel jacks, duct entrance tunnels, pulling tension gauge and similar devices. All equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices, which may move or wear in a manner to pose a hazard to the cable, shall not be used.
- D. All cable shall be pulled by hand unless installation conditions require mechanical assistance. Where mechanical assistance is used, care shall be taken to insure that the maximum tensile load for the cable as defined by the manufacturer is not exceeded. This may be in the form of continuous monitoring of pulling tension, use of a “break-away” or other approved method.

3.07 DEPARTMENT OF COMMERCE SUBMITTALS

- A. This Contractor is responsible for making required Department of Commerce or City of Madison Fire Department submittals.
- B. Pay any Department of Commerce or City of Madison Fire Department fees for reviewing submittal. These fees should be included in the contractors bid.
- C. Make submittal after engineering review has been obtained for shop drawings.
- D. Incorporate any Department of Commerce or City of Madison Fire Department comments into shop drawings and as-builts.

END OF SECTION

SECTION 16751

TELECOMMUNICATIONS DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.01 SCOPE

- A. The basic scope of this project is as follows:
1. Reroute a 12-strand multi-mode fiber optic cable presently serving an old telecommunications room on the 1st floor to Telecommunications Room 105. The fiber optic cabling is for voice and data communications. Coordinate the installation of this cable with the Dane County Information Technology (IT) staff.
 2. Provide a 12-strand multi-mode fiber optic cabling between the 3rd Floor telecommunications closet and the Main Computer Room location on the 5th Floor of the Dane County City-County Building. The fiber optic cabling is for voice and data communications. Coordinate the installation of this cable with the Dane County Information Technology (IT) staff.
 3. Provide a new telecommunications rack in the existing 1st floor telecommunications room complete with fiber optic patch panel. From the telecommunications closet, provide horizontal Category 6 cabling out to the workstation outlets as indicated on the floor plans.
 4. Provide a new fiber optic patch panel in the existing 3rd floor telecommunications rack. From the telecommunications closet, provide horizontal Category 6 cabling out to the workstation outlets as indicated on the floor plans.
 5. Provide all certification and testing of the equipment and cabling as required.
- B. Section Includes: Equipment, materials, labor, and services to provide telephone and data distribution system including, but not limited to:
1. Raceway, boxes, and cable tray
 2. Telephone and data cabling terminations
 3. Optical fiber and terminations
 4. Telecommunications outlets
 5. Terminal blocks/cross-connect systems
 6. Equipment racks and cabinets
 7. System testing
 8. Documentation and submissions
- C. Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.
- D. Work not included:
1. The following work will be done by others:
 - a. Off-site services.
 - b. Providing 120V wiring and outlets.
 - c. Providing data concentrators, hubs, servers, computers, and other active

devices.

1.02 REFERENCES

- A. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with NFPA-70 (National Electrical Code®), state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:
1. ANSI/NECA/BICSI-568 -- Standard for Installing Commercial Building Telecommunications Cabling
 2. ANSI/TIA/EIA Standards
 - a. ANSI/TIA/EIA-568-B.1 -- Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
 - b. ANSI/TIA/EIA-568-B.2 -- Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components
 - c. ANSI/TIA/EIA-568-B.3 -- Optical Fiber Cabling Components Standard
 - d. ANSI/TIA/EIA-569-A -- Commercial Building Standard for Telecommunications Pathways and Spaces
 - e. ANSI/TIA/EIA-606(A) -- The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - f. ANSI/TIA/EIA-607(A) -- Commercial Building Grounding and Bonding Requirements for Telecommunications
 - g. ANSI/TIA/EIA-526-7 -- Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
 - h. ANSI/TIA/EIA-526-14A -- Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant
 - i. ANSI/TIA/EIA-758(A) -- Customer-Owned Outside Plant Telecommunications Cabling Standard
- B. Install cabling in accordance with the most recent edition of BICSI® publications:
1. BICSI -- Telecommunications Distribution Methods Manual
 2. BICSI -- Cabling Installation Manual
 3. BICSI -- LAN Design Manual
 4. BICSI -- Customer-Owned Outside Plant Design Manual
- C. Federal, state, and local codes, rules, regulations, and ordinances governing the work, are as fully part of the specifications as if herein repeated or hereto attached. If the contractor should note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the owner's representative in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.

1.03 PERMITS, FEES, AND CERTIFICATES OF APPROVAL

- A. As prerequisite to final acceptance, supply to the owner certificates of inspection from an inspection agency acceptable to the owner and approved by local municipality and utility

company serving the project.

1.04 SYSTEM DESCRIPTION

- A. Telecommunications cabling system generally consists of one telecommunications outlet in each workstation, wall telephones in common and mechanical areas and telecommunications rooms (TRs) located on each floor.
 - 1. For this project, both telecommunications rooms are existing. See floor plans for the exact location.
 - 2. The equipment room (ER) is currently existing and is located on the 5th Floor of the City-County Building.
- B. The typical work area consists of a single-gang plate with three standards compliant work area outlets.
 - 1. Each work area outlet consists of one (1) four-pair data Category 6 cable or above, installed from work area outlet to the TR. Terminate data cables on rack mounted modular patch panels located in the appropriate TR.
- C. Vertical/horizontal backbone cabling consists of 50/125 mm multimode optical fiber cable installed from the telecommunications closet (room) to the Main Computer Room on the 5th Floor of the City-County Building. The backbone cabling to be used for both voice and data communications within the building.

1.05 SUBMITTALS

- A. Submit to the engineer/designer shop drawings, product data (including cut sheets and catalog information), and samples required by the contract documents. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. The engineer/designer will indicate approval of shop drawings, product data, and samples submitted to the engineer by stamping such submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor, showing the date and the contractor's legitimate firm name.
 - 1. By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents. The engineer/designer remains responsible for the design concept expressed in the contract documents as defined herein.
 - 2. The engineer's/designer's approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents, unless the contractor has specifically informed the engineer/designer in writing of such deviation at time of submittal, and the engineer/designer has given written approval of the specific deviation. The contractor shall continue to be responsible for deviations from requirements of the contract documents not specifically noted by the contractor in writing, and specifically approved by the engineer in writing.
 - 3. The engineer's/designer's approval of shop drawings, product data, and samples shall not relieve the contractor of responsibility for errors or omissions in such shop

drawings, product data, and samples.

4. The engineer's/designer's review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The engineer's/designer's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The engineer's/designer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- B. Perform no portion of the work requiring submittal and review of shop drawings, product data, or samples, until the engineer/designer has approved the respective submittal. Such work shall be in accordance with approved submittals.
 - C. Submit shop drawings, product data, and samples as a complete set within thirty (30) days of award of contract.
 1. For initial submission and for resubmission required for approval, submit four (4) copies of each item. The engineer/designer will only return two copies. Make reproductions as required for your use and distribution to subcontractors.
 2. Illegible submittals will not be checked by the engineer.
 - D. General: Submit the following:
 1. Bill of materials, noting long lead time items
 2. Optical loss budget calculations for each optical fiber run
 3. Project schedule including all major work components that materially affect any other work on the project
 - E. Shop drawings: Submit the following:
 1. Backbone (riser) diagrams.
 2. System block diagram, indicating interconnection between system components and subsystems.
 3. Interface requirements, including connector types and pin-outs, to external systems and systems or components not supplied by the contractor.
 4. Fabrication drawings for custom-built equipment.
 - F. Product Data -- Provide catalog cut sheets and information for the following:
 1. Wire, cable, and optical fiber
 2. Outlets, jacks, faceplates, and connectors
 3. All metallic and nonmetallic raceways, including surface raceways, outlet boxes, and fittings
 4. Terminal blocks and patch panels
 5. Enclosures, racks, and equipment housings
 6. Splice housings
 - G. Project record drawings:

1. Submit project record drawings at conclusion of the project and include:
 - a. Approved shop drawings
 - b. Plan drawings indicating locations and identification of work area outlets, nodes, telecommunications rooms (TRs), and backbone (riser) cable runs
 - c. Telecommunications rooms (TRs) and equipment room (ER and/or MC) termination detail sheets.
 - d. Cross-connect schedules including entrance point, main cross-connects, intermediate cross-connects, and horizontal cross-connects.
 - e. Labeling and administration documentation.
 - f. Warranty documents for equipment.
 - g. Copper certification test result printouts and diskettes.
 - (a.) Optical fiber power meter/light source test results.

1.06 QUALITY ASSURANCE

- A. The contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size.
- B. Upon request by the engineer/designer, furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems.
- C. Equipment and materials of the type for which there are independent standard testing requirements, listings, and labels, shall be listed and labeled by the independent testing laboratory.
- D. Where equipment and materials have industry certification, labels, or standards (i.e., NEMA - National Electrical Manufacturers Association), this equipment shall be labeled as certified or complying with standards.
- E. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.
- F. Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the owner and engineer/designer.

1.07 WARRANTY

- A. Specification Note: Insert manufacturer's extended warranty verbiage if requested.
- B. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship for a period of not less than fifteen (15) years from date of acceptance by the owner. The owner shall deem acceptance as beneficial use.
- C. Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period. Final payment shall not relieve you of these obligations.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the owner for secure storage of equipment and materials. Do not store equipment where conditions fall outside manufacturer's recommendations for environmental conditions. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.

1.09 SEQUENCE AND SCHEDULING

- A. Submit schedule for installation of equipment and cabling. Indicate delivery, installation, and testing for conformance to specific job completion dates. As a minimum, dates are to be provided for bid award, installation start date, completion of station cabling, completion of riser cabling, completion of testing and labeling, cutover, completion of the final punch list, start of demolition, owner acceptance, and demolition completion.

1.10 USE OF THE SITE

- A. Use of the site shall be at the owner's direction in matters in which the owner deems it necessary to place restriction.
- B. Access to building wherein the work is performed shall be as directed by the owner.
- C. The owner will occupy the premises during the entire period of construction for conducting his or her normal business operations. Cooperate with the owner to minimize conflict and to facilitate the owner's operations.
- D. Schedule necessary shutdowns of plant services with the owner, and obtain written permission from the owner. Refer to article - CONTINUITY OF SERVICES herein.
- E. Proceed with the work without interfering with ordinary use of streets, aisles, passages, exits, and operations of the owner.

1.11 CONTINUITY OF SERVICES

- A. Take no action that will interfere with, or interrupt, existing building services unless previous arrangements have been made with the owner's representative. Arrange the work to minimize shutdown time.
- B. Owner's personnel will perform shutdown of operating systems. The contractor shall give three (3) days' advance notice for systems shutdown.
- C. Should services be inadvertently interrupted, immediately furnish labor, including overtime, material, and equipment necessary for prompt restoration of interrupted service.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Hubbell, Ortronics, Panduit
 1. Or any other approved equivalent manufacturer that meets the performance requirements of this specification. Category 6 performance is standard.
 2. Contractor shall be a certified installer.
- B. Berk-Tek
- C. Belden

- D. Mohawk
- E. Commscope
- F. Superior Essex
- G. Optical Cable Corporation

2.02 FABRICATION

- A. Fabricate custom-made equipment with careful consideration given to aesthetic, technical, and functional aspects of equipment and its installation.

2.03 SUITABILITY

- A. Provide products that are suitable for intended use, including, but not limited to environmental, regulatory, and electrical.

2.04 BACKBONE CABLE

- A. VOICE/DATA TELECOMMUNICATIONS SERVICE BACKBONE CABLE (Edit for items that will actually be used on the project. Alter parameters for fire rating of cable jacket(s) as required.)
 - 1. Multimode 50/125 μm diameter tight-buffered optical fiber, with fiber counts as indicated on drawings, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA-568-B.3
 - a. Listed type OFNP, OFNR, OFCR, and/or OFCP (as required in the NEC 2002).

2.05 STATION CABLE

- A. VOICE TELECOMMUNICATIONS STATION CABLE
 - 1. Solid copper, 24 AWG, 100 W balanced twisted-pair (UTP) Category 6 cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 up to 250 MHz.
 - a. Listed Type CMP (as required in the NEC 2005).
- B. DATA STATION CABLE (Copper)
 - 1. Solid copper, 24 AWG, 100 W balanced twisted-pair (UTP) Category 6 cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 up to 250 MHz.
 - a. Listed Type CMP (as required in the NEC 2005).

2.06 WORK AREA OUTLETS

- A. VOICE/DATA WORK AREA OUTLETS (Copper only)
 - 1. Single-gang mounting plate with four (4) openings containing the following devices:
 - a. Voice Outlet - 8-pin modular, Category 6, unkeyed, white, pinned to T568A standards.
 - b. Data Outlet - 8-pin modular, Category 6, unkeyed, blue, pinned to T568A standards.
 - 2. The device color of outlets and jacket color for cabling that will be used on the project

shall be coordinated with the Dane County Information Technology (IT) Department prior to the beginning of any work. It is intended that the Dane County standard being maintained.

B. WALL VOICE OUTLETS

1. Single-gang stainless steel faceplate with six-conductor jack and wall telephone mounting lugs

C. DATA ONLY WORK AREA OUTLET

1. Single-gang faceplate with 8-pin modular, category 6, unkeyed, blue data jack, pinned to T568A standards

D. VOICE ONLY WORK AREA OUTLET

1. Single-gang faceplate with 8-pin modular, category 6, unkeyed, white telephone jack, pinned to T568A standards

2.07 PATCH PANELS

- A. 19 in. rack mountable, 24-port 8-pin modular to insulation displacement connector (IDC) meeting Category 5e performance standards, and pinned to either T568 (A or B) standards. Typical examples of IDC connections are the 110, BIX, and Krone.

2.08 RACK MOUNTED OPTICAL FIBER TERMINATION PANEL

- A. 19 in. rack mounted 72-port rack-mounted optical fiber termination panel with cable strain relief, grounding lugs, slack storage and three 12-port duplex SC or approved alternative connector panels with adapters and provisions for six (6) splice trays.

2.09 SPLICE TRAYS

- A. Sized for multimode fibers, nonmetallic with clear plastic cover, 12-fiber splice capacity, compatible with splice enclosure and splicing method.

2.10 OPTICAL FIBER CONNECTORS

- A. Ceramic tipped field installed 568SC connectors, which meet or exceed the performance specifications in ANSI/TIA/EIA-568-B.3.

2.11 OPTICAL FIBER JUMPERS

- A. Dual 50/125- μm (and/or singlemode) optical fiber jumper cable, 1 m long with 3.0 mm Duplex 568 SC optical fiber connectors on each end.

2.12 OPTICAL FIBER PIGTAILS

- A. 50/125 μm (and/or singlemode) optical fiber pigtail 1 m long with 3.0 mm single 568 SC optical fiber connectors on one end

2.13 OPEN FRAME EQUIPMENT RACK

- A. Open frame, 19 in. equipment rack, 7 foot 6 in. overall height with flange base, mounting rails drilled front and back and tapped to EIA standards, and a front-rack mountable 10 outlet multiple outlet electrical strip. **MATCH EXISTING MANUFACTURER AND MODEL.**

2.14 SPLICE HOUSING

- A. Encapsulated, re-enterable splice housing, sized as required with bonding straps, accessories, end caps and encapsulant as required
- B. Splice modules (such as 710 series or MS2) for use within splice housing

2.15 SPARES

- A. Furnish the following spare equipment and parts:
 - 1. Terminal block connectors, if required
 - 2. Test set cords, if required
 - 3. Install one test cord set in each telecommunications closet
 - 4. Five (5) percent of base bid quantity of each type of jack shall be provided
 - 5. Five (5) percent of base bid quantity of each type of outlet

PART 3 - EXECUTION

3.01 PRE-INSTALLATION SITE SURVEY

- A. Prior to start of systems installation, meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the General Contractor will be necessary to plan the crucial scheduled completions of the equipment room and telecommunications closets.
- B. Examine areas and conditions under which the system is to be installed. Do not proceed with the work until satisfactory conditions have been achieved.
- C. The contractor shall be responsible for meeting with the Owner's (Dane County) Information Technology staff prior to the start of any installation to coordinate the work to be installed as part of this project. It is the design intent to maintain any cabling or installation standards that are currently in use by Dane County.
 - 1. Failure to perform this meeting may cause work to be removed and reinstalled if not deemed acceptable by Dane County.

3.02 HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS

- A. Be responsible for safekeeping of your own and your subcontractors' property, such as equipment and materials, on the job site. The owner assumes no responsibility for protection of above named property against fire, theft, and environmental conditions.

3.03 PROTECTION OF OWNER'S FACILITIES

- A. Effectively protect the owner's facilities, equipment, and materials from dust, dirt, and damage during construction.
- B. Remove protection at completion of the work.

3.04 INSTALLATION

- A. Receive, check, unload, handle, store, and adequately protect equipment and materials to be installed as part of the contract. Store in areas as directed by the owner's representative. Include delivery, unloading, setting in place, fastening to walls, floors, ceilings, or other structures where required, interconnecting wiring of system components, equipment alignment and adjustment, and other related work whether or not expressly defined herein.
- B. Install materials and equipment in accordance with applicable standards, codes, requirements, and recommendations of national, state, and local authorities having jurisdiction, and National Electrical Code® (NEC) and with manufacturer's printed instructions.
- C. Adhere to manufacturer's published specifications for pulling tension, minimum bend radii, and sidewall pressure when installing cables.
 - 1. Where manufacturer does not provide bending radii information, minimum-bending radius shall be 15 times cable diameter. Arrange and mount equipment and materials in a manner acceptable to the engineer and the owner.
- D. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be firestopped after installation and testing, utilizing a firestopping assembly approved for that application.
- E. Install station cabling to the nearest telecommunications room (TR), unless otherwise noted.
- F. Installation shall conform to the following basic guidelines:
 - 1. Use of approved wire, cable, and wiring devices
 - 2. Neat and uncluttered wire termination
- G. Attach cables to permanent structure with suitable attachments at intervals of 48 to 60 inches. Support cables installed above removable ceilings.
- H. Install adequate support structures for 10 foot of service slack at each TR.
- I. Support riser cables every three (3) floors and at top of run with cable grips.
 - 1. Limit number of four-pair data riser cables per grip to fifty (50)
- J. Install cables in one continuous piece. Splices shall not be allowed except as indicated on the drawings or noted below:
- K. Provide overvoltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.

3.05 GROUNDING

- A. Grounding shall conform to ANSI/TIA/EIA 607(A) - Commercial Building Grounding and Bonding Requirements for Telecommunications, National Electrical Code®, ANSI/NECA/BICSI-568 and manufacturer's grounding requirements as minimum.
- B. Bond and ground equipment racks, housings, messenger cables, and raceways.
- C. Connect cabinets, racks, and frames to single-point ground which is connected to building ground system via #6 AWG green insulated copper grounding conductor.

3.06 LABELING

- A. Labeling shall conform to ANSI/TIA/EIA-606(A) standards. In addition, provide the following:
1. Label each outlet with permanent self-adhesive label with minimum 3/16 in. high characters.
 2. Label each cable with permanent self-adhesive label with minimum, 1/8 in. high characters, in the following locations:
 - a. Inside receptacle box at the work area.
 - b. Behind the communication closet patch panel or punch block.
 - c. Use labels on face of data patch panels. Provide facility assignment records in a protective cover at each telecommunications closet location that is specific to the facilities terminated therein.
 - d. Use color-coded labels for each termination field that conforms to ANSI/TIA/EIA-606(A) standard color codes for termination blocks.
 - e. Mount termination blocks on color-coded backboards.
 - f. Labels shall be machine-printed. Hand-lettered labels shall not be acceptable.
 - g. Label cables, outlets, patch panels, and punch blocks with room number in which outlet is located, followed by a single letter suffix to indicate particular outlet within room, i.e., S2107A, S2107B. Indicate riser cables by an R then pair or cable number.
 - h. Mark up floor plans showing outlet locations, type, and cable marking of cables. Turn these drawings over to the owner two (2) weeks prior to move in to allow the owner's personnel to connect and test owner-provided equipment in a timely fashion.
 - i. Three (3) sets of as-built drawing shall be delivered to the owner within four (4) weeks of acceptance of project by the owner. A set of as-built drawings shall be provided to the owner in magnetic media form (3.5" floppy disks) and utilizing CAD software that is acceptable to the owner. The magnetic media shall be delivered to the owner within six (6) weeks of acceptance of project by owner.

3.07 TESTING

- A. Testing shall conform to ANSI/TIA/EIA-568-B.1 standard. Testing shall be accomplished using level IIe or higher field testers.
- B. Test each pair and shield of each cable for opens, shorts, grounds, and pair reversal. Correct grounded, and reversed pairs. Examine open and shorted pairs to determine if problem is caused by improper termination. If termination is proper, tag bad pairs at both ends and note on termination sheets.
1. Perform testing of copper cables with tester meeting ANSI/TIA/EIA-568-B.1 requirements.

Category 6 Test Parameters:

Frequency Mhz	Category 6 Cable Permanent Link Test					
	TIA/EIA 568B.2-1 Insertion Loss Attenuation	TIA/EIA 568B.2-1 NEXT Worst Pair to Pair	TIA/EIA 568B.2-1 PSNEXT Worst Case Loss	TIA/EIA 568B.2-1 ELFEXT Worst Pair to Pair Loss	TIA/EIA 568B.2-1 PSELFEXT Loss	TIA/EIA 568B.2-1 Return Loss
	Max. dB	dB	dB	DB	dB	dB
1.00	1.9	65.0	62.0	64.2	61.2	19.1
4.00	3.5	64.1	61.8	52.1	49.1	21.0
8.00	5.0	59.4	57.0	46.1	43.1	21.0
10.00	5.5	57.8	55.5	44.2	41.2	21.0
16.00	7.0	54.6	52.2	40.1	37.1	20.0
20.00	7.9	53.1	50.7	38.2	35.2	19.5
25.00	8.9	51.5	49.1	36.2	33.2	19.0
31.25	10.0	50.0	47.5	34.3	31.3	18.5
62.50	14.4	45.1	42.7	28.3	25.3	16.0
100.00	18.6	41.8	39.3	24.2	21.2	14.0
200.00	27.4	36.9	34.3	18.2	15.2	11.0
250.00	31.1	35.3	32.7	16.2	13.2	10.0

C. Propagation Delay

1. The maximum propagation delay determined in accordance with the ANSI/TIA/EIA – 568B.2 for a Permanent Link configuration shall be less than 498-ns measured at 10MHz. (Note: In determining the permanent link propagation delay, the propagation delay contribution of connecting hardware is assumed to not exceed 2.5 ns from 1 MHz to 250MHz).

D. Delay Skew

1. For all frequencies from 1 MHz to 250 MHz, Category 6 cable propagation delay skew shall not exceed 44ns/100m at 20 degrees C, 40 degrees C, and 60 degrees C. In addition, the propagation delay skew between all pairs shall not vary more than +/- 10ns from the measured value at 20 degrees C when measured at 40 degrees C and 60 degrees C. Compliance shall be determined using a minimum 100m of cable.

E. In order to establish testing baselines, cable samples of known length and of the cable type and lot installed shall be tested. The cable may be terminated with an 8-position Category 6 Modular plug (8-pin) to facilitate testing. Net Propagation Velocity (NPV) and nominal attenuation values shall be calculated based on this test and be utilized during the testing of the installed cable plant. This requirement can be waived if NPV data is available from the cable manufacturer for the exact cable type under test.

F. In the event results of the tests are not satisfactory, the Contractor shall make adjustments, replacement and changes as are necessary, and shall then repeat the test or tests which disclosed faulty or defective material, equipment or installation method, and shall make additional tests as the Engineer deems necessary at no additional expense to the project or user agency.

G. Optical Fiber Testing

1. Initially test optical cable with a light source and power meter utilizing procedures as stated in ANSI/TIA/EIA-526-14A: OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant and ANSI/TIA/EIA-526-7 Measurement of

Optical Power Loss of Installed Singlemode Fiber Cable Plant. Measured results shall be plus/minus 1 dB of submitted loss budget calculations. If loss figures are outside this range, test cable with optical time domain reflectometer to determine cause of variation. Correct improper splices and replace damaged cables at no charge to the owner

- a. Cables shall be tested at 850 and 1300 nm for multimode optical fiber cables.
 - b. Testing procedures shall utilize "Method B" – One jumper reference.
 - c. Bi-directional testing of optical fibers is required.
- H. Where any portion of system does not meet the specifications, correct deviation and repeat applicable testing at no additional cost to the owner.

3.08 FIELD QUALITY CONTROL

- A. Employ job superintendent or project manager during the course of the installation to provide coordination of work of this specification and of other trades, and provide technical information when requested by other trades. This person shall maintain current RCDD® (Registered Communications Distribution Designer) registration and shall be responsible for quality control during installation, equipment set-up, and testing.
- B. At least 30 percent of installation personnel shall be BICSI Registered Telecommunications Installers. Of that number, at least 15 percent shall be registered at the Technician Level, at least 40 percent shall be registered at the Installer Level 2, and the balance shall be registered at the Installer Level 1.
- C. Installation personnel shall meet manufacturer's training and education requirements for implementation of extended warranty program.

END OF SECTION

SECTION 16950

OCCUPANCY SENSOR LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.01 SCOPE

- A. All requirements of Conditions of Contract and Division 1 govern work under this Section.

1.02 GENERAL PROVISIONS

- A. In general, the work includes:
 1. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.
 2. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 16.
 3. Contractor must submit data sheets on sensors, control units and all junction boxes and mounting accessories, including all wiring diagrams.

1.03 EQUIPMENT QUALIFICATION

- A. Products supplied shall be from a manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five (5) years.
- B. All components shall be UL listed, offer a five (5) year warranty and meet all state and local applicable codes requirements.

1.04 SYSTEM DESCRIPTION

- A. The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.
- B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.
- C. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The suppliers obligation shall include repair or replacement, and testing without charge to the owner, all or in parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

1.05 SUBMITTALS

- A. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data, and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.
- B. Submit a lighting plan clearly marked by manufacturer showing proper product, location,

and orientation of each sensor.

- C. Submit any interconnection diagrams per major sub-system showing proper wiring.
- D. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.

1.06 SYSTEM OPERATION

- A. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The Watt Stopper, Inc.
- B. Or Equivalent Devices by the Following Manufacturers
 - 1. Hubbell
 - 2. Leviton
 - 3. Sensor Switch

2.02 SYSTEM OPERATION

- A. All products shall be Watt Stopper product numbers:
 - 1. Ceiling Sensors: W-500A, W-1000A, W-2000A, W-2000H, W-PIR, DT-100L, CI-100, CI-200.
 - 2. Wall Sensors: WI-120A, WI-277A, WS-120, WS-277, WM-120, WM-277.
 - 3. Power and Slave Packs: A-120E, A-277E, S-120/277.
 - 4. Low Temperature: CB-100, CB-200.
- B. Wall switch sensors shall be capable of detection of motion at desk top level up to 300 square feet, and gross motion up to 1,000 square feet.
- C. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1,000 watts at 277 volts, and shall have 180 degree coverage capability.
- D. Bi-level wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1,000 watts to 277 volts.
- E. Passive Infrared sensors shall have a multiple segmented Lodif Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.
- F. Passive Infrared and Dual Technology sensors shall have fully automatic operation, offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.
- G. All sensors shall be capable of operating normally with electronic ballast, PL lamp systems, and rated motor loads.
- H. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- I. All sensors shall have readily accessible, user adjustable controls for time delay and

sensitivity. Controls shall be recessed to limit tampering.

- J. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.
- K. Ultrasonic operating frequency shall be crystal controlled to within plus or minus 0.005% tolerance to assure reliable performance and eliminate sensor cross talk. Sensors using multiple frequencies are not acceptable.
- L. All sensors shall provide a method of indication to verify that motion is being detected during testing and that the unit is working.
- M. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed, and Common outputs for use with HVAC control, Data Logging, and other control options. Sensors utilizing separate components to achieve this function are not acceptable.
- N. All sensors shall have no leakage current to load in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
- O. The Contractor shall certify in writing that installed sensors comply with the specified California Energy Commission criteria for ultrasonic sound.
- P. All sensors shall have UL rated, 94V-0 plastic enclosures.

2.03 CIRCUIT CONTROL HARDWARE - CU

- A. Control Units - For ease of mounting, installation and future service, control unit(s) shall be able to mount on external J boxes and be integrated self-contained unit consisting internally of load switching control relay and a transformer to provide low-voltage power to a minimum of two (2) sensors.
- B. Relay Contacts shall have ratings of:
 - 1. 13A - 120 VAC Tungsten
 - 2. 20A - 120 VAC Ballast
 - 3. 20A - 277 VAC Ballast

2.04 CONTROL WIRING

- A. A. Control wiring between sensors and controls units shall be Class II, 18-24 AWG stranded U.L. Classified, PVC insulated or Teflon jacketed cable approved for use in plenums, where applicable.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. It shall be the contractor's responsibility with the suppliers assistance to locate and aim sensory in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within in the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate

only rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.

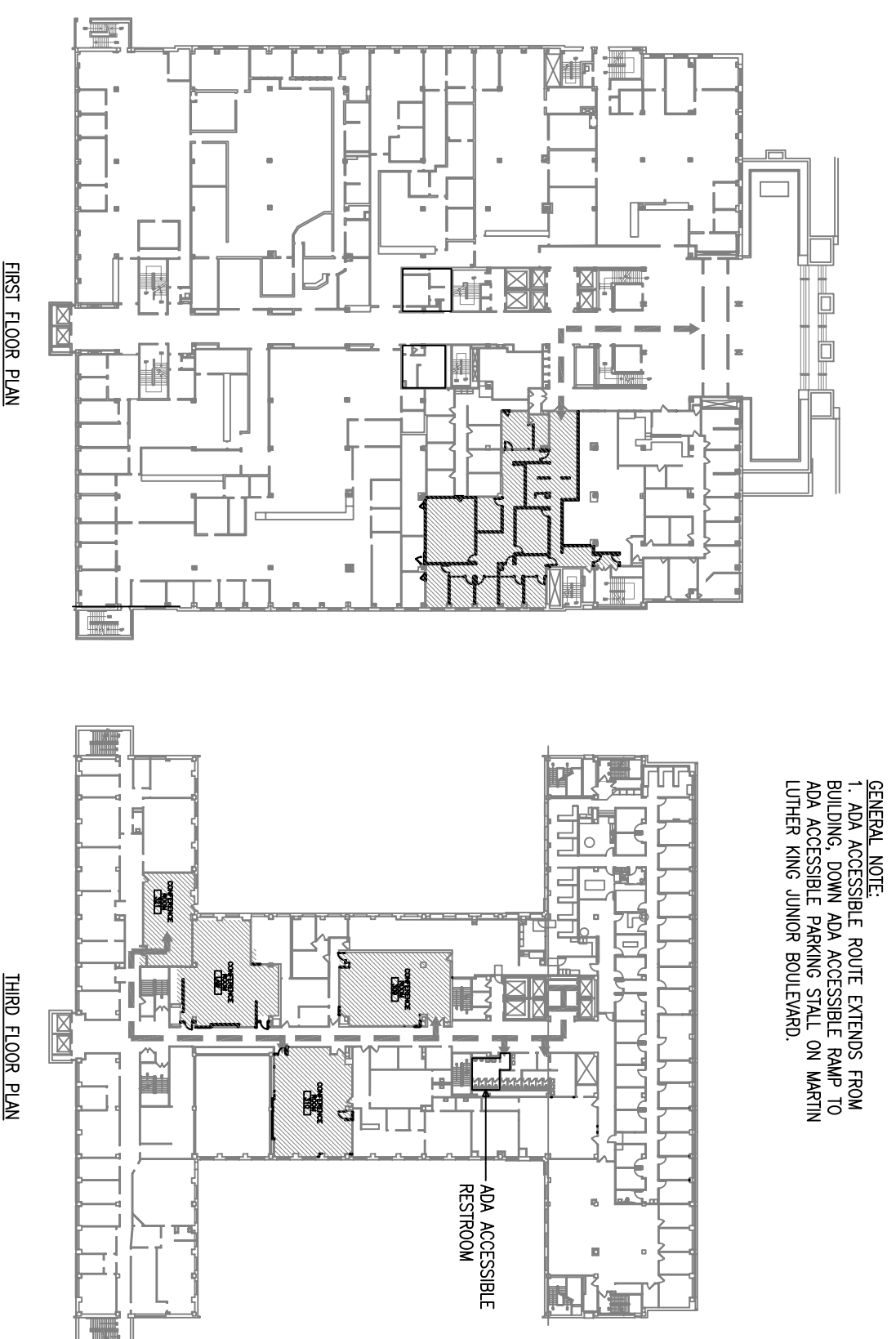
- B. It is the contractor's responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the owner's facility, to verify placement of sensors and installation criteria.
- C. Proper judgement must be exercised in executing the installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems, or;

END OF SECTION

TENANT IMPROVEMENTS FIRST AND THIRD FLOOR CITY-COUNTY BUILDING 210 MARTIN LUTHER KING, JR. BLVD. MADISON, WISCONSIN



MADISON, WISCONSIN



GENERAL NOTE:
STAIR ROUTE EXITS FROM
BUILDING, DOWN ADA ACCESSIBLE RAMP TO
ADA ACCESSIBLE PARKING STALL ON MARTIN
LUTHER KING JUNIOR BOULEVARD.

FIRST FLOOR PLAN

THIRD FLOOR PLAN

ABBREVIATIONS

ADA	AMERICANS WITH DISABILITIES ACT
A.F.F.	ABOVE FINISHED FLOOR
AL	ALUMINUM
AP	ACCESS PANEL
CG	CORNER GUARD
CJ	CONTROL JOINT
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
CJH	CABINET UNIT HEATER
EJ	EXPANSION JOINT
EW	ELECTRIC WATER COOLER
FD	FLOOR DRAIN
FO	FOUNDATION DRAIN SYSTEM FLUSHOUT
FRT	FIRE TREATED
FX-#	FIRE EXTINGUISHER AND TYPE
GMB	GYPSUM WALL BOARD
HM	HOLLOW METAL
MB	MARKER BOARD
TB	TACK BOARD
BB	BULLETIN BOARD
M.O.	MASONRY OPENING
N.I.C.	NOT IN CONTRACT
O.F.C.I.	OWNER FURNISHED CONTRACTOR INSTALLED
O.F.O.I.	OWNER FURNISHED OWNER INSTALLED
OPP	OPPOSITE
PLAM	PLASTIC LAMINATE
REV	REVERSE
R.O.	ROUGH OPENING
S.S.	STAINLESS STEEL
TZO	TERAZZO
U.N.O.	UNLESS NOTED OTHERWISE
VCT	VINYL COMPOSITION TILE
WD	WOOD
WP	WATER PROOFING
WPT	WORK POINT
MAJOR USE & OCCUPANCY CLASSIFICATION: B	
CONSTRUCTION CLASSIFICATION: IB	
GROSS FLOOR AREA: 5,667 GSF	
SPRINKLERED	
MAXIMUM EXIT ACCESS TRAVEL DISTANCE: 300'	
TOTAL OCCUPANT LOAD: 419	
SINGLE MEETING ROOM OCCUPANCY < 100	

INDEX OF DRAWINGS

GENERAL	
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D2.3	THIRD FLOOR DEMOLITION PLAN
D3.1	FIRST FLOOR REFLECTED CEILING DEMOLITION PLAN
D3.3	THIRD FLOOR REFLECTED CEILING DEMOLITION PLAN
ARCHITECTURAL	
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A2.3	THIRD FLOOR PLAN
A3.1	FIRST FLOOR REFLECTED CEILING PLAN
A3.3	THIRD FLOOR REFLECTED CEILING PLAN
A5.0	WALL SECTIONS
A5.1	CASWORK SECTIONS
A7.0	DOOR & FRAME ELEVATIONS, PARTITION TYPES, DETAILS & SCHEDULE
A7.1	DETAILS
A8.1	FIRST FLOOR INTERIOR ELEVATIONS
A8.3	THIRD FLOOR INTERIOR ELEVATIONS
A9.1	FIRST FLOOR FINISH PLAN AND SCHEDULE
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PLUMBING	
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P2.1	THIRD FLOOR PLUMBING RECONSTRUCTION PLAN
HVAC	
H1-1	FIRST FLOOR PLAN - HVAC DEMO
H1-3	THIRD FLOOR PLAN - HVAC DEMO
H2-1	FIRST FLOOR HVAC PLAN - NEW WORK
H2-3	THIRD FLOOR PLAN - NEW WORK
H3-1	SCHEDULES
H3-3	THIRD FLOOR PLAN - 1/4" SCALE
H4-1	DETAILS
H4-3	HVAC SCHEDULES AND DETAILS
H5-3	HVAC DETAILS
ELECTRICAL	
E1.1	PARTIAL FIRST FLOOR LIGHTING PLAN
E1.2	PARTIAL FIRST FLOOR POWER PLAN
E2.1	PARTIAL THIRD FLOOR LIGHTING PLAN
E2.2	PARTIAL THIRD FLOOR POWER PLAN
E3.0	ELECTRICAL SYMBOLS, DETAILS AND SCHEDULE

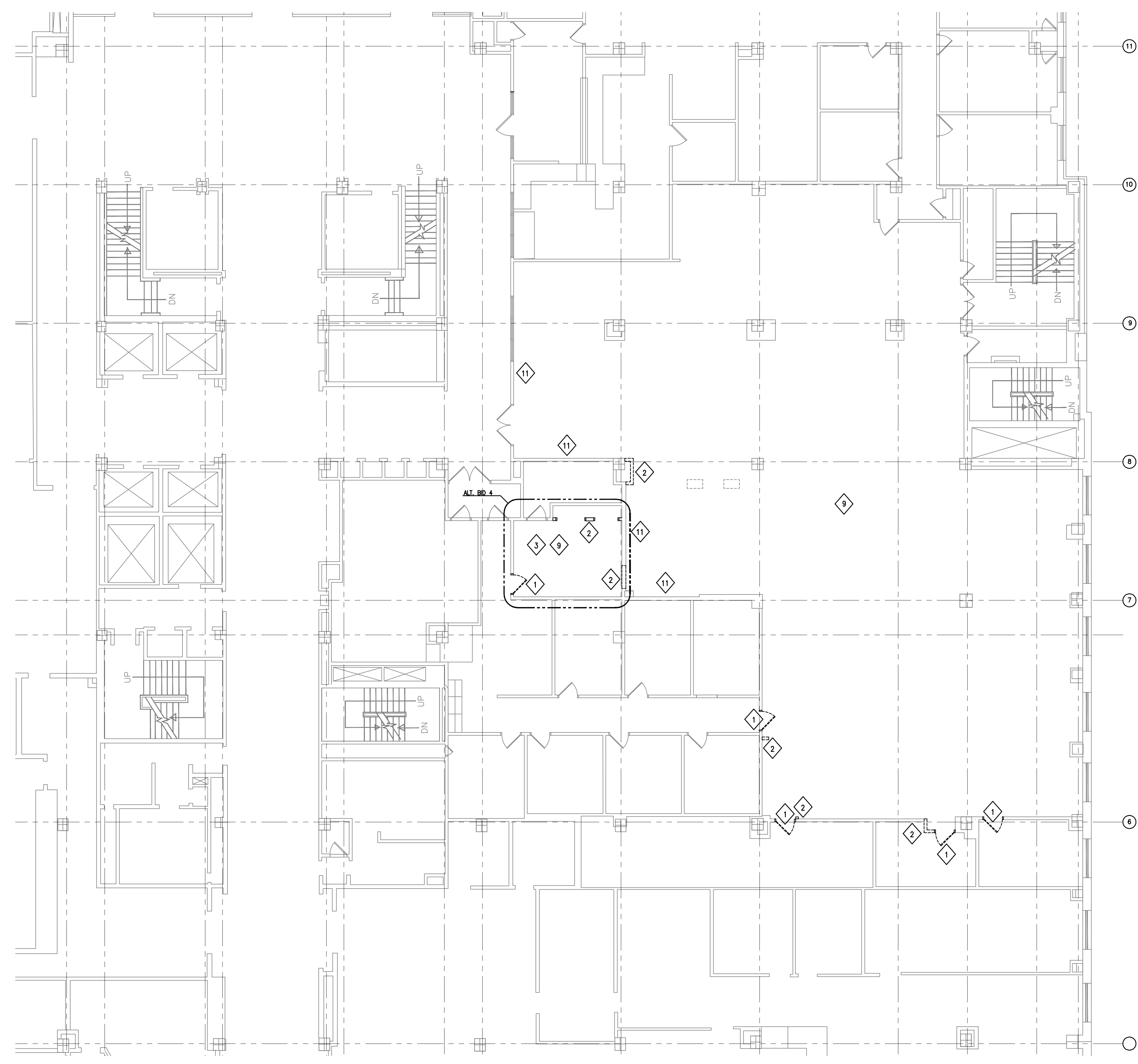
ARCHITECTURAL SYMBOLS AND LEGEND

	X/XXX DETAIL REFERENCE SHEET REFERENCE DETAIL NUMBER
	X/XXX WALL SECTION REFERENCE SHEET REFERENCE DETAIL NUMBER
	X XXX WALL SECTION REFERENCE SHEET REFERENCE DETAIL NUMBER
	X ELEV X ELEVATION REFERENCE
	X PART X PARTITION TYPE REF. SEE SHEET A7.0
	NEW WALLS
	X WIN WINDOW TYPES SEE A7.0
	1 HOUR FIRE RATED WALL
	2 HOUR FIRE RATED WALL
	DOOR SWING #/NUMBER. SEE A7.0
	EXISTING DOOR SWING #/NUMBER. SEE A7.0
	REVISIONS
	EX-1 RECESSED FIRE EXTINGUISHER
	EX-2 SURFACE MOUNT FIRE EXTINGUISHER
	x70-1 SPOT ELEVATION (FEET-INCHES)
	x70.83 SPOT ELEVATION (FEET/DECIMAL)
	OFFICE 012 ROOM NAME & NUMBER SEE ROOM FIN SCHED SHEET A9.0

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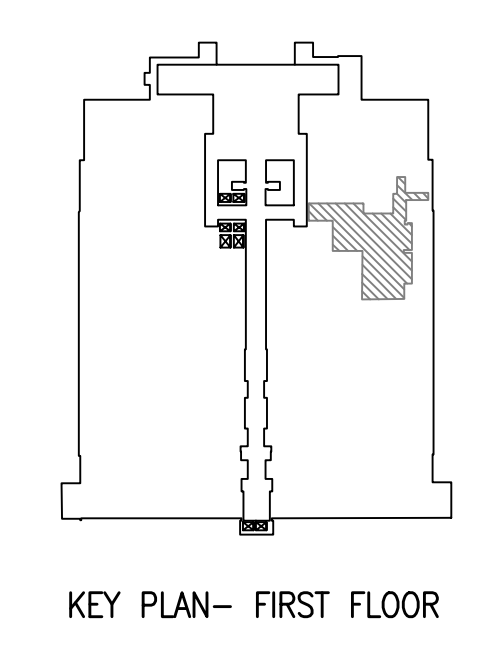


- DEMOLITION NOTES**
- 1 DEMO DOOR AND HM FRAME IN ITS ENTIRETY. SALVAGE DOOR AND HARDWARE FOR REINSTALLATION, BY OWNER.
 - 2 DEMO PORTION OF EXISTING PLASTER WALL IN ITS ENTIRETY, BY OWNER.
 - 3 DEMO CARPET AND TRANSITION STRIPS, BY OWNER.
 - 4 NOT USED.
 - 5 NOT USED.
 - 6 NOT USED.
 - 7 NOT USED.
 - 8 NOT USED.
 - 9 DEMO VINYL BASE, BY OWNER.
 - 10 NOT USED.
 - 11 DEMO WOOD CHAIRRAIL AND BASE, AND SALVAGE FOR REINSTALLATION, BY OWNER.
 - 12 NOT USED.
 - 13 NOT USED.
 - 14 NOT USED.
 - 15 NOT USED.
 - 16 NOT USED.
 - 17 NOT USED.
 - 18 NOT USED.
 - 19 NOT USED.
 - 20 NOT USED.
 - 21 NOT USED.

- GENERAL NOTES:**
1. FIELD VERIFY ALL EXISTING CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.
 2. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR MORE DEMOLITION INFORMATION.

1 FIRST FLOOR DEMOLITION PLAN
1/8"=1'-0"

PLAN NORTH
TRUE NORTH



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

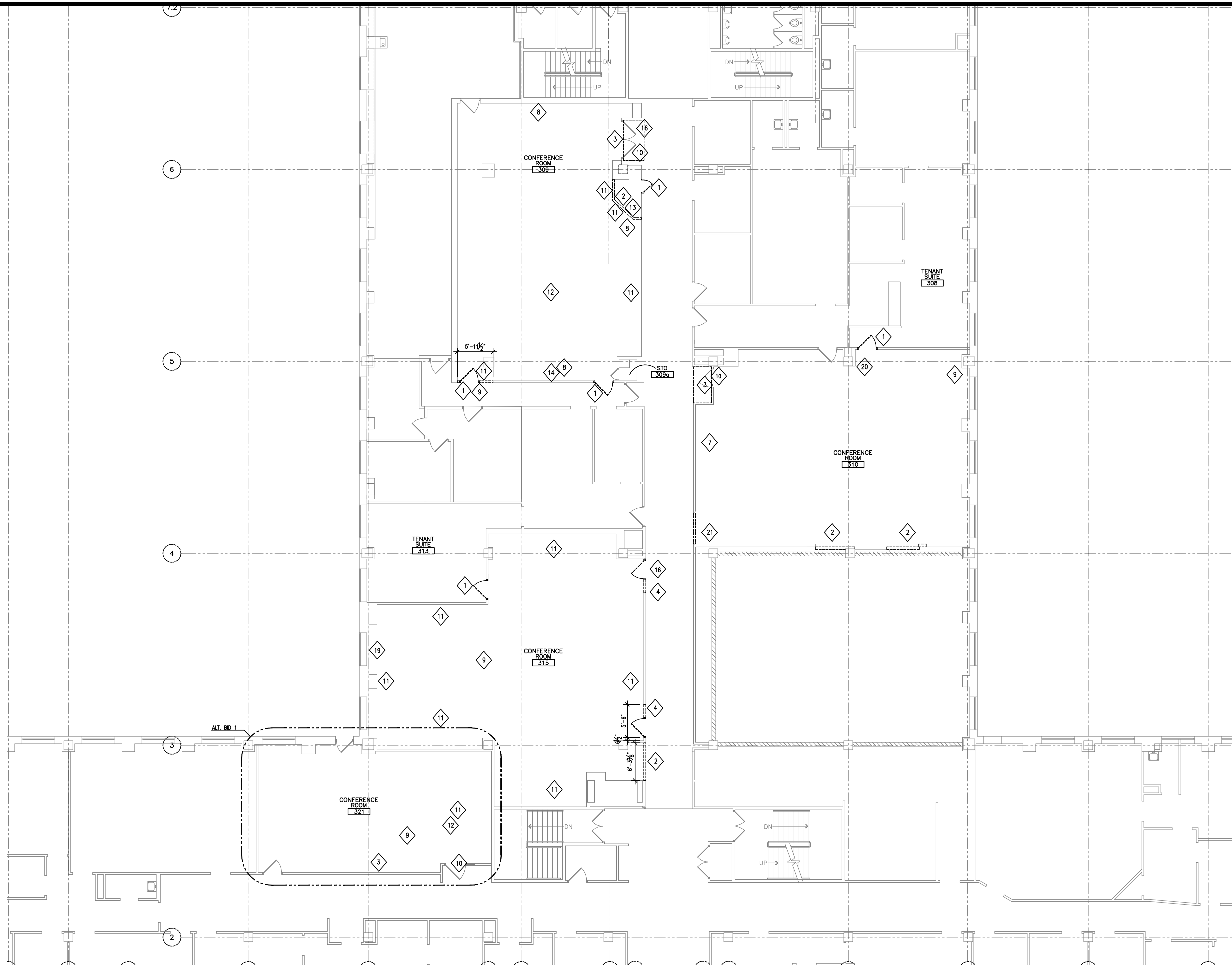
DRAWING
FIRST FLOOR
DEMOLITION PLAN

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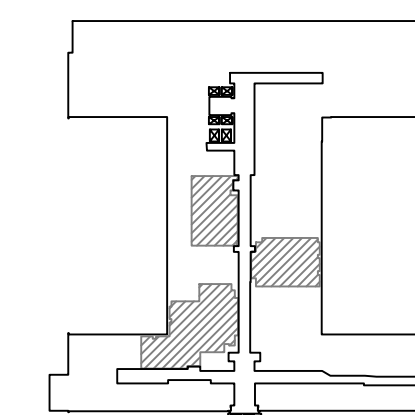
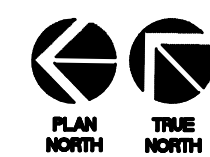
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- DEMOLITION NOTES**
- 1 DEMO DOOR AND HM FRAME IN ITS ENTIRETY. SALVAGE DOOR AND HARDWARE FOR REINSTALLATION, BY OWNER.
 - 2 DEMO PORTION OF EXISTING PLASTER WALL IN ITS ENTIRETY, BY OWNER.
 - 3 DEMO CARPET AND TRANSITION STRIPS, BY OWNER.
 - 4 DEMO EXISTING ALUMINUM STOREFRONT INCLUDING DOOR & GLAZING IN ITS ENTIRETY, BY OWNER.
 - 5 NOT USED.
 - 6 NOT USED.
 - 7 DEMO ALL WOOD TRIM BASE AND CROWN MOLDING IN ITS ENTIRETY, BY OWNER.
 - 8 DEMO CROWN MOLDING IN ITS ENTIRETY, SALVAGE FOR RE-USE, BY OWNER.
 - 9 DEMO VINYL BASE, BY OWNER.
 - 10 DEMO PORTION OF FRAME/CMB AS REQUIRED FOR INSTALLATION OF NEW HARDWARE.
 - 11 DEMO WOOD CHAIRRAIL AND BASE, AND SALVAGE FOR REINSTALLATION, BY OWNER.
 - 12 DEMO FURNITURE AND PARTIAL HEIGHT WALLS, BY OWNER.
 - 13 DEMO GLAZING IN ITS ENTIRETY. SALVAGE FOR REUSE, BY OWNER.
 - 14 DEMO DISPLAY AND TRIM IN ITS ENTIRETY, BY OWNER.
 - 15 NOT USED.
 - 16 DEMO MARBLE BASE AND SALVAGE FOR REINSTALLATION, BY OWNER.
 - 17 NOT USED.
 - 18 NOT USED.
 - 19 REMOVE EXISTING WINDOW COVERINGS BY OWNER.
 - 20 REMOVE PLYWOOD SUB-FLOOR BY OWNER.
 - 21 DEMO TEMPORARY ENCLOSURE.

- GENERAL NOTES:**
- 1. FIELD VERIFY ALL EXISTING CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.
 - 2. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR MORE DEMOLITION INFORMATION.

1 THIRD FLOOR DEMOLITION PLAN
1/8"=1'-0"



KEY PLAN- THIRD FLOOR

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

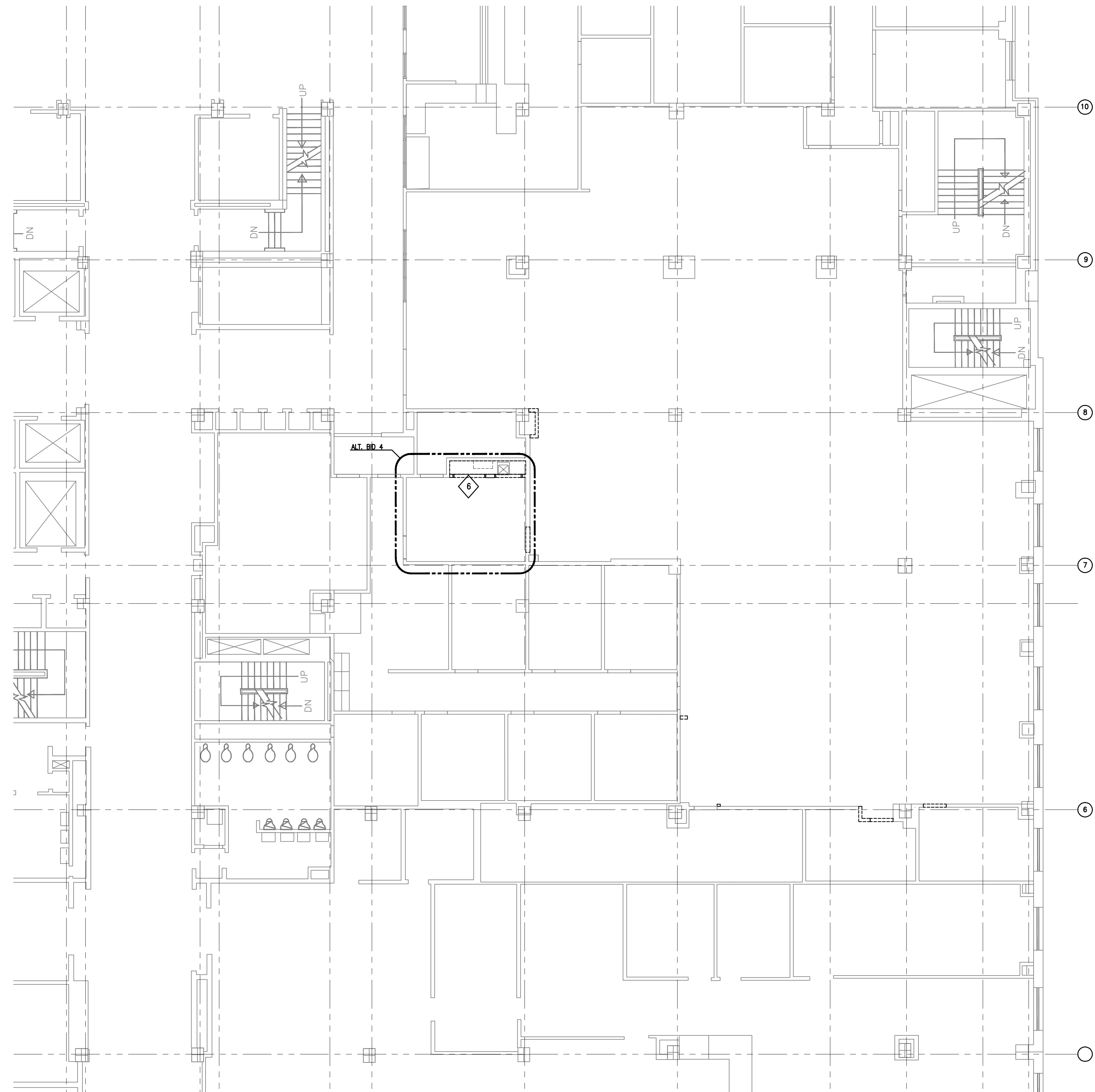
DRAWING
THIRD FLOOR
DEMOLITION PLAN

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DEMOLITION NOTES

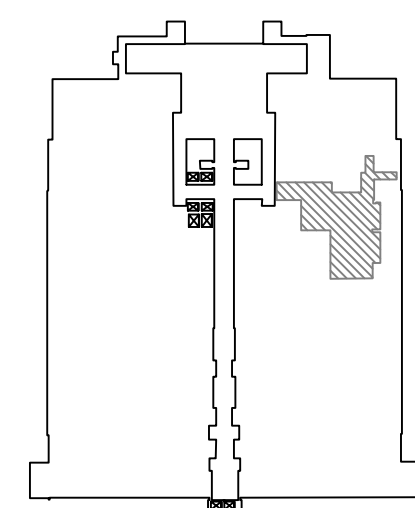
- 1 NOT USED.
- 2 NOT USED.
- 3 NOT USED.
- 4 NOT USED.
- 5 NOT USED.
- 6 DEMO ACOUSTIC/METAL PAN CEILING IN ITS ENTIRETY, BY OWNER. SEE ELECTRICAL DEMOLITION FOR ADDITIONAL DEMOLITION INFORMATION.
- 7 NOT USED.
- 8 NOT USED.
- 9 NOT USED.
- 10 NOT USED.
- 11 NOT USED.
- 12 NOT USED.
- 13 NOT USED.
- 14 NOT USED.
- 15 NOT USED.
- 16 NOT USED.
- 17 NOT USED.
- 18 NOT USED.
- 19 NOT USED.
- 20 NOT USED.

GENERAL NOTES:

1. FIELD VERIFY ALL EXISTING CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.
2. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR MORE DEMOLITION INFORMATION.

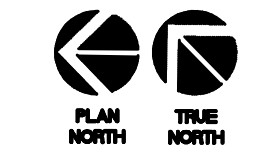
REFLECTED CEILING PLAN SYMBOLS

- DEMO WOOD/GWB CEILING, SEE ELECTRICAL AND MECHANICAL FOR MORE INFORMATION
- DEMO ACOUSTIC/METAL PAN CEILING, SEE ELECTRICAL AND MECHANICAL FOR MORE INFORMATION



KEY PLAN- FIRST FLOOR

1 FIRST FLOOR REFLECTED CEILING DEMOLITION PLAN
1/8"=1'-0"



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR
REFLECTED CEILING
DEMOLITION PLAN
DATE
03.24.09

D3.1

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DEMOLITION NOTES

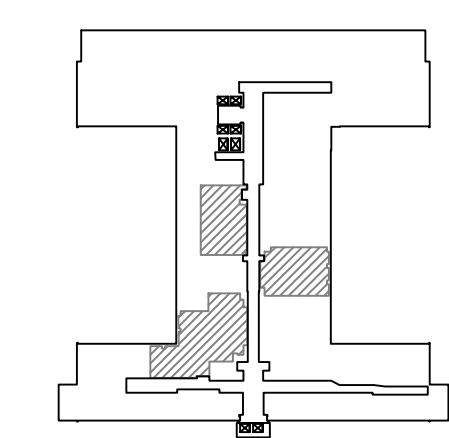
- 1 NOT USED.
- 2 NOT USED.
- 3 NOT USED.
- 4 NOT USED.
- 5 DEMO WOOD/GWB CEILING IN ITS ENTIRETY, BY OWNER. SEE ELECTRICAL DEMOLITION FOR ADDITIONAL DEMOLITION INFORMATION.
- 6 DEMO ACOUSTIC/METAL PAN CEILING IN ITS ENTIRETY, BY OWNER. SEE ELECTRICAL DEMOLITION FOR ADDITIONAL DEMOLITION INFORMATION.
- 7 NOT USED.
- 8 NOT USED.
- 9 NOT USED.
- 10 NOT USED.
- 11 NOT USED.
- 12 NOT USED.
- 13 NOT USED.
- 14 NOT USED.
- 15 NOT USED.
- 16 NOT USED.
- 17 NOT USED.
- 18 PORTION OF EXISTING ACT REQUIRED FOR ACCESS TO MECHANICAL WORK BY OWNER. ACT WILL BE SALVAGED FOR REINSTALLATION.
- 19 NOT USED.
- 20 NOT USED.

GENERAL NOTES:

1. FIELD VERIFY ALL EXISTING CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.
2. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR MORE DEMOLITION INFORMATION.

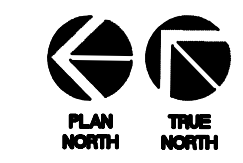
REFLECTED CEILING PLAN SYMBOLS

- DEMO WOOD/GWB CEILING, SEE ELECTRICAL AND MECHANICAL FOR MORE INFORMATION
- DEMO ACOUSTIC/METAL PAN CEILING, SEE ELECTRICAL AND MECHANICAL FOR MORE INFORMATION



KEY PLAN- THIRD FLOOR

1 THIRD FLOOR AND REFLECTED CEILING DEMOLITION PLAN
1/8"=1'-0"



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
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DRAWING
THIRD FLOOR REFLECTED
CEILING DEMOLITION PLAN

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D3.3

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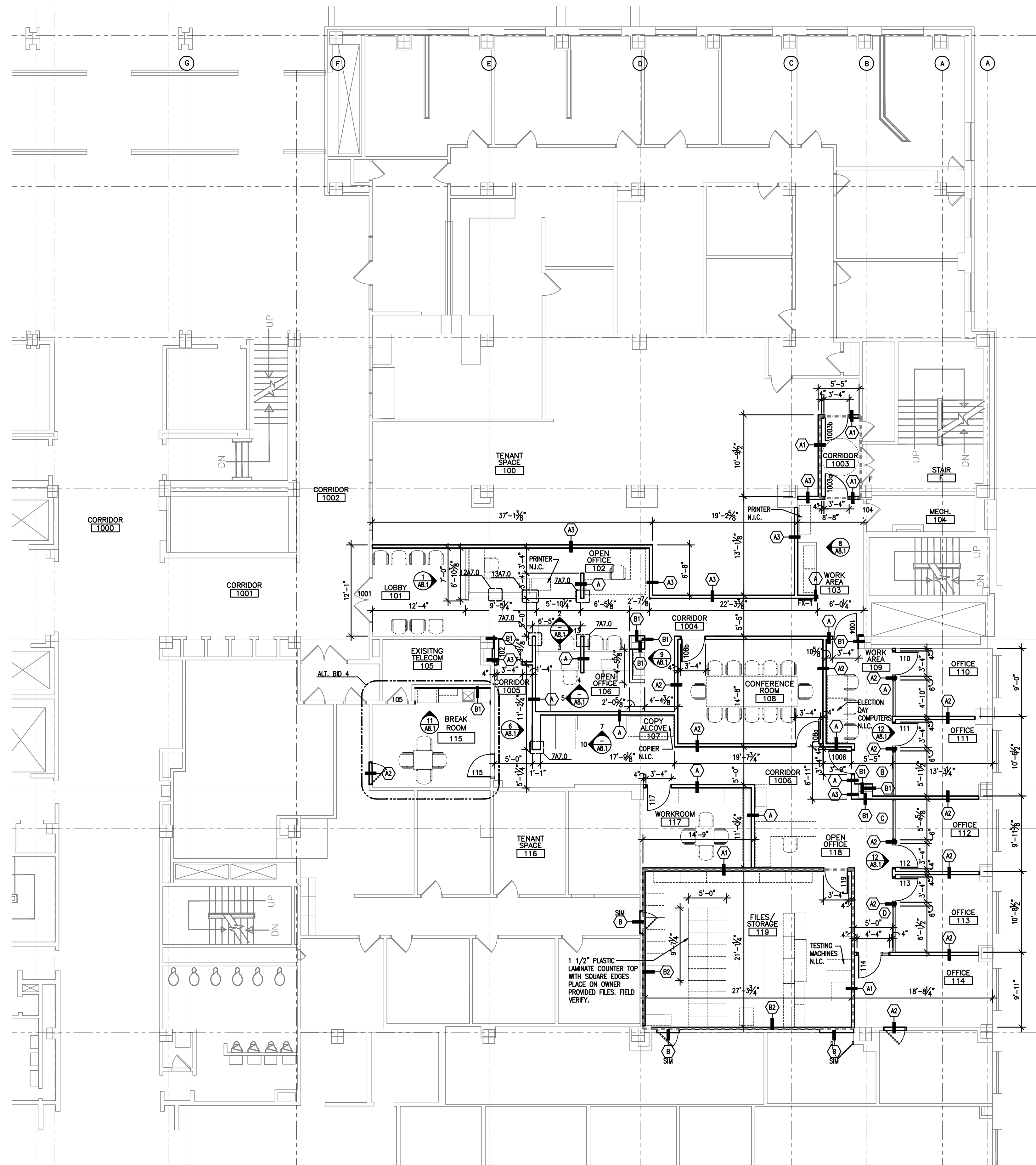
DRAWING
FIRST FLOOR PLAN

DATE
03.24.09

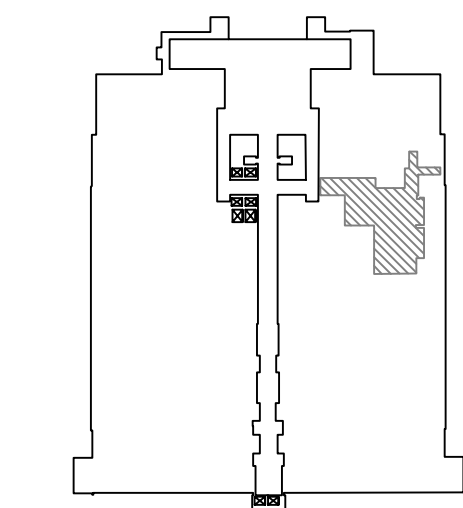
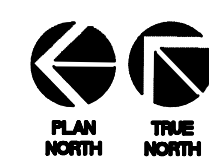
A2.1

GENERAL NOTES:

1. FIELD VERIFY ALL EXISTING CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCIES.
2. PHASED CONSTRUCTION: TO MAINTAIN USABLE MEETING SPACE DURING CONSTRUCTION, CONSTRUCTION OF THE THIRD FLOOR MEETING ROOMS SHALL BE PHASED TO ALLOW COMPLETION OF ONE MEETING ROOMS PRIOR TO COMMENCING WORK ON THE FOLLOWING MEETING ROOMS:
PHASE 1: ROOM 310 AND FIRST FLOOR
PHASE 2: ROOM 309 AND 321
PHASE 3: ROOM 315
3. THE SCHEDULE OF WORK NOT DEDICATED TO A PHASE ABOVE (CORRIDORS, ADJACENT TENANT SPACES) IS TO BE COORDINATED WITH OWNER.
3. ALL FURNITURE IS N.I.C.
4. PATCH ALL WALLS TO MATCH ADJACENT MATERIAL WHERE DAMAGED BY DEMOLITION OR REMOVAL OF CHAIRRAIL/CROWN MOULDING.
5. PATCH ALL OPENINGS IN FLOOR/CEILING TO MATCH ADJACENT MATERIAL WHERE DUCTWORK, MECHANICAL PENETRATIONS AND PLUMBING PENETRATIONS HAVE BEEN REMOVED.
6. BASE BID: ALL CONFERENCE ROOM EXTERIOR WINDOWS TO RECEIVE MANUAL SHADES.
7. REFER TO INTERIOR ELEVATIONS FOR MORE INFORMATION.
8. ALTERNATE BID 1: CONFERENCE ROOM 321 INCLUDING MANUAL SHADE.
9. ALTERNATE BID 2: MOTORIZED SHADES IN LIEU OF MANUAL SHADES ROOMS 310 AND 315.
10. ALTERNATE BID 3: MOTORIZED SHADES IN LIEU OF MANUAL SHADES ROOM 321.
11. ALTERNATE BID 4: FIRST FLOOR BREAK ROOM.
12. ALTERNATE BID 5: SOLID SURFACE IN LIEU OF MARBLE IN ROOMS 310 AND 315.
13. ALTERNATE BID 6: HEAT EXCHANGER.
14. MAINTAIN EXISTING FIRE RATING AT ALL FLOOR/CEILING PENETRATIONS. EXISTING CONCRETE STRUCTURE IS 6" MIN.
15. PATCH ALL WALLS TO MATCH ADJACENT MATERIAL WHERE DAMAGED BY REMOVAL OF 6" BASE FOR INSTALLATION OF 4" BASE, SEE A2.1 FINISH SCHEDULE.
16. CONCEAL ALL NEW ELECTRICAL SURFACE MOUNT ONLY WHERE EXISTING CONSTRUCTION WILL NOT ALLOW CONCEALED.
17. REPAIR (SAND, TEXTURE) DAMAGED AREAS OF EXISTING GWS WALLS TO REMAIN AND PREP TO RECEIVE FINISH.



1 FIRST FLOOR PLAN
1/8"=1'-0"

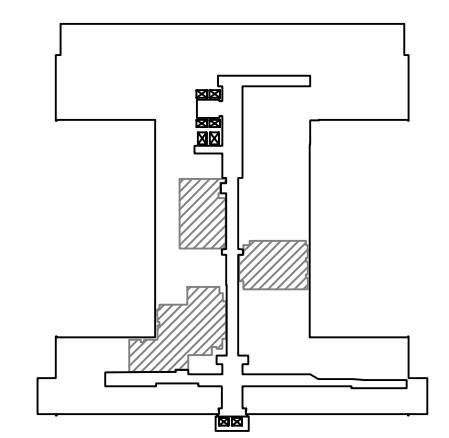
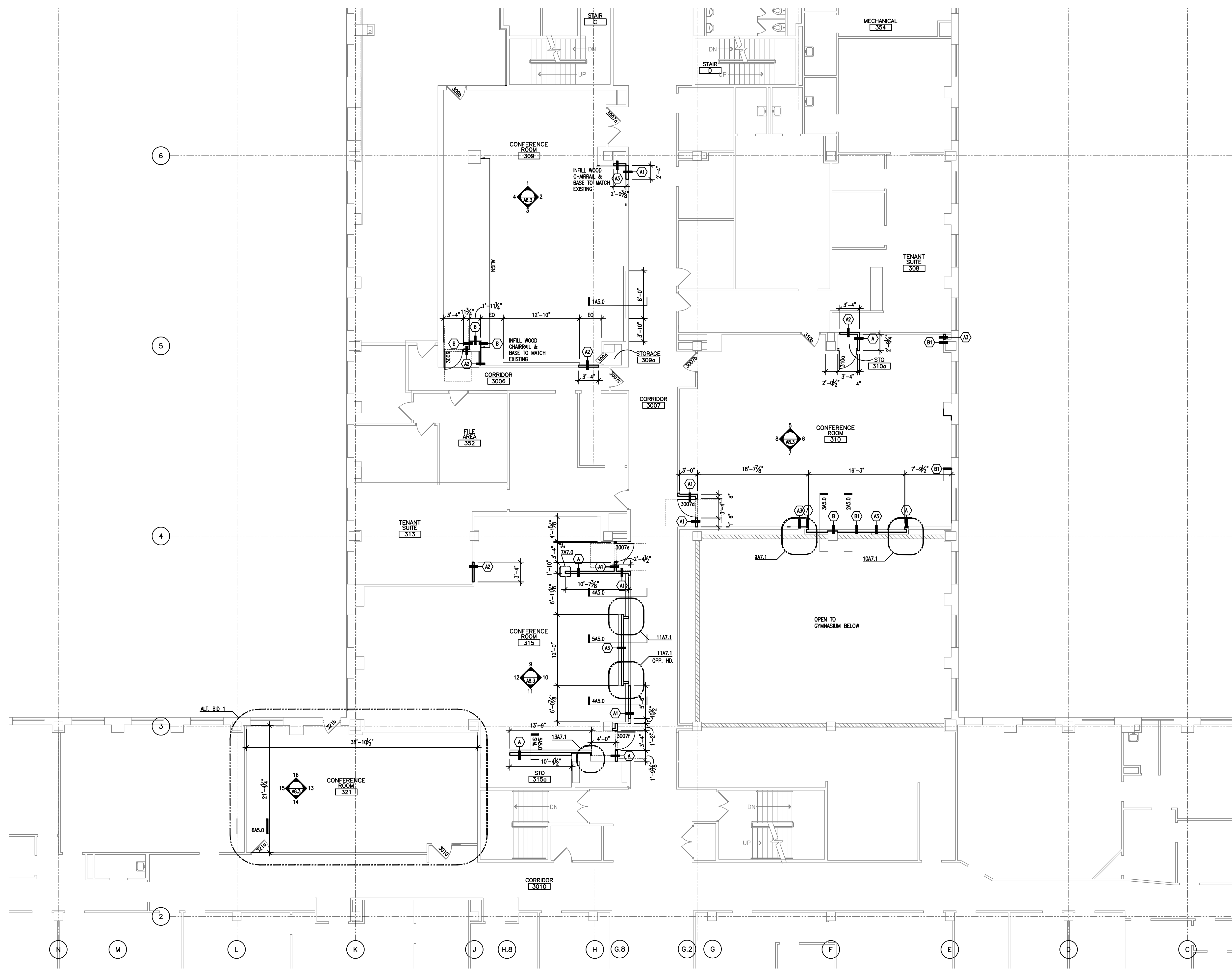


KEY PLAN- FIRST FLOOR

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KEY PLAN- THIRD FLOOR

1 THIRD FLOOR PLAN
1/8"=1'-0"
PLAN NORTH TRUE NORTH

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
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DRAWING
THIRD FLOOR PLAN

DATE
03.24.09

A2.3

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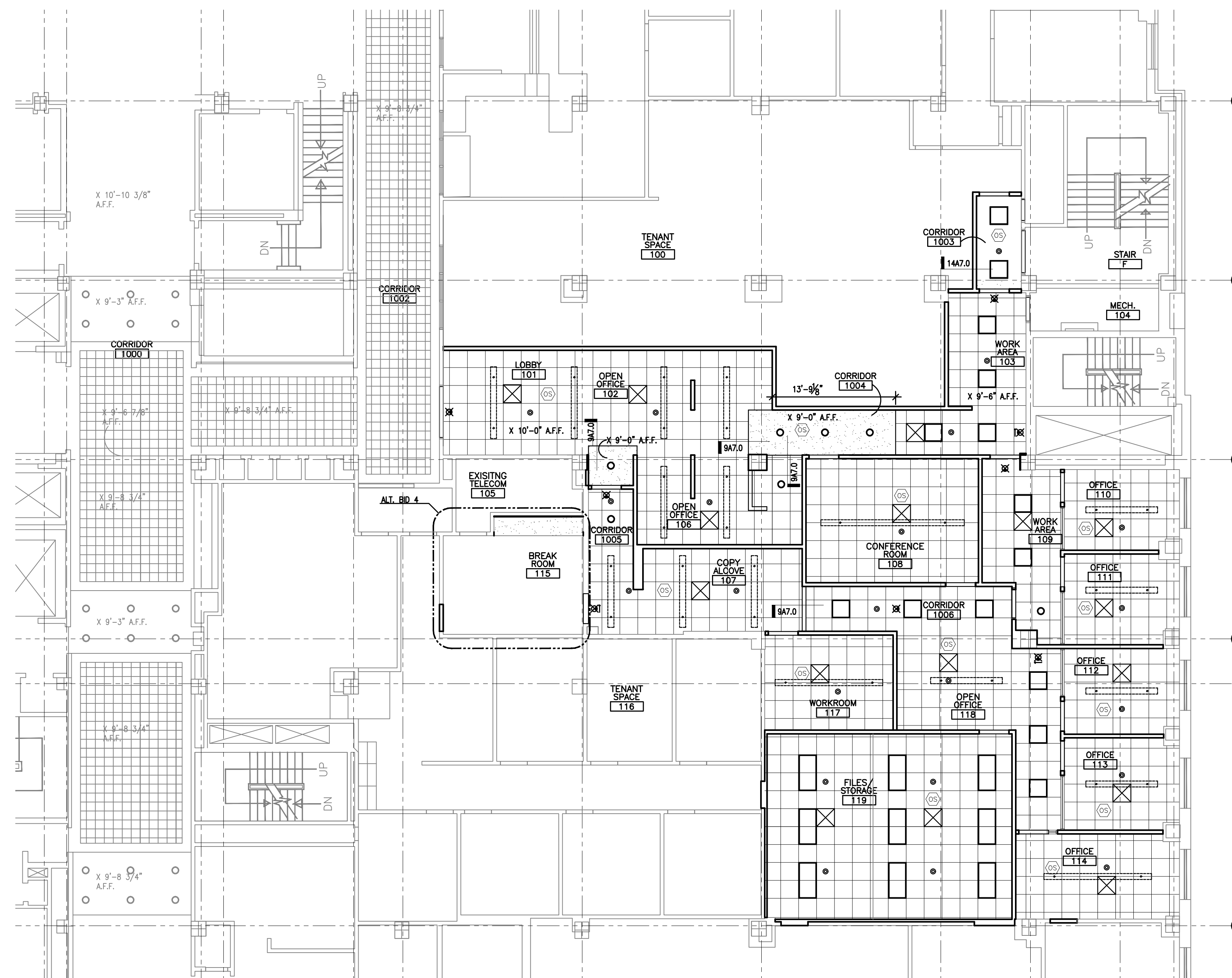
REFLECTED CEILING PLAN SYMBOLS

	GYPSUM WALL BOARD
	2'x2' ACOUSTICAL CEILING TILE
	EXISTING GYPSUM WALL BOARD
	RECESSED DOWNLIGHT
	2'x2' FLUORESCENT LIGHT FIXTURE, SEE ELECTRICAL
	1'x LINEAR FLUORESCENT INDIRECT PENDANT FIXTURE, SEE ELECTRICAL
	1'x4' FLUORESCENT INDIRECT SCONCE FIXTURE, SEE ELECTRICAL
	1'x4' FLUORESCENT, SEE ELECTRICAL
	EXIT LIGHT, ARROW INDICATES DIRECTION PLACE CENTER OF 2x2' TILE
	HVAC SUPPLY DIFFUSER
	HVAC EXHAUST/TRANSFER DIFFUSER
	HVAC EXHAUST DIFFUSER
	OCCUPANCY SENSOR
	SPRINKLER HEAD

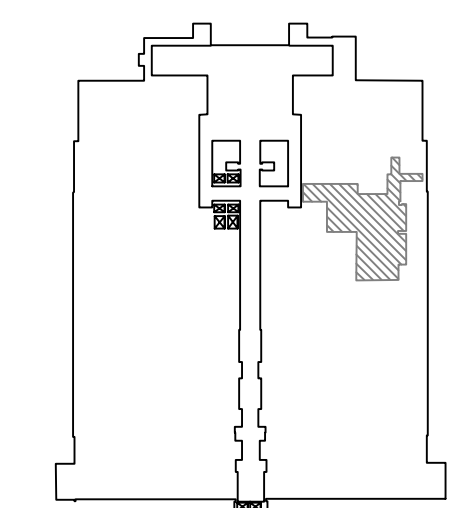
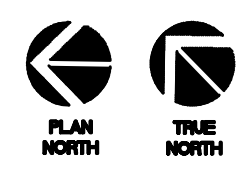
REFLECTED CEILING PLAN GENERAL NOTES

1. FIELD VERIFY ALL CONDITIONS, NOTIFY ARCHITECT OF ANY DISCREPANCY.
2. SEE MECHANICAL FOR COORDINATION OF EQUIPMENT LOCATIONS.
3. SEE ELECTRICAL FOR FIXTURE TYPES.
4. CENTER ALL FIXTURES IN ACT.
5. SEE ROOM FINISH SCHEDULE FOR MORE INFORMATION.
6. PREFERRED SPRINKLER HEAD LOCATIONS INDICATED. INSTALL PER NFPA 13, SEE SPECIFICATION SECTION 015010.

ISSUED



1 FIRST FLOOR REFLECTED CEILING PLAN
1/8"=1'-0"



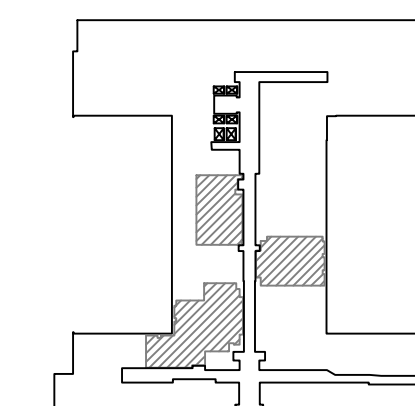
KEY PLAN- FIRST FLOOR

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR REFLECTED
CEILING PLAN

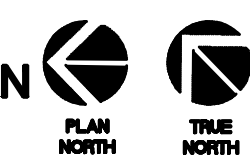
DATE
03.24.09

A3.1



KEY PLAN- THIRD FLOOR

1 PARTIAL THIRD FLOOR PLAN
1/8"=1'-0"



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

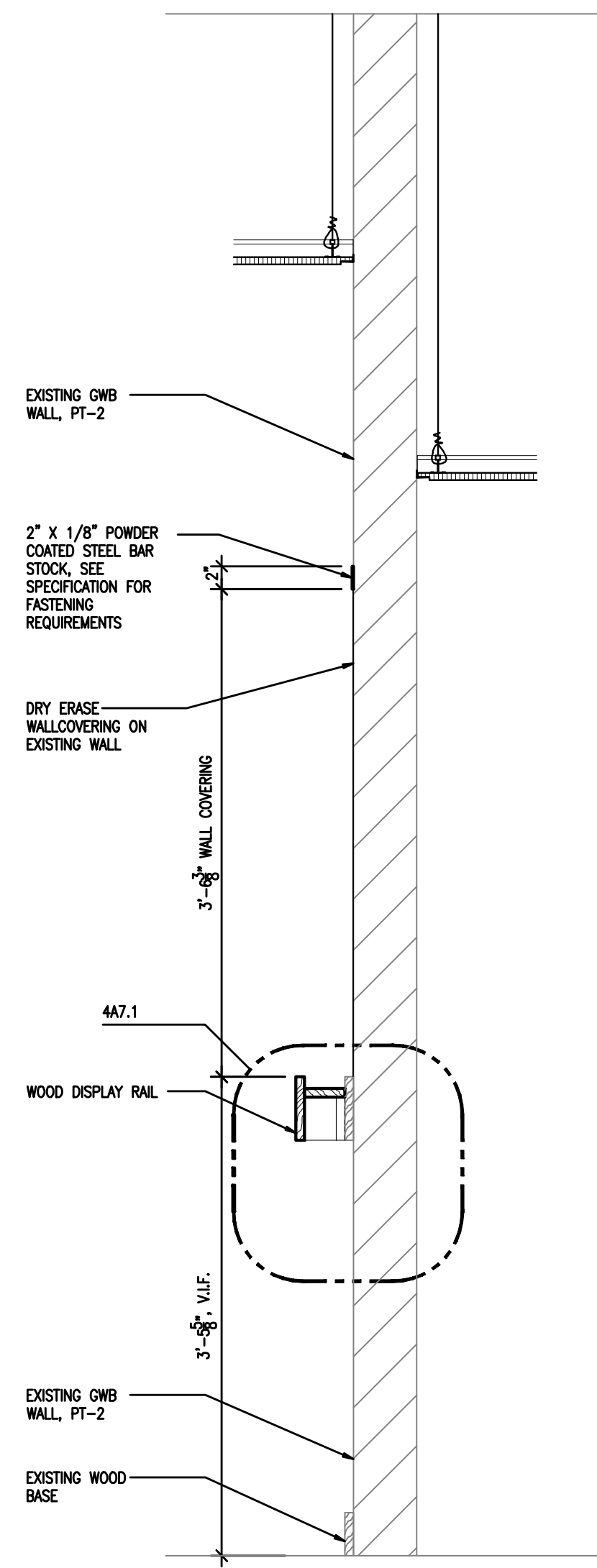
DRAWING
THIRD FLOOR
REFLECTED CEILING PLAN

DATE
03.24.09

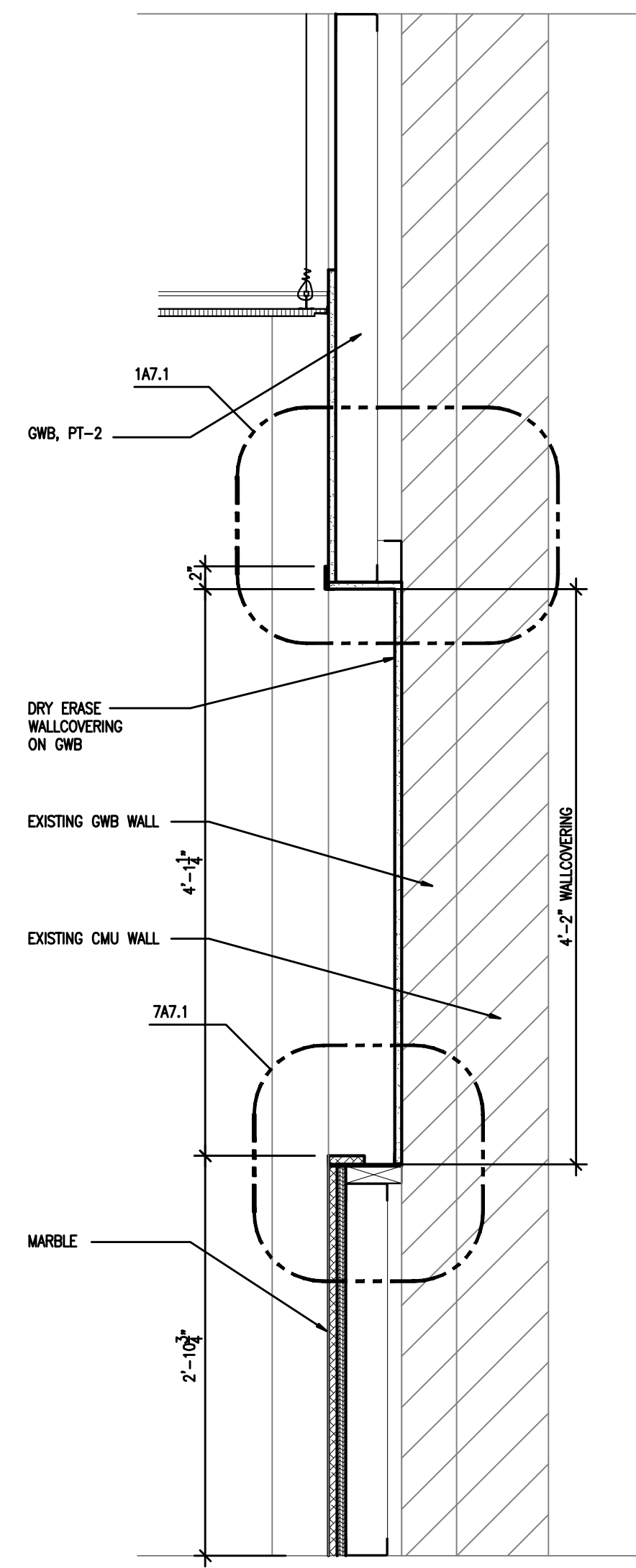
Architecture
Planning

Dorschner/Associates, Inc.
848 E. Washington Ave., Ste 112
Madison, Wisconsin 53703

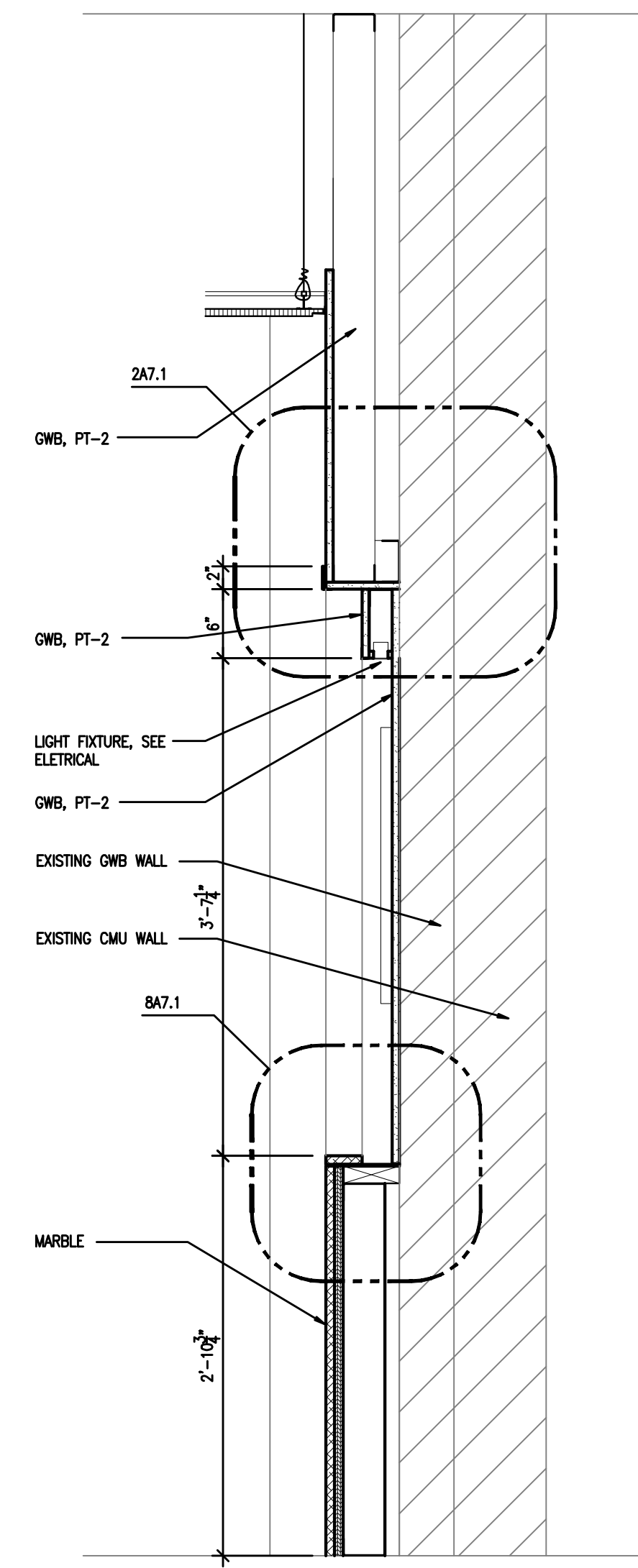
ISSUED



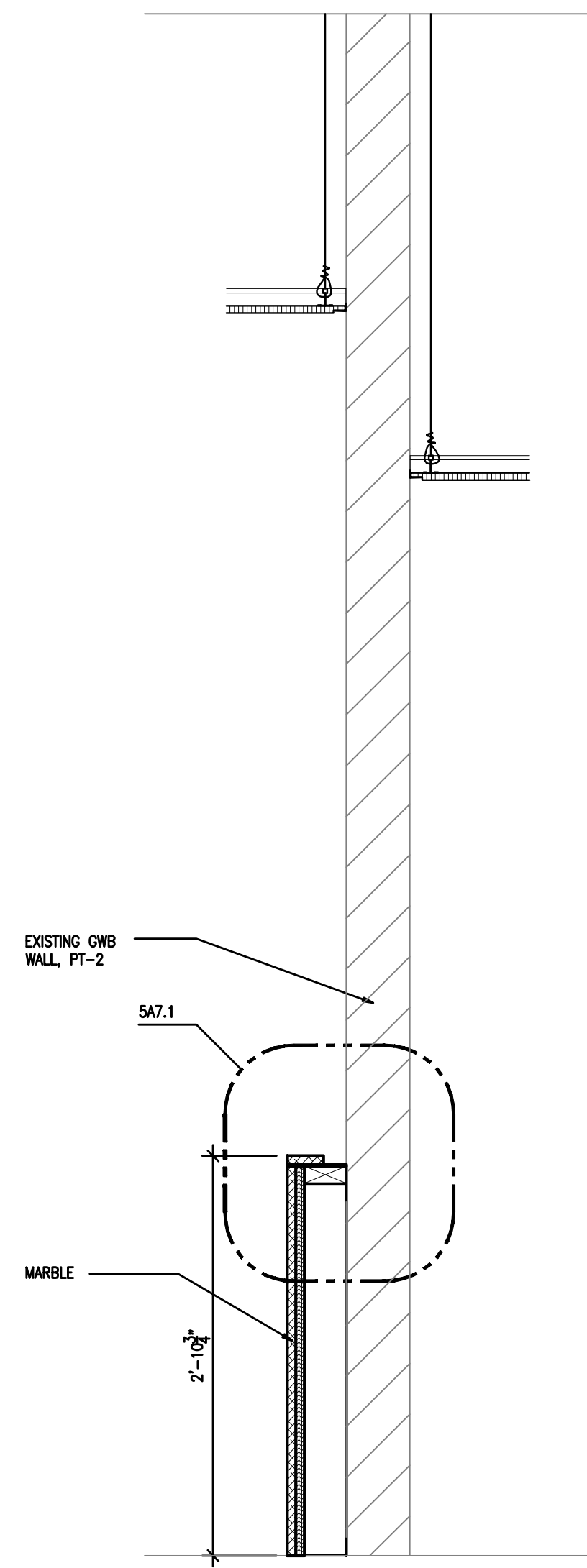
1 WALL SECTION
1/4\"/>



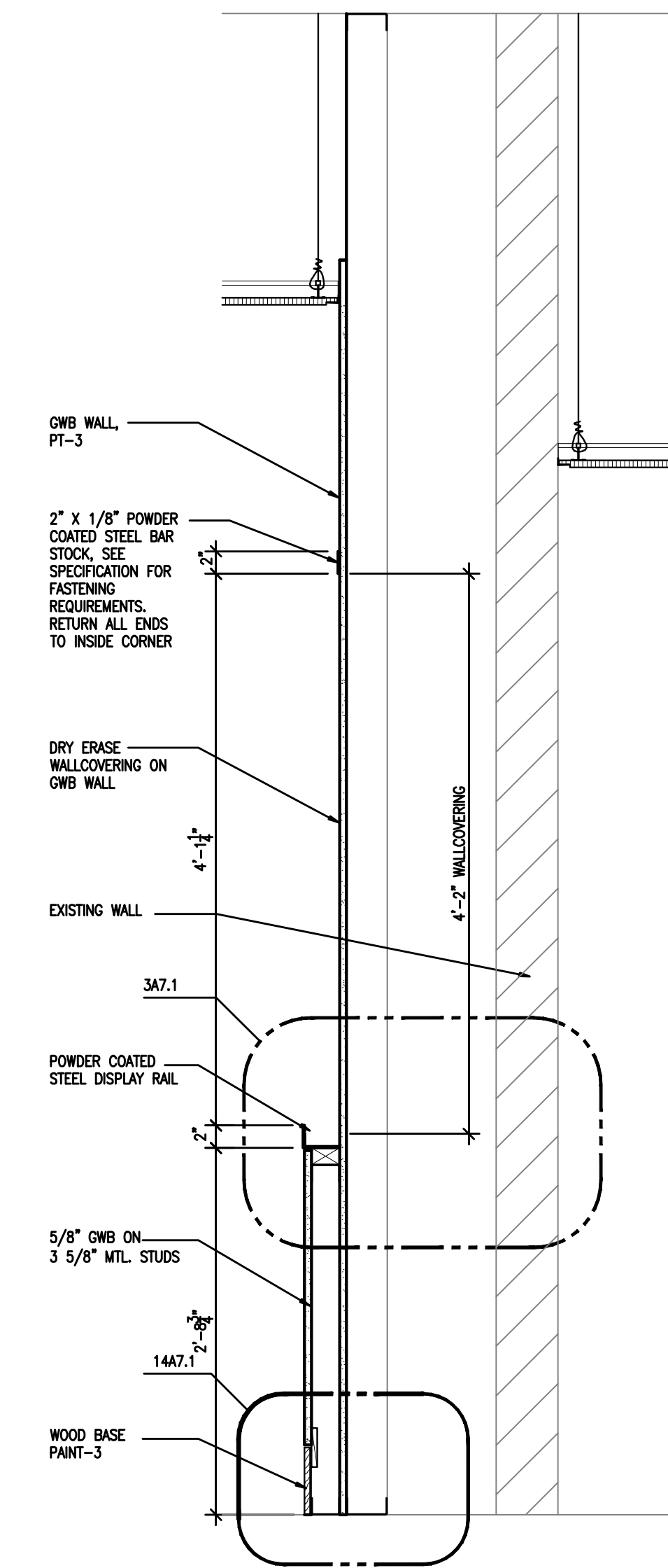
2 WALL SECTION
1/4\"/>



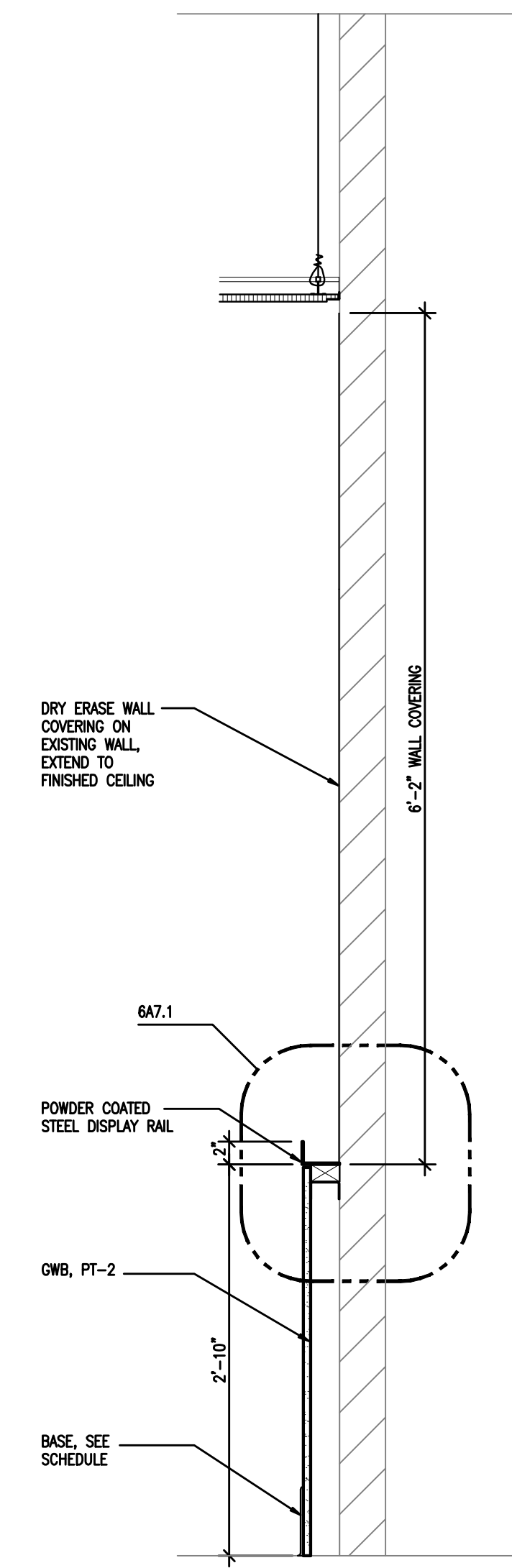
3 WALL SECTION
1/4\"/>



4 WALL SECTION
1/4\"/>



5 WALL SECTION
1/4\"/>



6 WALL SECTION (ALT. BID 1)
1/4\"/>

GENERAL NOTES:
ALTERNATE BID 5: SOLID SURFACE-3 IN LIEU OF MARBLE IN ROOMS 310 AND 315. PROVIDE 1/4\"/>

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
WALL SECTIONS

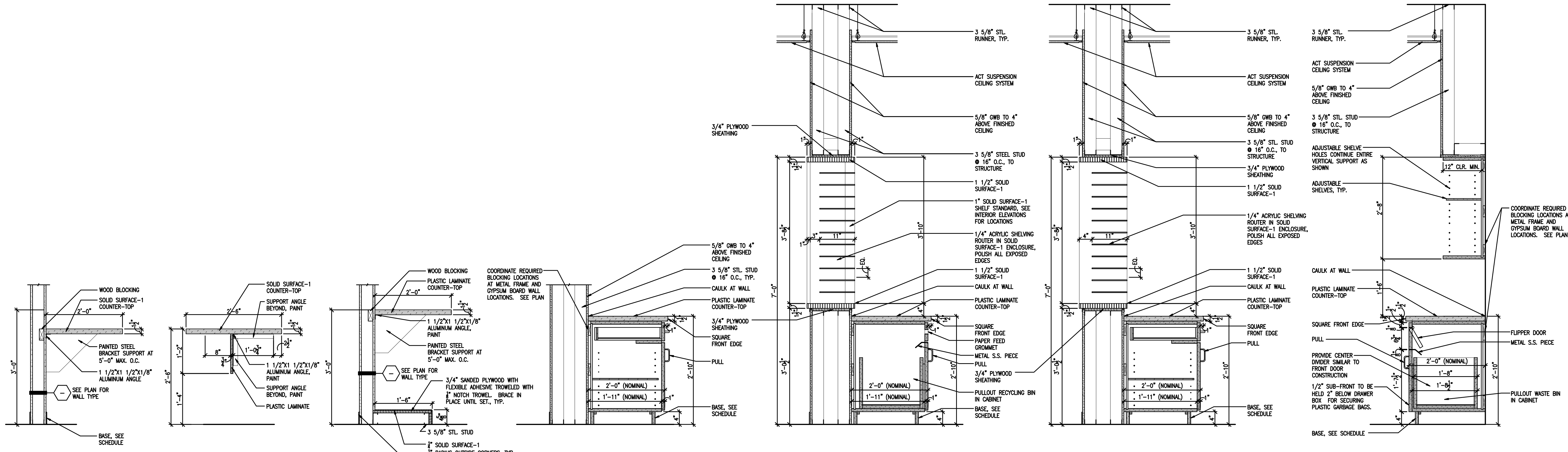
DATE
03.24.09

A5.0

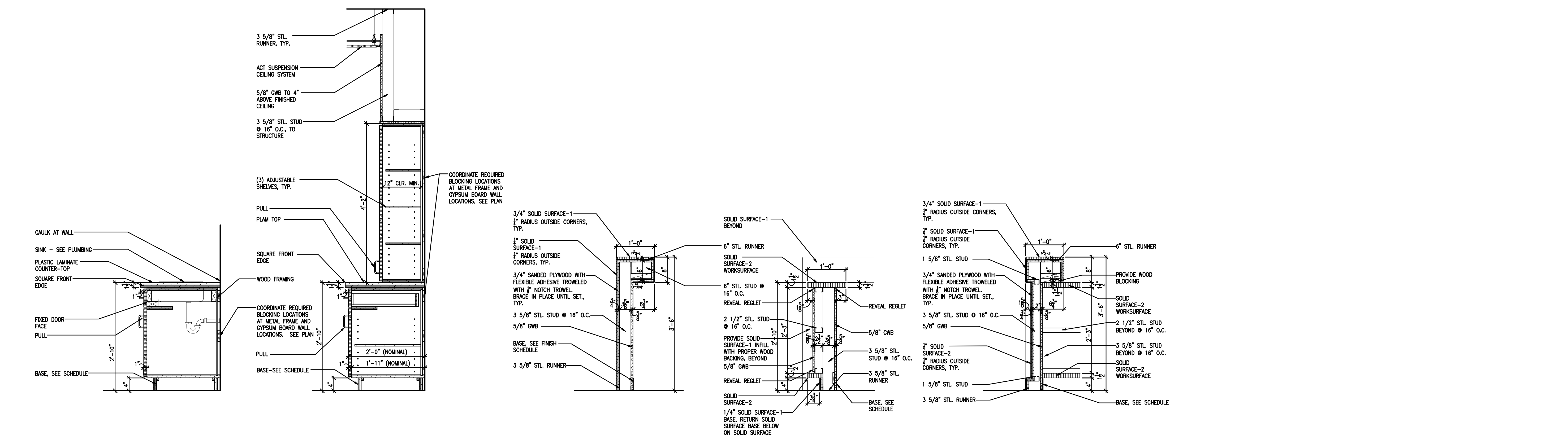
Architecture
Planning

Dorschner/Associates, Inc.
840 E. Washington Ave., Ste 112
Madison, Wisconsin 53703

ISSUED



1 CASEWORK SECTION 3/4"x1'-0" 2 CASEWORK SECTION 3/4"x1'-0" 3 CASEWORK SECTION 3/4"x1'-0" 4 CASEWORK SECTION 3/4"x1'-0" 5 CASEWORK SECTION 3/4"x1'-0" 6 CASEWORK SECTION 3/4"x1'-0" 7 CASEWORK SECTION (ALT. BID 4) 3/4"x1'-0"



8 CASEWORK SECTION (ALT. BID 4) 3/4"x1'-0" 9 CASEWORK SECTION (ALT. BID 4) 3/4"x1'-0" 10 RECEPTION SECTION 3/4"x1'-0" 11 RECEPTION SECTION 3/4"x1'-0" 12 RECEPTION SECTION 3/4"x1'-0"

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
CASEWORK SECTIONS

DATE
03.24.09

A5.1

Architecture Planning

Dorschner/Associates, Inc.
 848 E. Washington Ave., Ste 112
 Madison, Wisconsin 53703

ISSUED

PROJECT
 TENANT IMPROVEMENTS
 FIRST AND THIRD FLOOR
 CITY-COUNTY BUILDING
 210 MARTIN LUTHER KING,
 JR. BLVD., MADISON, WI

DRAWING
 DOOR & FRAME ELEVATIONS,
 PARTITION TYPES, DETAILS
 & SCHEDULE
DATE
 03.13.09

DOOR		FRAME		LFB LABEL	HDWR GROUP	REMARKS
NO.	QTY	W	H			
F	2	3-0	7-0	1 3/4"	HM	EXIST
102	1	3-0	7-0	1 3/4"	WD	C GLT-4
104	1	3-0	7-0	1 3/4"	HM	EXIST
105	1	3-0	7-0	1 3/4"	WD	EXIST
108a	1	3-0	7-0	1 3/4"	WD	B GLT-4A
108b	1	3-0	7-0	1 3/4"	WD	B GLT-4A
110	1	3-0	7-0	1 3/4"	WD	A
111	1	3-0	7-0	1 3/4"	WD	A
112	1	3-0	7-0	1 3/4"	WD	A
113	1	3-0	7-0	1 3/4"	WD	A
114	1	3-0	7-0	1 3/4"	WD	A
115	1	3-0	7-0	1 3/4"	WD	A
117	1	3-0	7-0	1 3/4"	WD	A
119	1	3-0	7-0	1 3/4"	WD	A
1001	2	3-0	7-0	1 3/4"	AL	EXIST
1003a	1	3-0	7-0	1 3/4"	WD	A
1003b	1	3-0	7-0	1 3/4"	WD	A
1004	1	3-0	7-0	1 3/4"	WD	C GLT-4
1006	1	3-0	7-0	1 3/4"	WD	A
309a	1	3-0	7-0	1 3/4"	WD	EXIST
309b	1	3-0	7-0	1 3/4"	WD	EXIST
310a	1	3-0	7-0	1 3/4"	WD	A
310b	1	3-0	7-0	1 3/4"	WD	EXIST
321a	1	3-0	7-0	1 3/4"	WD	EXIST
3006	1	3-0	7-0	1 3/4"	WD	A
3007a	2	3-0	7-0	1 3/4"	WD	EXIST
3007b	1	3-0	7-0	1 3/4"	WD	EXIST
3007c	1	3-0	7-0	1 3/4"	WD	EXIST
3007d	1	3-0	7-0	1 3/4"	WD	A
3007e	1	3-0	7-0	1 3/4"	WD	A
3007f	1	3-0	7-0	1 3/4"	WD	A
3010	1	3-0	7-0	1 3/4"	WD	EXIST

GENERAL NOTES:

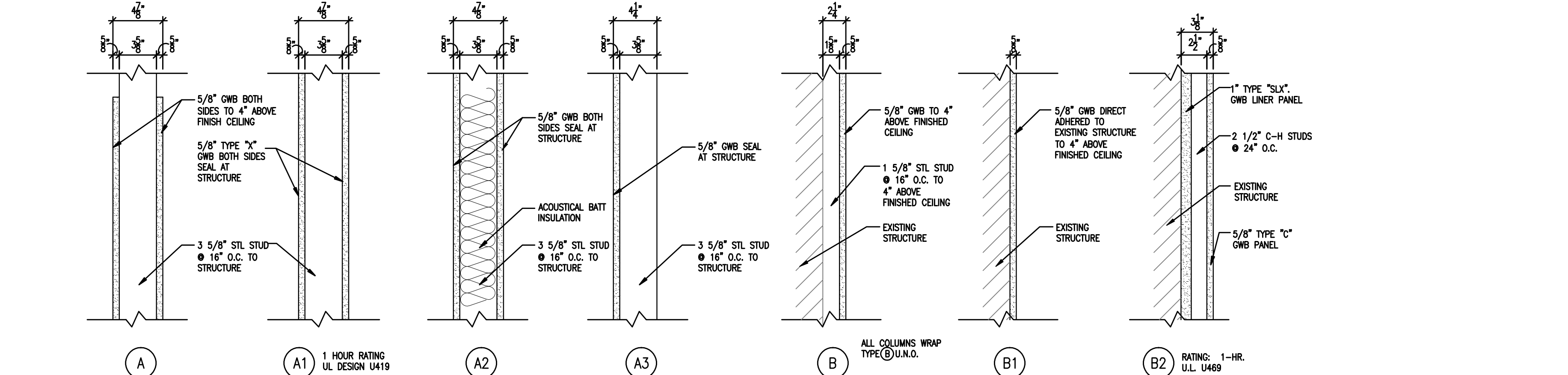
- P. PAINT ALL HM FRAMES/DOORS TO MATCH OWNER'S SAMPLE.
- P. PAINT ALL EXISTING HM FRAMES/DOORS IN PROJECT AREA TO MATCH OWNER'S SAMPLE.
- STAIN ALL WOOD DOORS TO MATCH OWNER'S SAMPLE.
- REFER TO SHEET A7.0 FOR HOLLOW METAL FRAME ELEVATIONS.

LEGEND

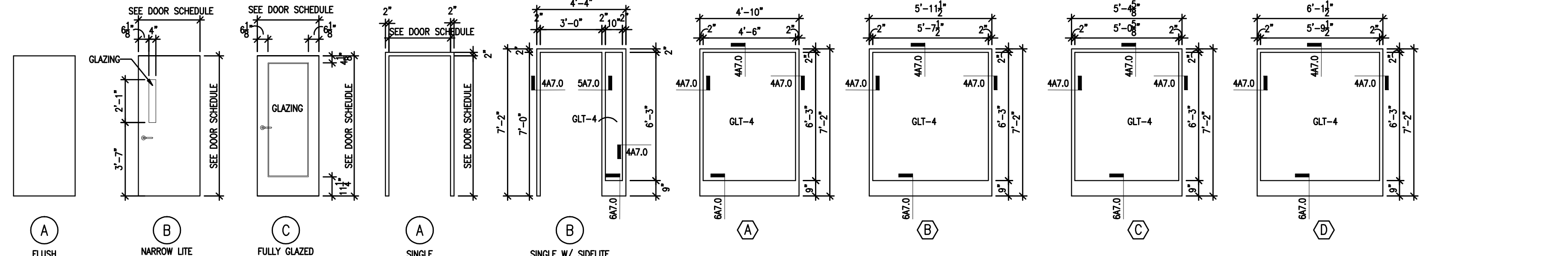
AL ALUMINUM
 HM HOLLOW METAL
 WD WOOD
 UC UNDERCUT

REMARKS

- PRIOR TO ANY MODIFICATION TO EXISTING MARBLE DURING SHOP DRAWING SUBMITTAL, DISCUSS WITH OWNER.

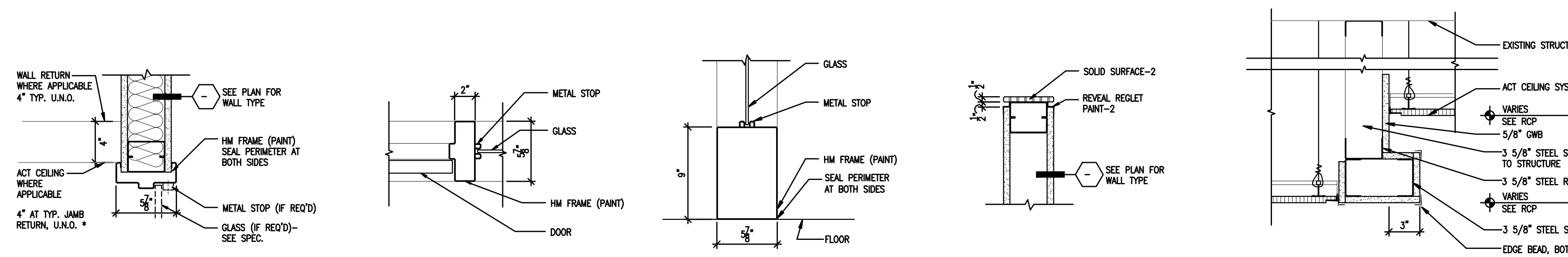


1 PARTITION TYPES
 1 1/2"-1'-0"



2 DOOR AND FRAME ELEVATIONS
 1/4"-1'-0"

3 WINDOW ELEVATIONS
 1/4"-1'-0"

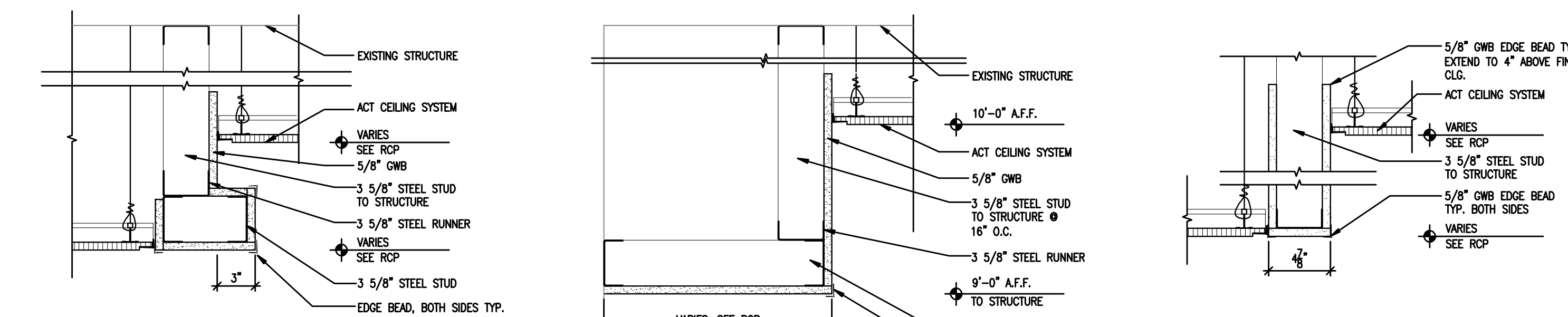


4 HM DOOR JAMB/HEAD DETAIL
 1 1/2"-1'-0"

5 HM JAMB DETAIL
 1 1/2"-1'-0"

6 HM BASE DETAIL
 1 1/2"-1'-0"

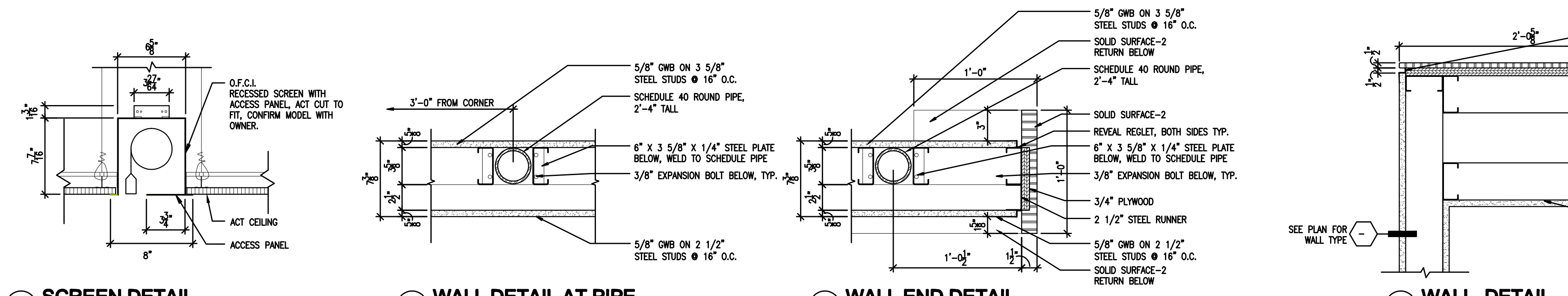
7 CORNER DETAIL
 1 1/2"-1'-0"



8 BULKHEAD DETAIL
 1 1/2"-1'-0"

9 SOFFIT DETAIL
 1 1/2"-1'-0"

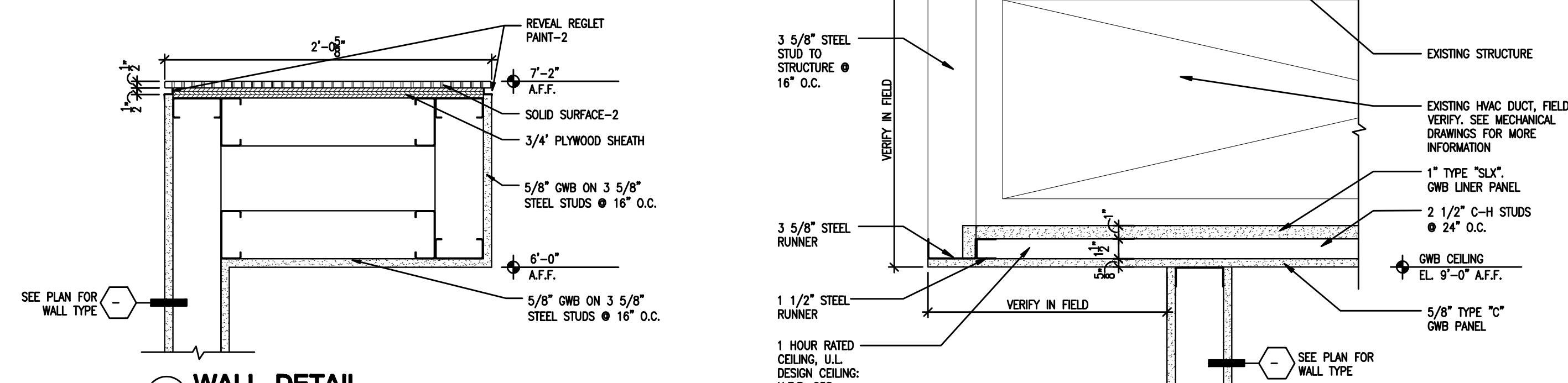
10 BULKHEAD DETAIL
 1 1/2"-1'-0"



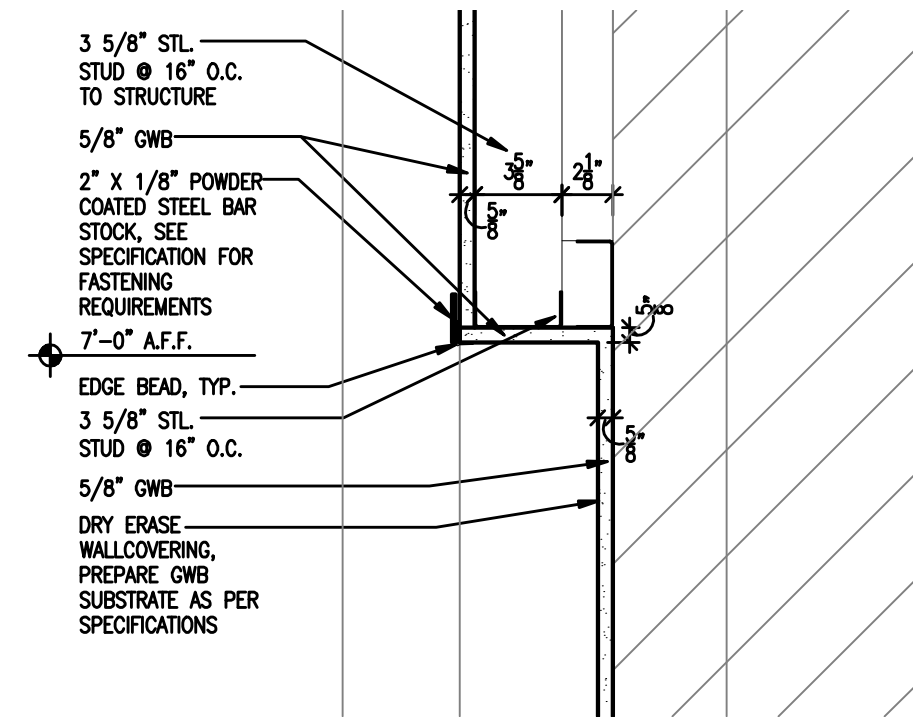
11 SCREEN DETAIL
 1 1/2"-1'-0"

12 WALL DETAIL AT PIPE
 1 1/2"-1'-0"

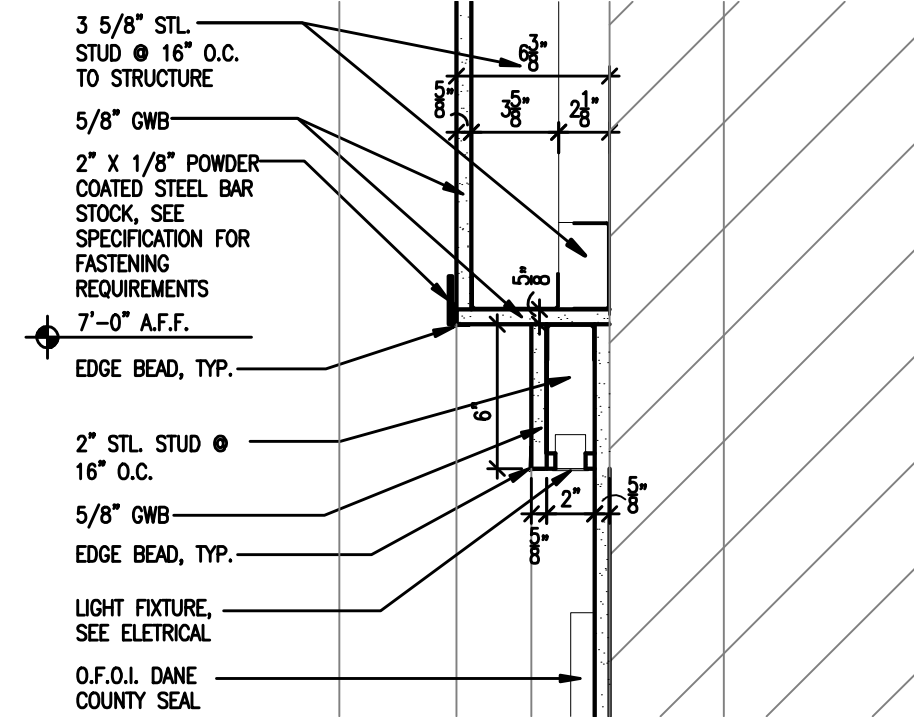
13 WALL END DETAIL
 1 1/2"-1'-0"



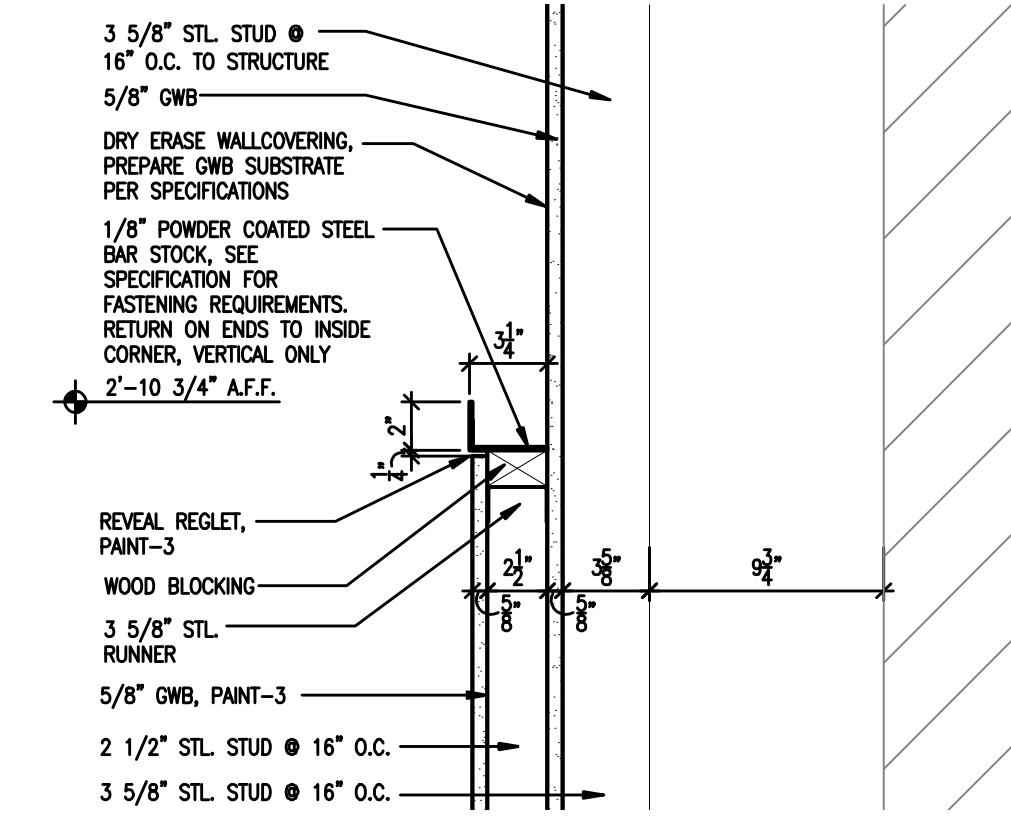
14 CEILING DETAIL
 1 1/2"-1'-0"



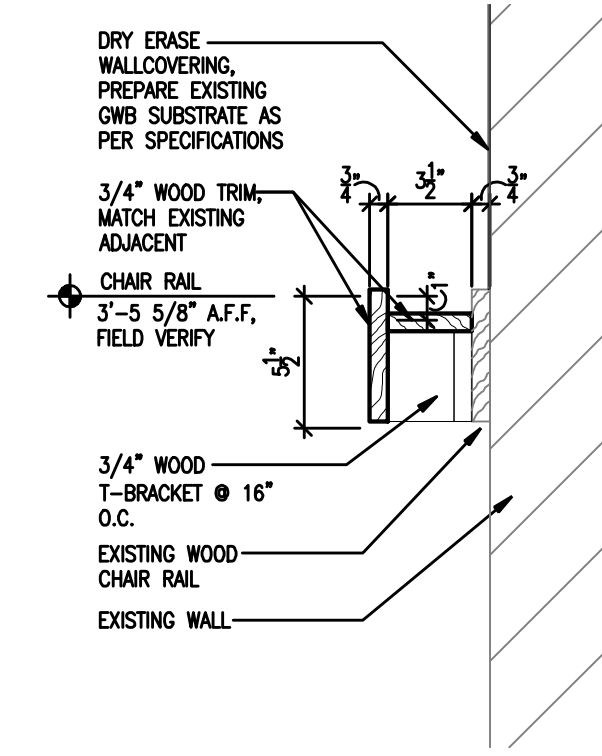
1 SOFFIT DETAIL
1 1/2" x 1'-0"



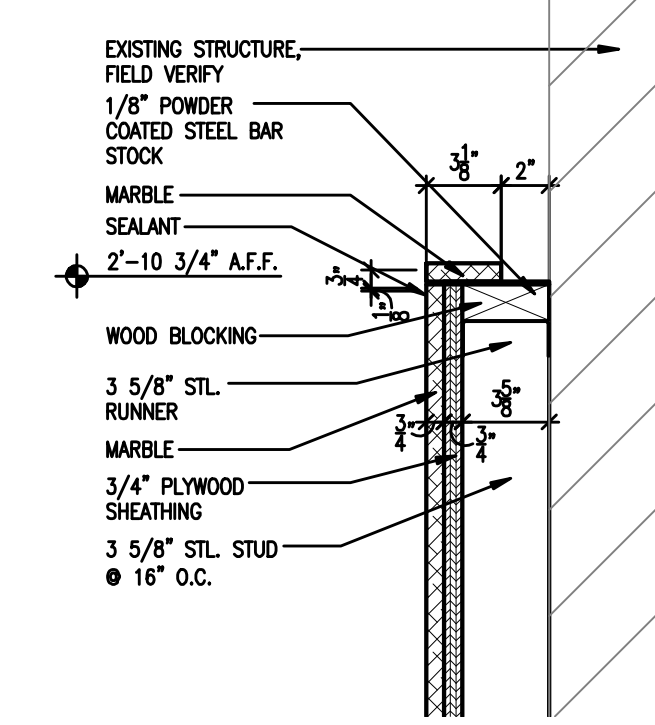
2 SOFFIT DETAIL
1 1/2" x 1'-0"



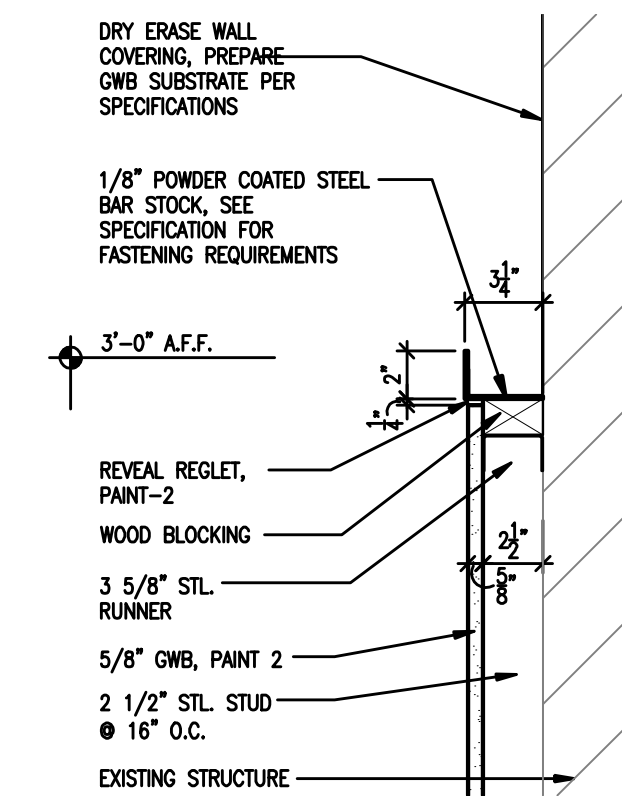
3 DISPLAY RAIL DETAIL
1 1/2" x 1'-0"



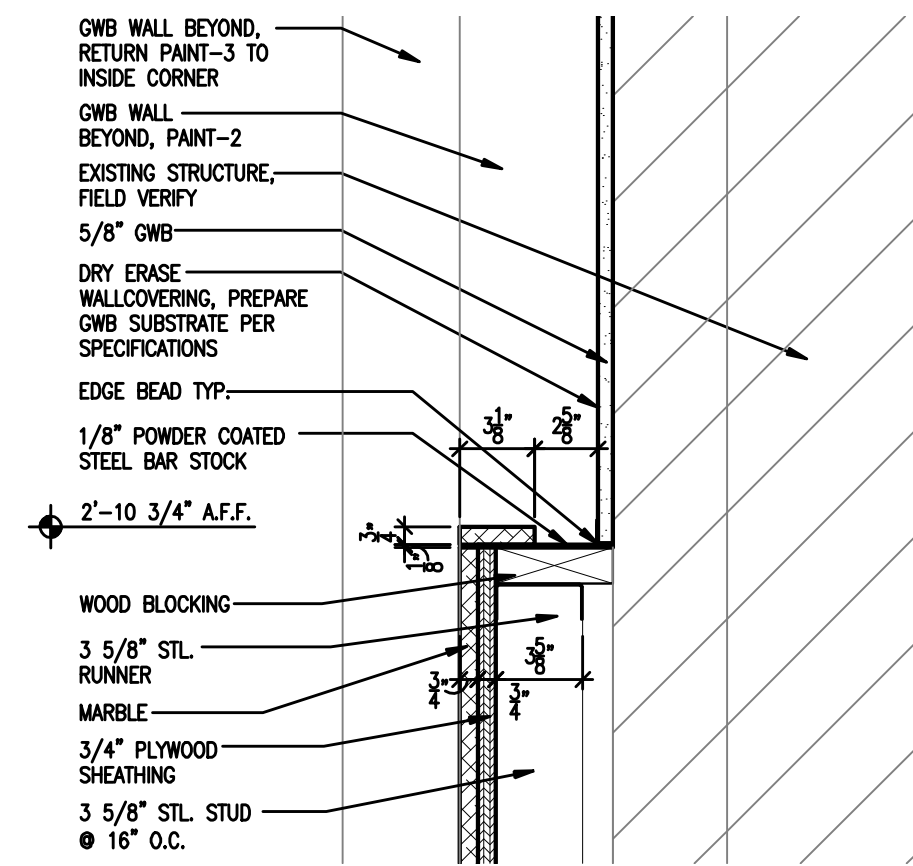
4 DISPLAY RAIL DETAIL
1 1/2" x 1'-0"



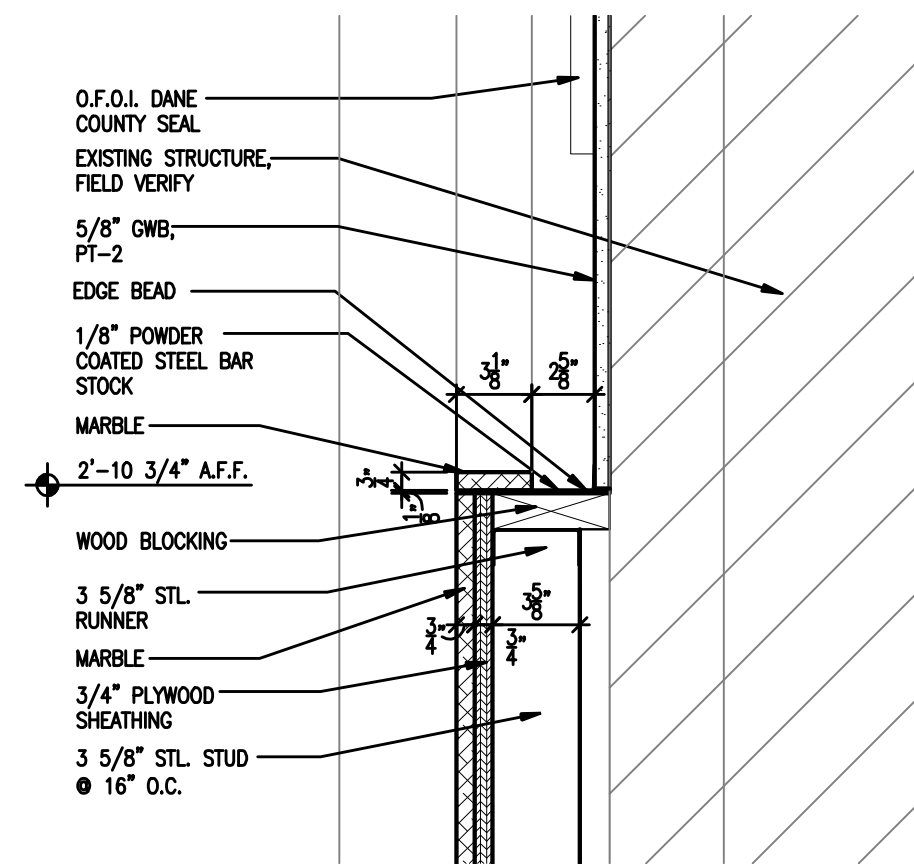
5 DISPLAY RAIL DETAIL
1 1/2" x 1'-0"



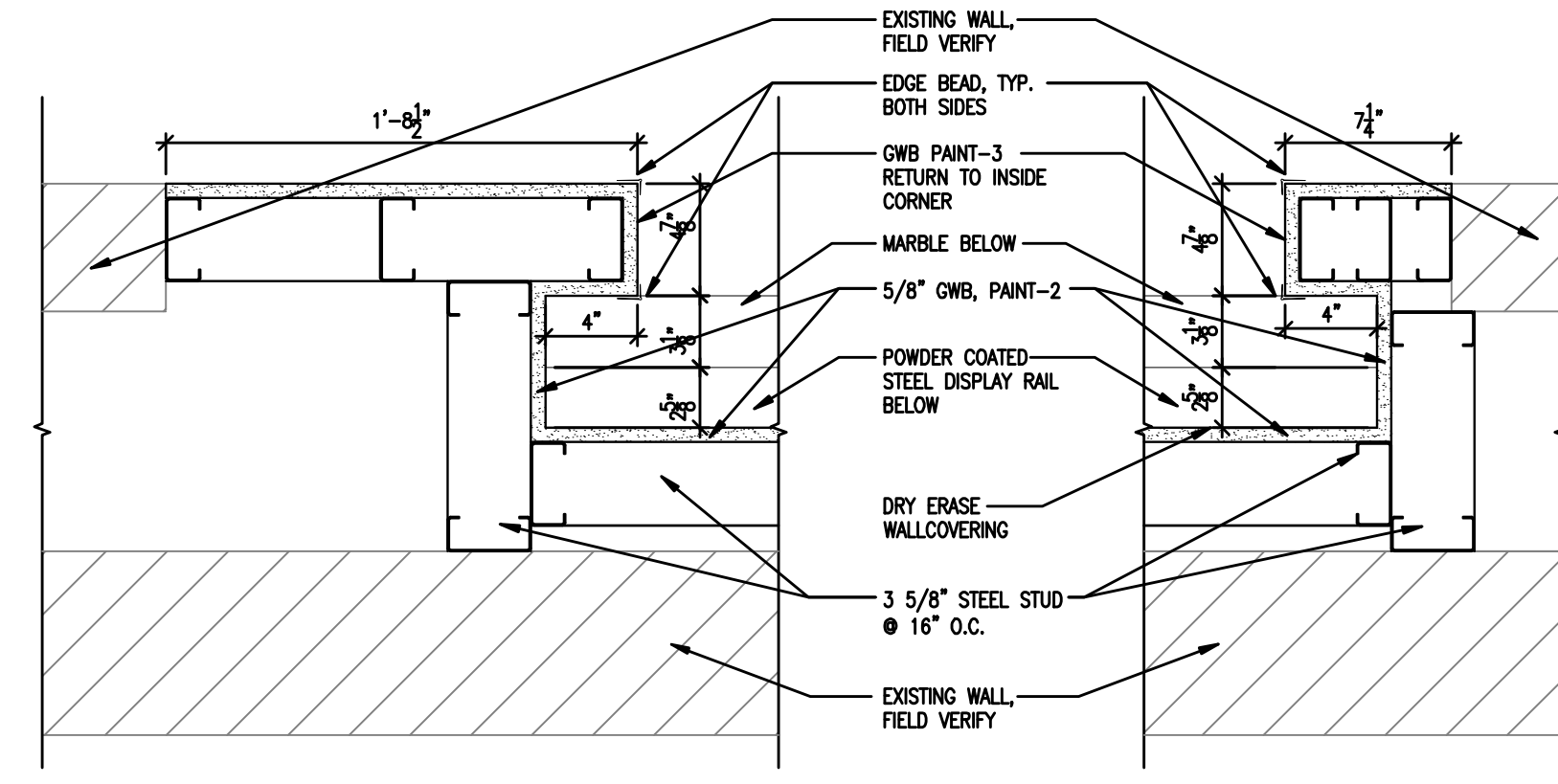
6 DISPLAY RAIL DETAIL (ALT. BID 1)
1 1/2" x 1'-0"



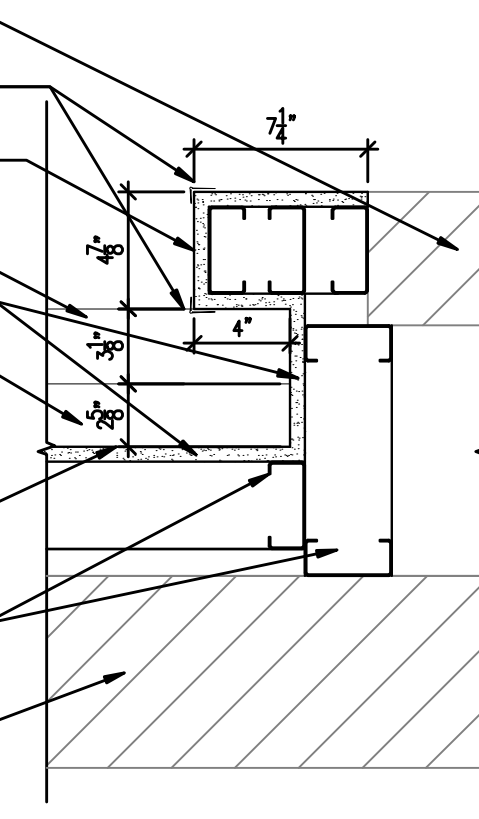
7 DISPLAY RAIL DETAIL
1 1/2" x 1'-0"



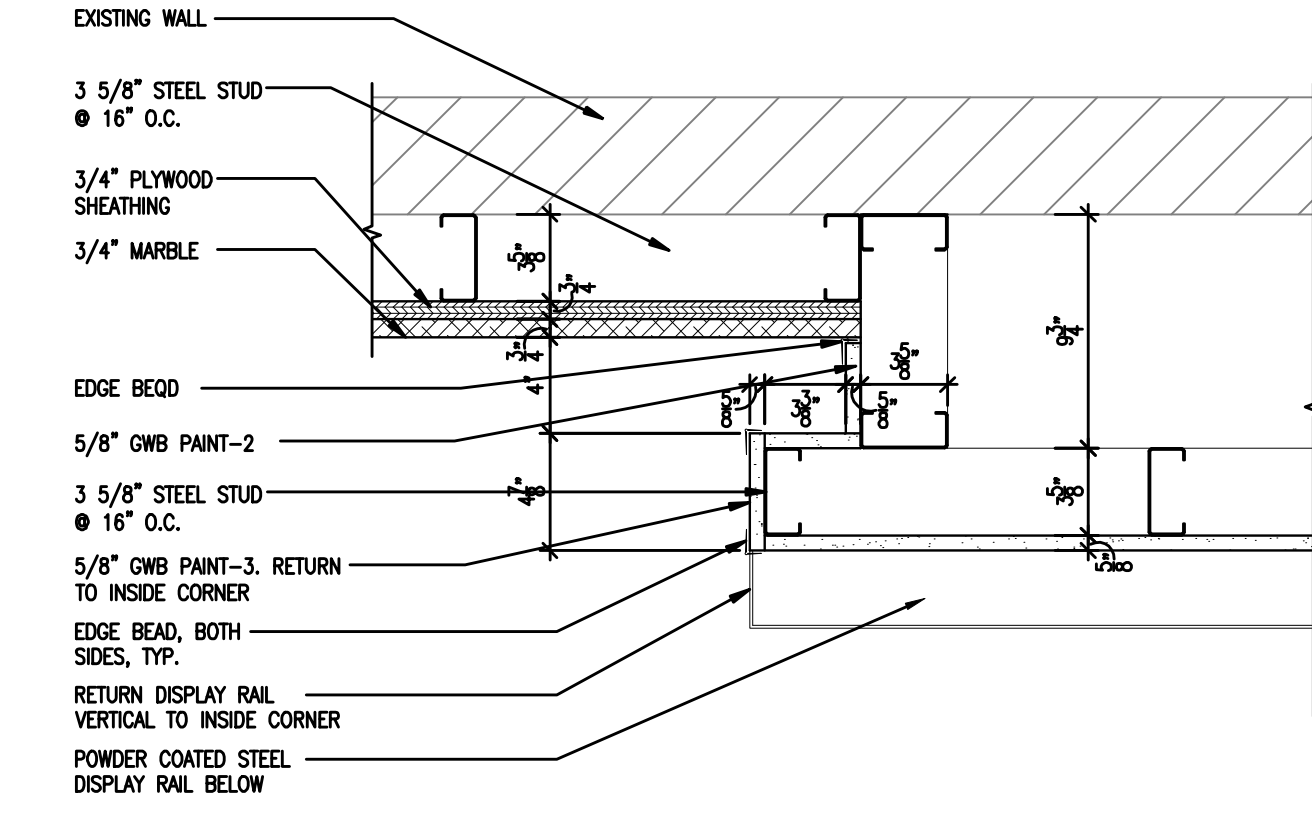
8 DISPLAY RAIL DETAIL
1 1/2" x 1'-0"



9 PLAN DETAIL
1 1/2" x 1'-0"

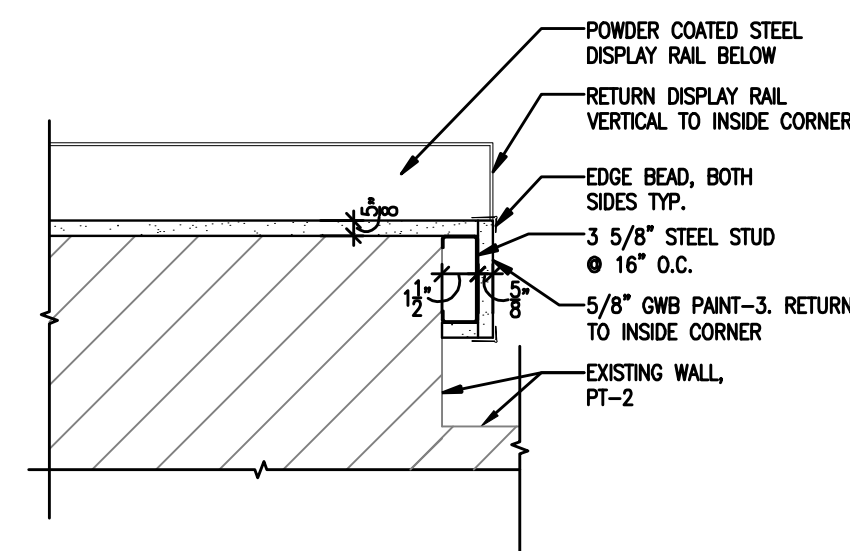


10 PLAN DETAIL
1 1/2" x 1'-0"

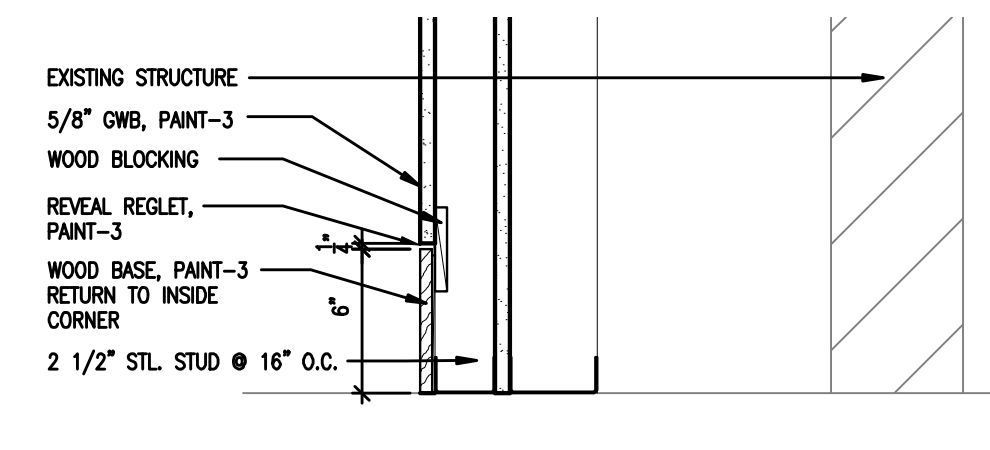


11 PLAN DETAIL
1 1/2" x 1'-0"

12 NOT USED
1 1/2" x 1'-0"



13 PLAN DETAIL
1 1/2" x 1'-0"



14 BASE DETAIL
1 1/2" x 1'-0"

GENERAL NOTES:

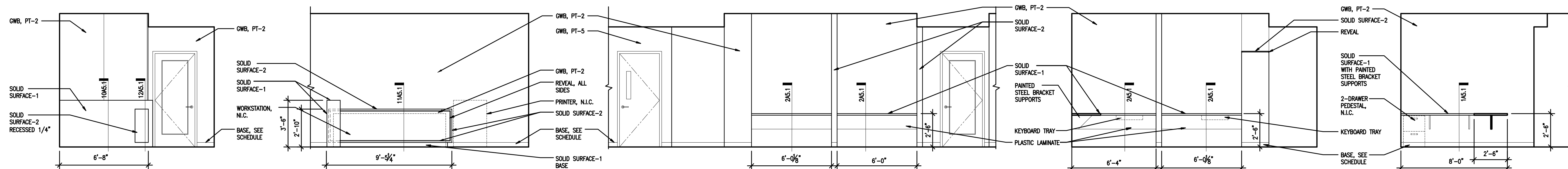
ALTERNATE BID 5: SOLID SURFACE-3 IN LIEU OF MARBLE IN ROOMS 310 AND 315. PROVIDE 1/4" SOLID SURFACE-3 AT VERTICAL APPLICATIONS AND 3/4" SOLID SURFACE-3 AT HORIZONTAL APPLICATIONS. SUBSTRATE TO BE 3/4" SANDED PLYWOOD WITH FLEXIBLE ADHESIVE TROWELED WITH 1/8" NOTCH TROWEL. BRACE IN PLACE UNTIL SET, TYP. 1/4" RADIUS TYP.

PROJECT
THIRD FLOOR MEETING ROOM RENOVATION, CITY-COUNTY BUILDING, 210 MARTIN LUTHER KING, JR. BLVD., MADISON, WI

DRAWING
DETAILS

DATE
12.10.08

A7.1



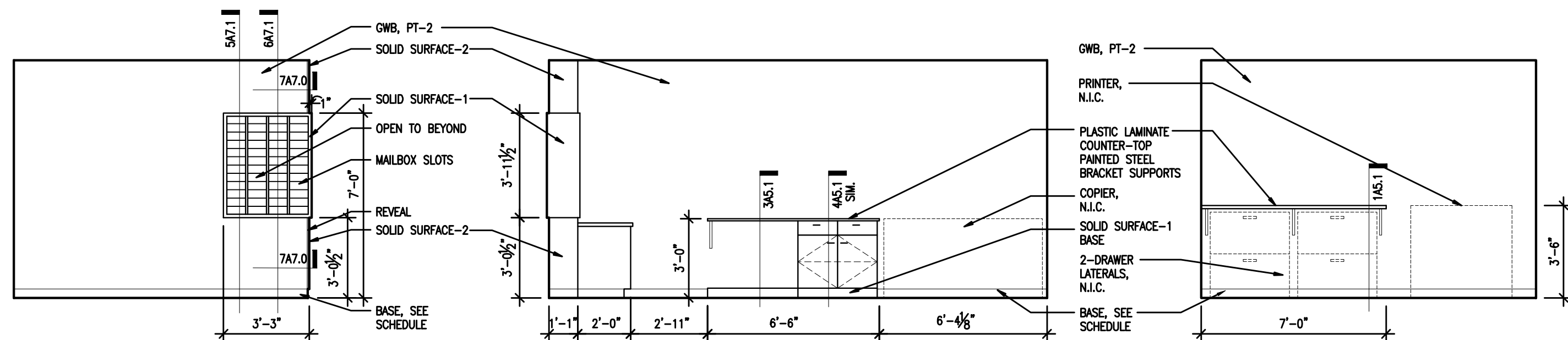
1 INTERIOR ELEVATION
1/4"=1'-0"

2 INTERIOR ELEVATION
1/4"=1'-0"

3 INTERIOR ELEVATION
1/4"=1'-0"

4 INTERIOR ELEVATION
1/4"=1'-0"

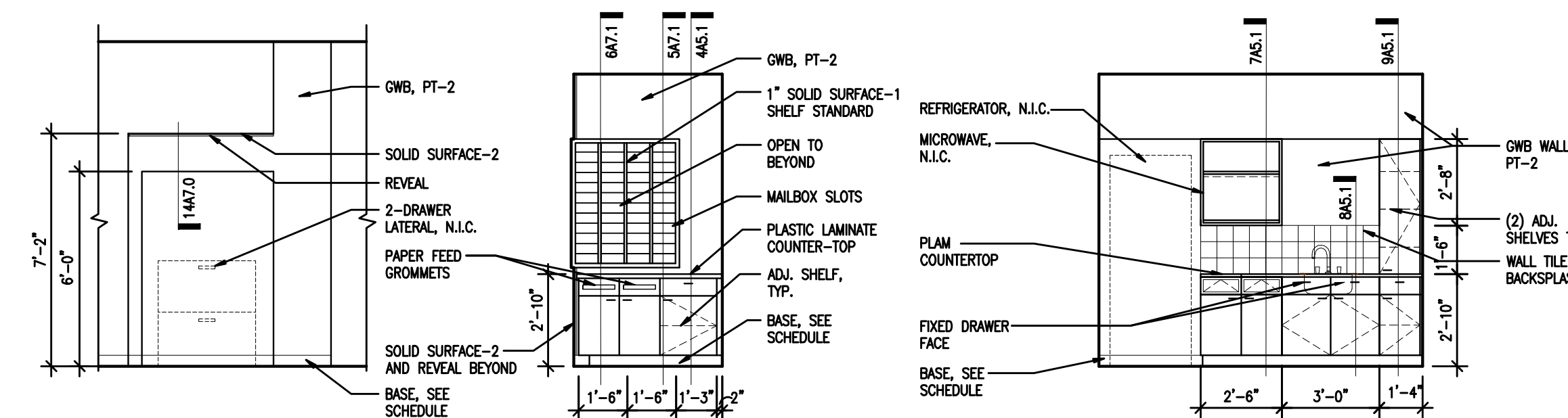
5 INTERIOR ELEVATION
1/4"=1'-0"



6 INTERIOR ELEVATION
1/4"=1'-0"

7 INTERIOR ELEVATION
1/4"=1'-0"

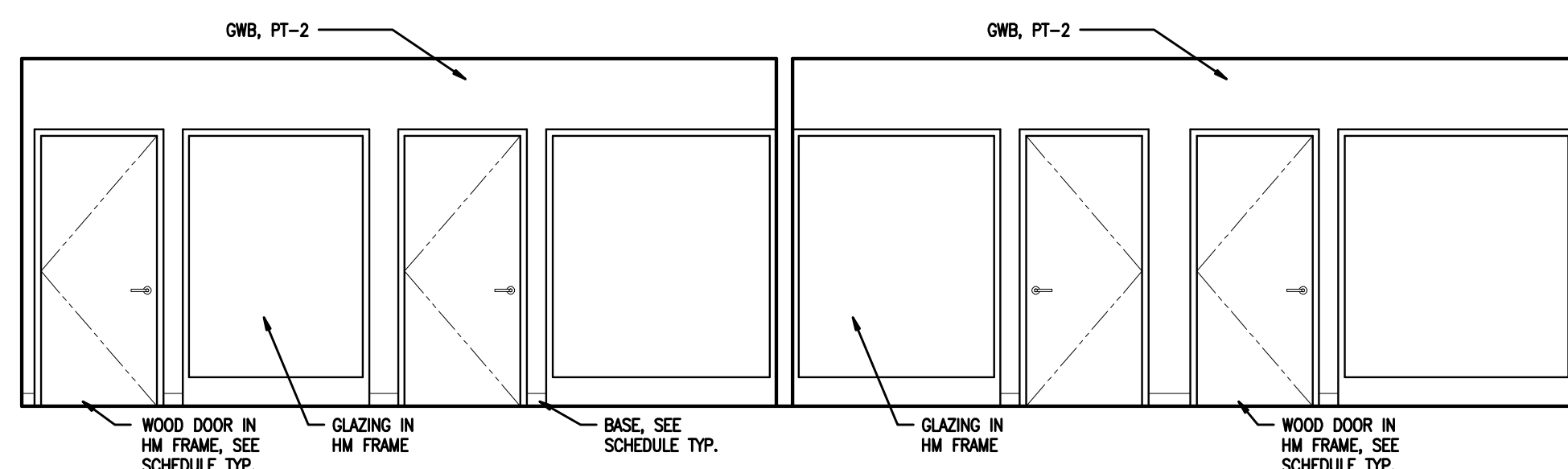
8 INTERIOR ELEVATION
1/4"=1'-0"



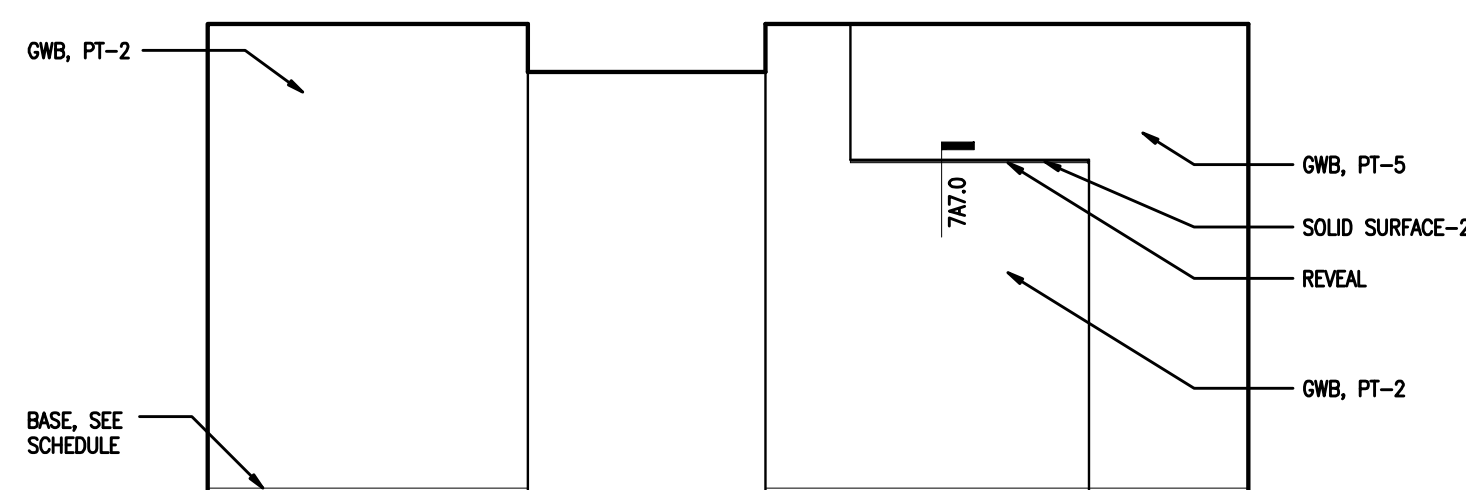
9 INTERIOR ELEVATION
1/4"=1'-0"

10 INTERIOR ELEVATION
1/4"=1'-0"

11 INTERIOR ELEVATION (ALT. BID 4)
1/4"=1'-0"



12 INTERIOR ELEVATION
1/4"=1'-0"



13 INTERIOR ELEVATION
1/4"=1'-0"

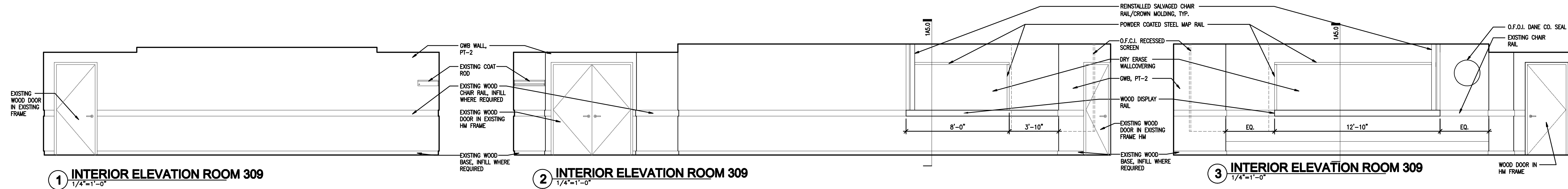
ISSUED

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR INTERIOR
ELEVATIONS

DATE
03.24.09

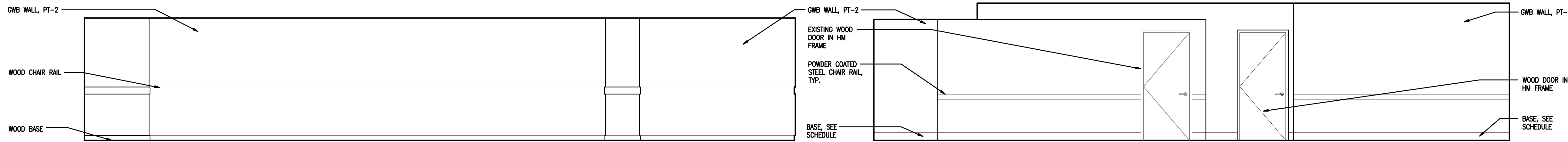
A8.1



1 INTERIOR ELEVATION ROOM 309
1/4"=1'-0"

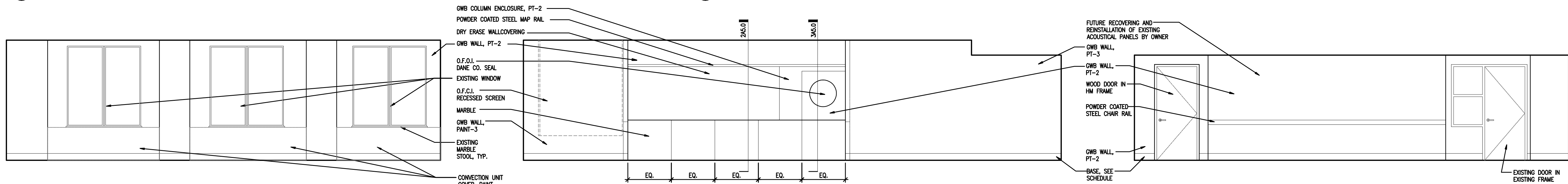
2 INTERIOR ELEVATION ROOM 309
1/4"=1'-0"

3 INTERIOR ELEVATION ROOM 309
1/4"=1'-0"



4 INTERIOR ELEVATION ROOM 310
1/4"=1'-0"

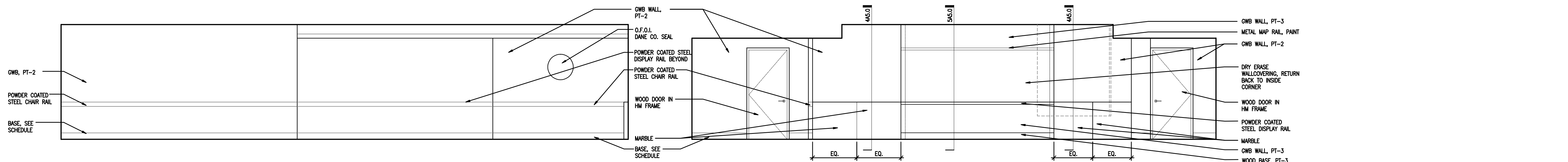
5 INTERIOR ELEVATION ROOM 310
1/4"=1'-0"



6 INTERIOR ELEVATION ROOM 310
1/4"=1'-0"

7 INTERIOR ELEVATION ROOM 310
1/4"=1'-0"

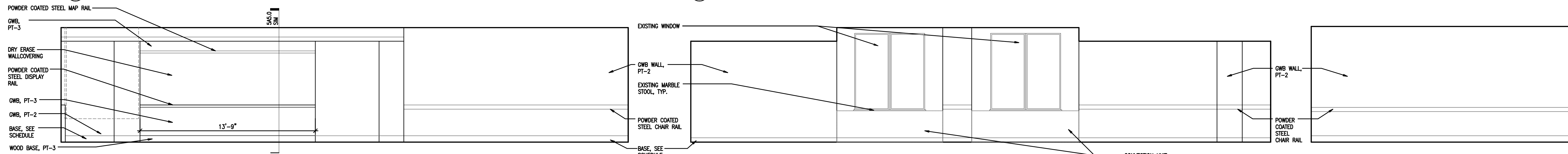
8 INTERIOR ELEVATION ROOM 310
1/4"=1'-0"



9 INTERIOR ELEVATION ROOM 315
1/4"=1'-0"

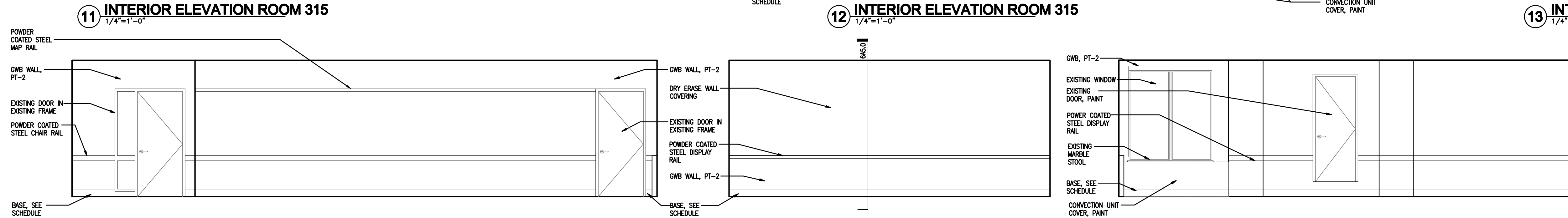
10 INTERIOR ELEVATION ROOM 315
1/4"=1'-0"

11 INTERIOR ELEVATION ROOM 315
1/4"=1'-0"



12 INTERIOR ELEVATION ROOM 315
1/4"=1'-0"

13 INTERIOR ELEVATION ROOM 321 (ALT. BID 1)
1/4"=1'-0"



14 INTERIOR ELEVATION ROOM 321 (ALT. BID 1)
1/4"=1'-0"

15 INTERIOR ELEVATION ROOM 321 (ALT. BID 1)
1/4"=1'-0"

16 INTERIOR ELEVATION ROOM 321 (ALT. BID 1)
1/4"=1'-0"

GENERAL NOTES:
ALTERNATE BID 5: SOLID SURFACE-3 IN LIEU OF MARBLE IN ROOMS 310 AND 315. PROVIDE 1/4" SOLID SURFACE-3 AT VERTICAL APPLICATIONS AND 3/4" SOLID SURFACE-3 AT HORIZONTAL APPLICATIONS. SUBSTRATE TO BE 3/4" SANDED PLYWOOD WITH FLEXIBLE ADHESIVE TROWELED WITH 1/8" NOTCH TROWEL. BRACE IN PLACE UNTIL SET, TYP. 1/4" RADIUS TYP.

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

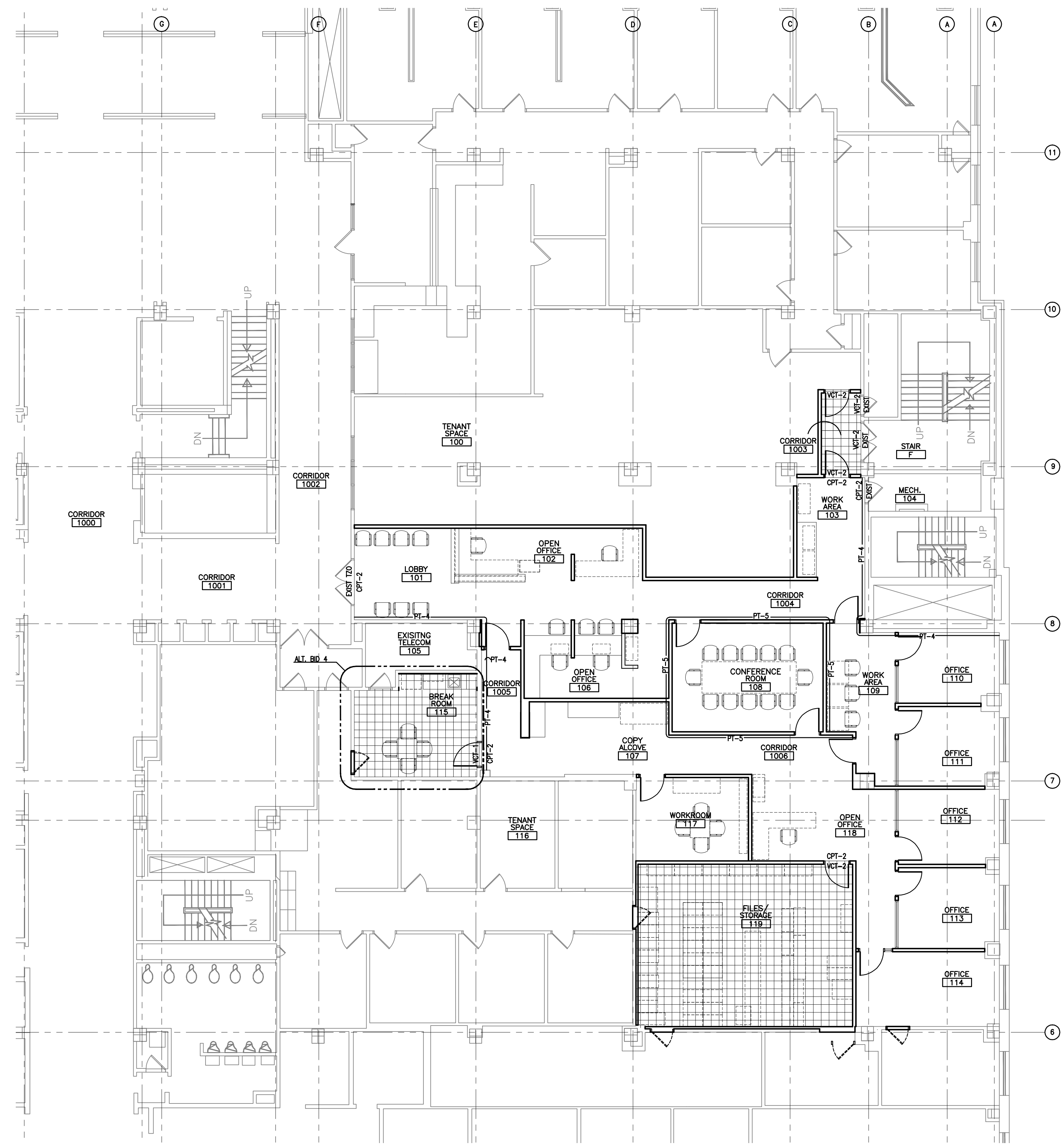
DRAWING
THIRD FLOOR INTERIOR
ELEVATIONS

DATE
03.24.09

Architecture
Planning

Dorschner/Associates, Inc.
848 E. Washington Ave., Ste 112
Madison, Wisconsin 53703

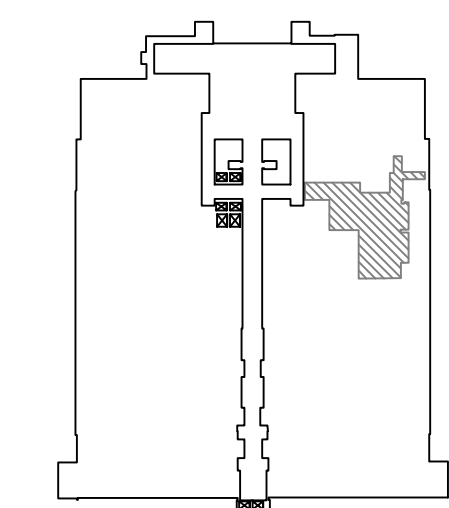
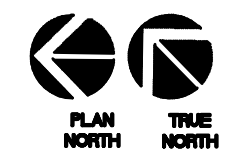
ISSUED



ROOM FINISH SCHEDULE											
ROOM NO.	ROOM NAME	FLOOR FINISH	BASE	WALL FINISH				CEILING MATERIAL	CEILING HT.	FINISH	REMARKS
				NORTH	EAST	SOUTH	WEST				
100	TENANT SPACE	-	-	-	-	-	-	-	-	-	-
101	LOBBY	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-4	ACT	10'-0"	-	-
102	OPEN OFFICE	CPT-2	RUBBER-2	-	PT-2	PT-2	PT-2	ACT/GWB	VARIES	PT-1	-
103	WORK AREA	CPT-2	RUBBER-2	PT-2	PT-2	PT-4	PT-2	ACT	9'-6"	-	-
104	MECH.	EXIST	EXIST	-	-	-	-	EXIST	EXIST	-	-
105	EXISTING TELECOM	EXIST	EXIST	-	-	-	-	EXIST	EXIST	-	-
106	OPEN OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-5	PT-2	ACT	10'-0"	-	-
107	COPY ALCOVE	CPT-2	RUBBER-2	PT-2	PT-2	PT-5	PT-2	ACT	9'-0"	-	-
108	CONFERENCE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
109	WORK AREA	CPT-2	RUBBER-2	PT-5	PT-4	PT-2	PT-2	ACT	9'-0"	-	-
110	OFFICE	CPT-2	RUBBER-2	PT-2	PT-4	PT-2	PT-2	ACT	9'-0"	-	-
111	OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
112	OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
113	OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
114	OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
115	BREAK ROOM	VCT-2	EXIST	PT-2	PT-2	PT-2	PT-2	EXIST	EXIST	-	-
116	TENANT SPACE	EXIST	EXIST	-	-	-	-	PAINT	-	-	4
117	WORK ROOM	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
118	OPEN OFFICE	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
119	FILES / STORAGE	VCT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	10'-0"	-	-
1000	CORRIDOR	EXIST	EXIST	-	-	-	-	EXIST	9'-0"	-	-
1001	CORRIDOR	EXIST	EXIST	-	-	-	-	EXIST	EXIST	-	-
1002	CORRIDOR	EXIST	EXIST	-	-	-	-	EXIST	EXIST	-	-
1003	CORRIDOR	CPT-2	RUBBER-2	PT-2	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
1004	CORRIDOR	CPT-2	RUBBER-2	PT-2	PT-2	PT-4	PT-5	ACT/GWB	VARIES	PT-1	-
1005	CORRIDOR	CPT-2	RUBBER-2	PT-4	PT-2	PT-2	PT-2	ACT	9'-0"	-	-
1006	CORRIDOR	CPT-2	RUBBER-2	PT-2	PT-5	PT-2	PT-2	ACT	9'-0"	-	-
308	TENANT SUITE	EXIST	EXIST	-	-	-	-	PAINT	EXIST	-	4
309	CONFERENCE	CPT-1	EXIST WOOD	PT-2	PT-2	PT-2	PT-2	1	VARIES	-	2
309a	STORAGE	CPT-1	EXIST WOOD	PT-2	PT-2	PT-2	PT-2	EXIST	7'-10 1/4"	-	2
310	CONFERENCE	CPT-1	RUBBER-1	PT-2	PT-2	PT-2	PT-2/PT-3	1	VARIES	-	-
310a	STORAGE	CPT-1	RUBBER-1	PT-2	PT-2	PT-2	PT-2	GWB	7'-10 3/8"	PT-1	-
313	TENANT SUITE	EXIST	EXIST	-	-	-	-	PAINT	EXIST	-	4
315	CONFERENCE	CPT-1	RUBBER-1	PT-2	PT-3	PT-2/PT-3	PT-2/PT-3	1	VARIES	-	-
315a	STORAGE	CPT-1	RUBBER-1	PT-2	PT-2	PT-3	PT-3	1	7'-11 1/8"	-	-
321	CONFERENCE	CPT-1	RUBBER-1	PT-2	PT-2	PT-2	PT-2	ACT	VARIES	-	-
3006	CORRIDOR	VCT-2	RUBBER-1	-	-	-	-	EXIST	EXIST	-	-
3007	CORRIDOR	TZO	MARBLE/RESILIENT	PT-1	-	-	-	1	7'-9 1/2"	-	1,3
3010	CORRIDOR	EXIST VCT	EXIST	-	-	-	-	EXIST	EXIST	-	-

GENERAL FINISH NOTES	ROOM FINISH SCHEDULE REMARKS
<ol style="list-style-type: none"> PAINT ALL HM FRAMES INDICATED ON DOOR SCHEDULE ON A7.0. PAINT ALL ACCESS PANELS, INCLUDING EXISTING IN PROJECT AREA. ALL GYPSUM BOARD SOFFITS AND BULKHEADS TO BE PAINTED INCLUDING EXISTING, PT-1 U.N.O. REFER TO INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION. ALL FURNITURE, N.I.C. WHERE RUBBER BASE IS INDICATED IN FINISH SCHEDULE: ALL FIRST FLOOR SPACES TO RECEIVE 4" RUBBER BASE, O.F.C.I. ALL THIRD FLOOR SPACES TO RECEIVE 6" RUBBER BASE. POWDER COATED STEEL COLOR TO BE SELECTED BY ARCHITECT. PREP FLOOR PER SPECIFICATION. 	<ol style="list-style-type: none"> PAINT IN PUBLIC CORRIDOR 3007 BY OWNER. EXISTING WOOD BASE TO REMAIN. INFILL AREAS OF WOOD BASE TO NEXT JOINT, STAIN TO MATCH EXISTING. MARBLE BASE NORTH SIDE OF CORRIDOR 3007, RUBBER BASE ON SOUTH SIDE. BASE MATERIAL IN CORRIDOR 3007 TO MATCH ADJACENT EXISTING MATERIAL AT AREAS OF INFILL. COLOR TO MATCH EXISTING PAINT. CONFIRM WITH OWNER.

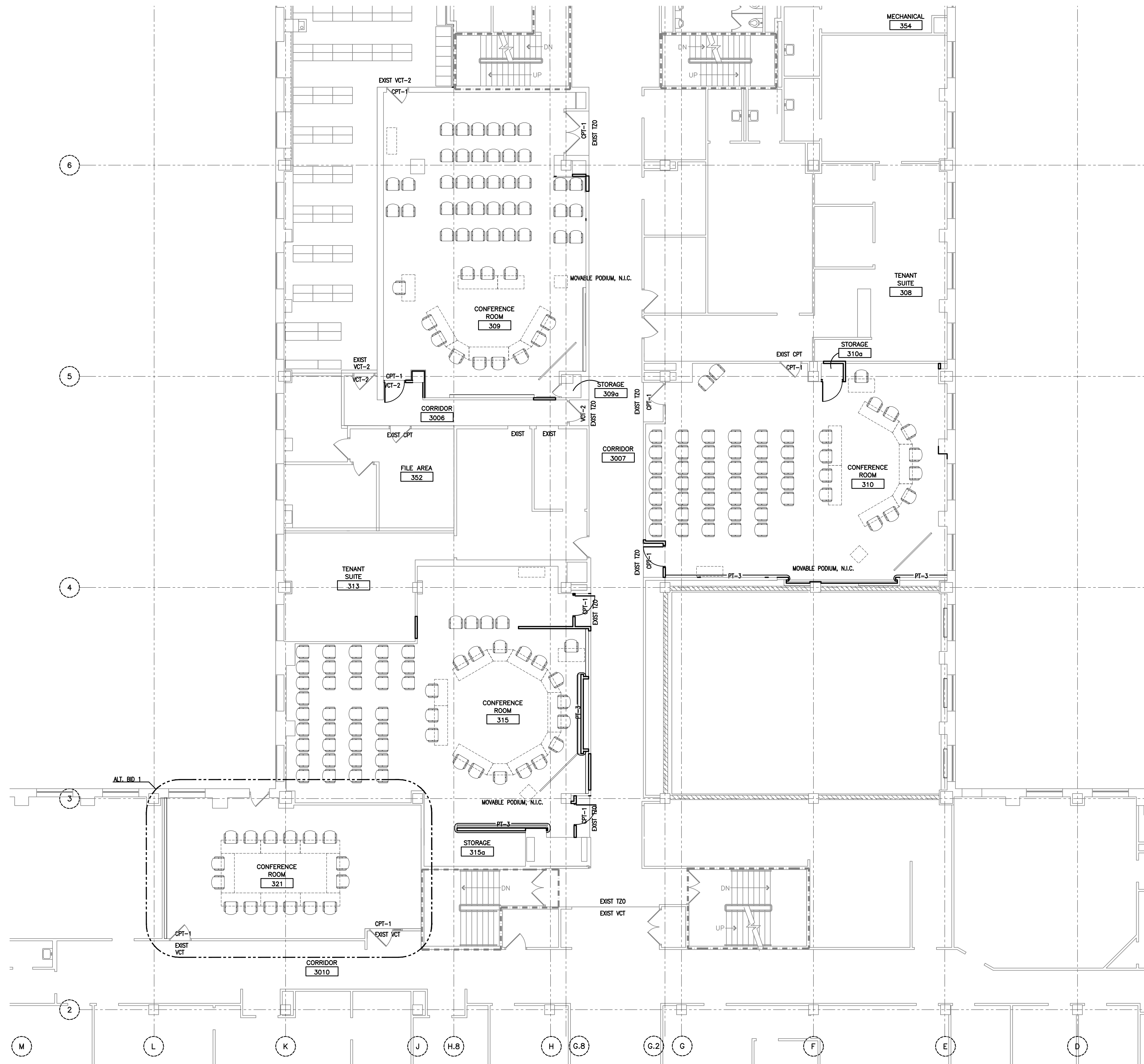
1 FIRST FLOOR FINISH PLAN
1/8"=1'-0"



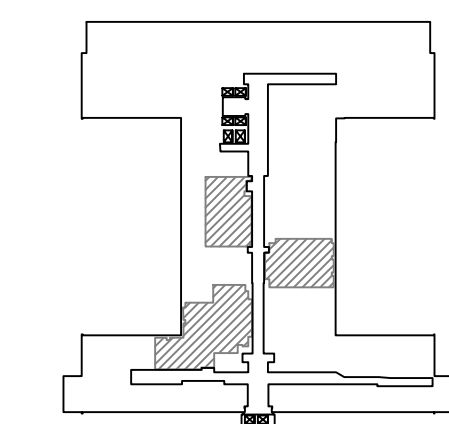
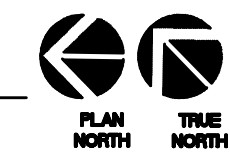
KEY PLAN- FIRST FLOOR

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR
FINISH PLAN AND
SCHEDULE
DATE
03.24.09



1 THIRD FLOOR PLAN
1/8"=1'-0"

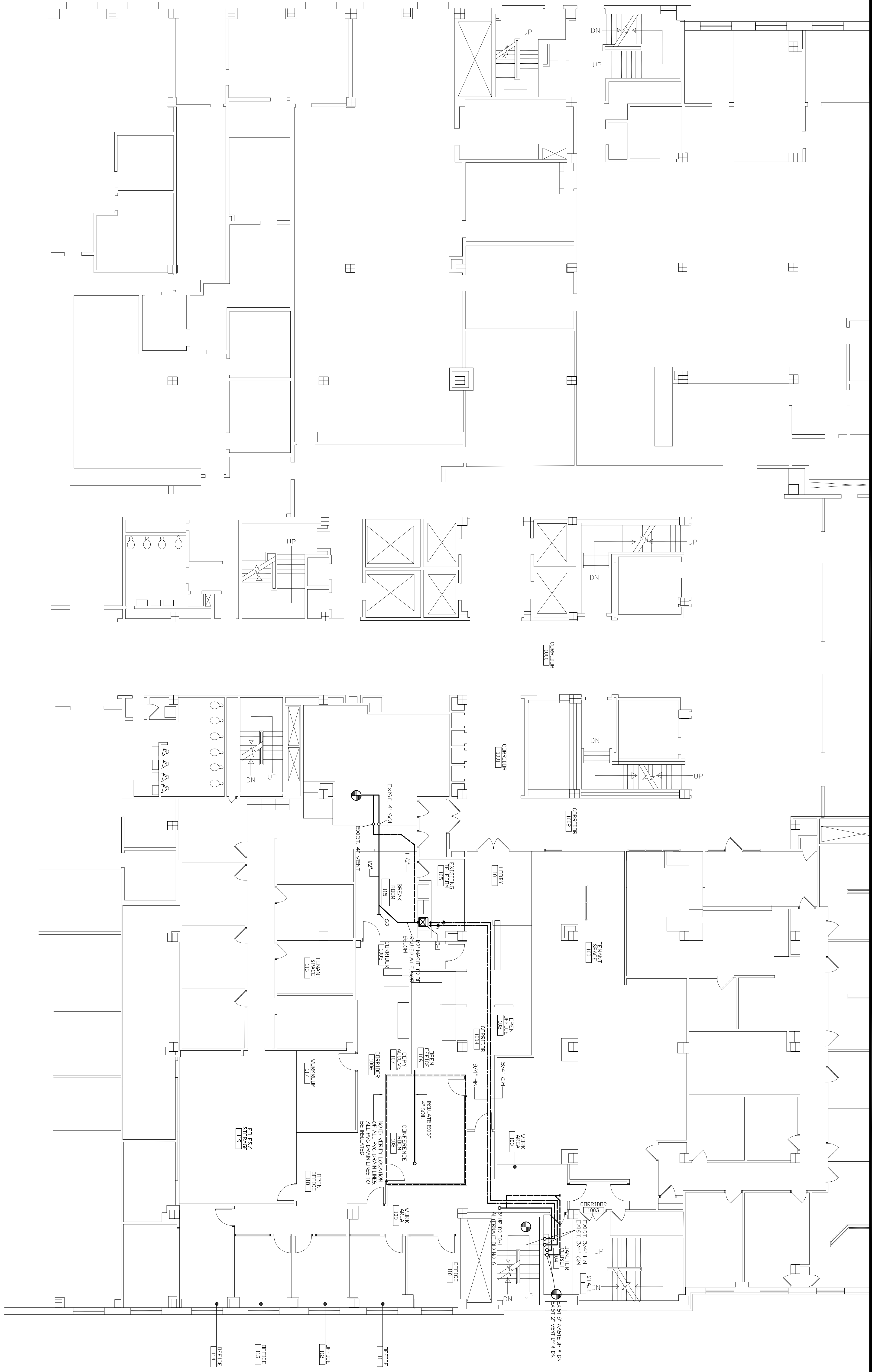


KEY PLAN- THIRD FLOOR

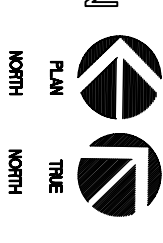
PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
THIRD FLOOR
FINISH PLAN

DATE
03.24.09



1 FIRST FLOOR PLUMBING PLAN
7/25/10



GENERAL NOTES
1. ALTERNATE BID 4: FIRST FLOOR BREAKROOM

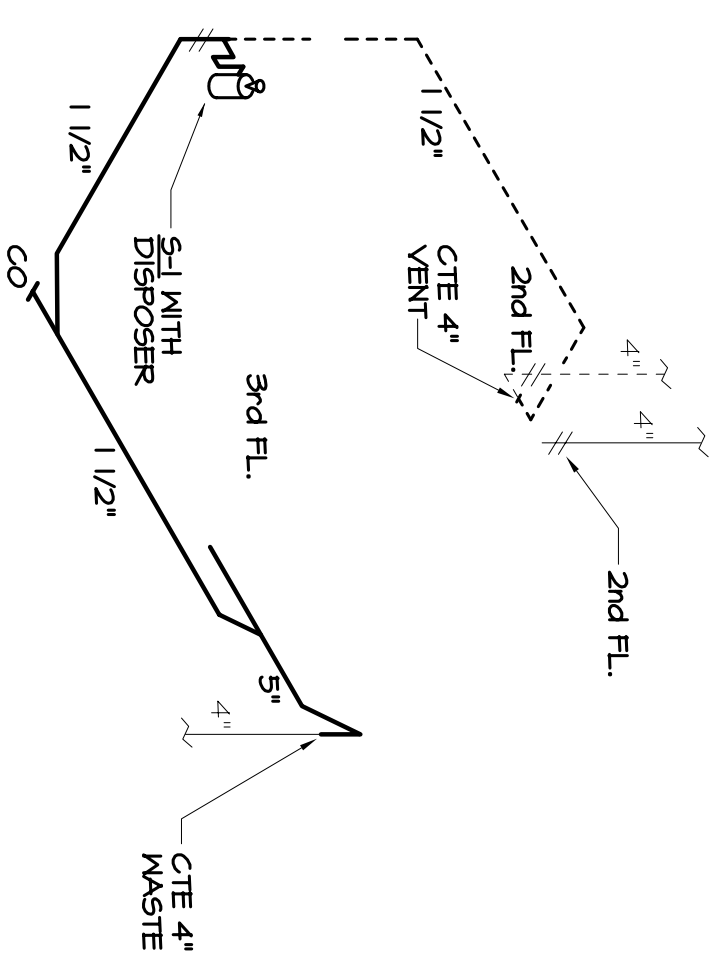
PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR PLAN -
NEW WORK

DATE
03.24.09

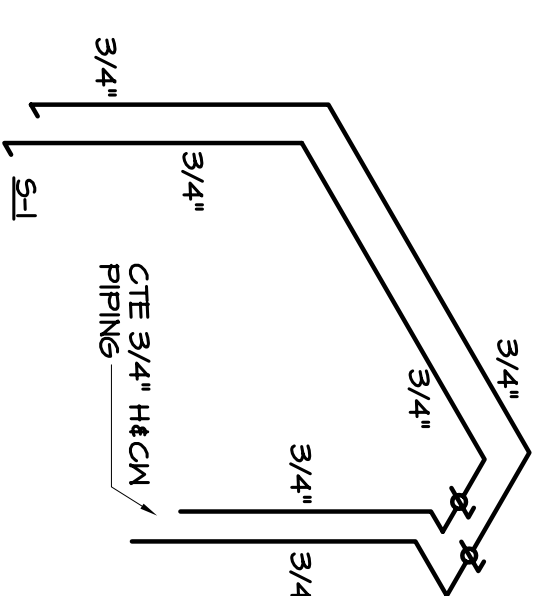
Architecture
Planning

Dorshine/Associates, Inc.
849 E. Washington Ave., Ste 112
Madison, Wisconsin 53703



SOIL WASTE AND VENT PIPING ISOMETRIC
NO SCALE ALTERNATE BID 4: FIRST FLOOR BREAK ROOM

ISSUED



WATER PIPING ISOMETRIC
NO SCALE ALTERNATE BID 4: FIRST FLOOR BREAK ROOM

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
THIRD FLOOR PLUMBING
RECONSTRUCTION PLAN
DATE
03.24.09

ISOMETRICS

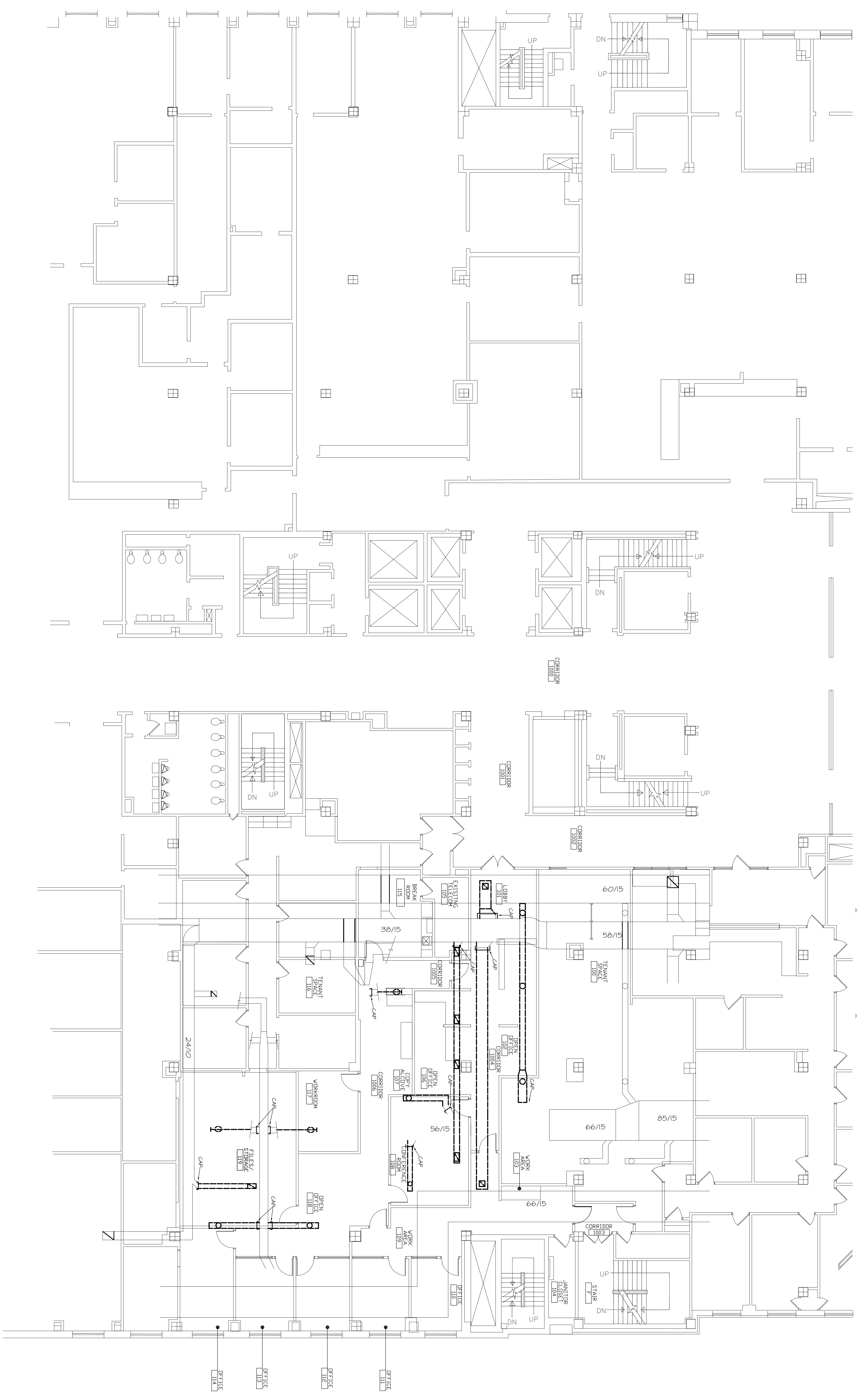
Architecture
Planning

Doroehn/Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703

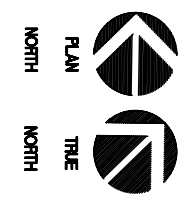
ISSUED

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
FIRST FLOOR PLAN -
HVAC DEMO
DATE
03.24.09



1 FIRST FLOOR HVAC DEMO
1/8" = 1'-0"



GENERAL NOTES

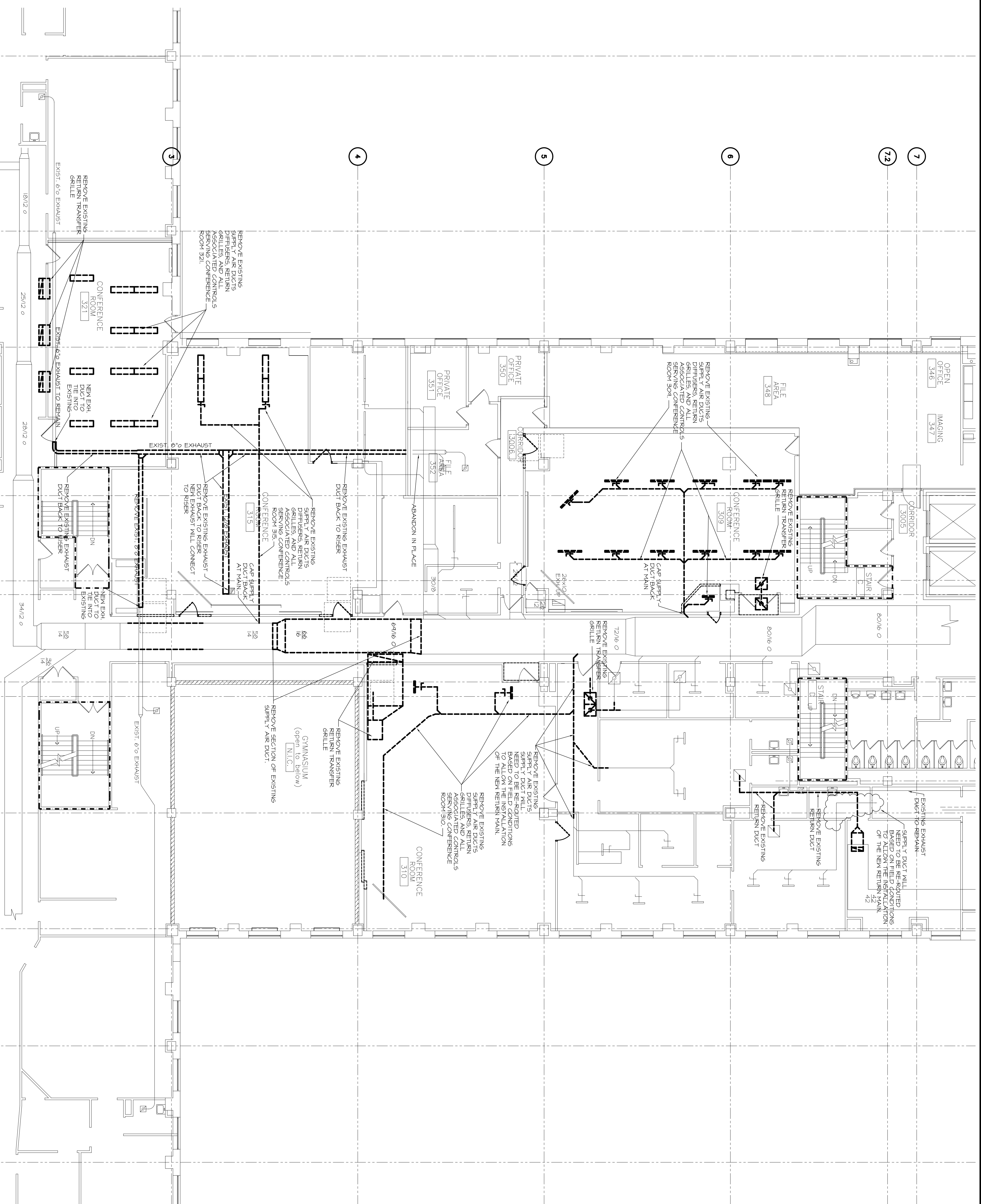
1. DEMO OF EXISTING DUCTWORK, DIFFUSERS, GRILLES AND CONTROLS BY OWNER. ALL CUTTING AND PATCHING AT OWNER COMPLETED. DEMO REMAINS WITH IN THE SCOPE OF WORK..

GENERAL NOTES:
 1. DEMO OF EXISTING DUCTWORK, DIFFUSERS, GRILLES AND CONTROLS BY OWNER. ALL CUTTING AND PATCHING AT OWNER COMPLETED DEMO REMAINS WITH IN THE SCOPE OF WORK.
 2. ALTERNATE BID 1: CONFERENCE ROOM 321 INCLUDING MANUAL SHOE.

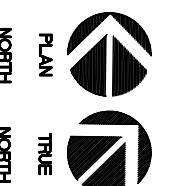
Architecture
 Planning

Donohue/Associates, Inc.
 849 E. Washington Ave., Ste 112
 Madison, Wisconsin 53703

ISSUED



1 THIRD FLOOR PLAN - HVAC DEMO
 1/8/21-20



PLAN NORTH
 TIME NORTH

PROJECT
 TENANT IMPROVEMENTS
 FIRST AND THIRD FLOOR
 CITY-COUNTY BUILDING
 210 MARTIN LUTHER KING,
 JR. BLVD., MADISON, WI

DRAWING
 THIRD FLOOR PLAN -
 HVAC DEMO
 DATE
 03.24.09

H1-3

ISSUED



LEGEND NOTES:
○ PROVIDE (2) 12X12 1 1/4 IN
1/2\"/>

1 FIRST FLOOR HVAC PLAN
DATE: 03.24.09

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR., BLVD., MADISON, WI

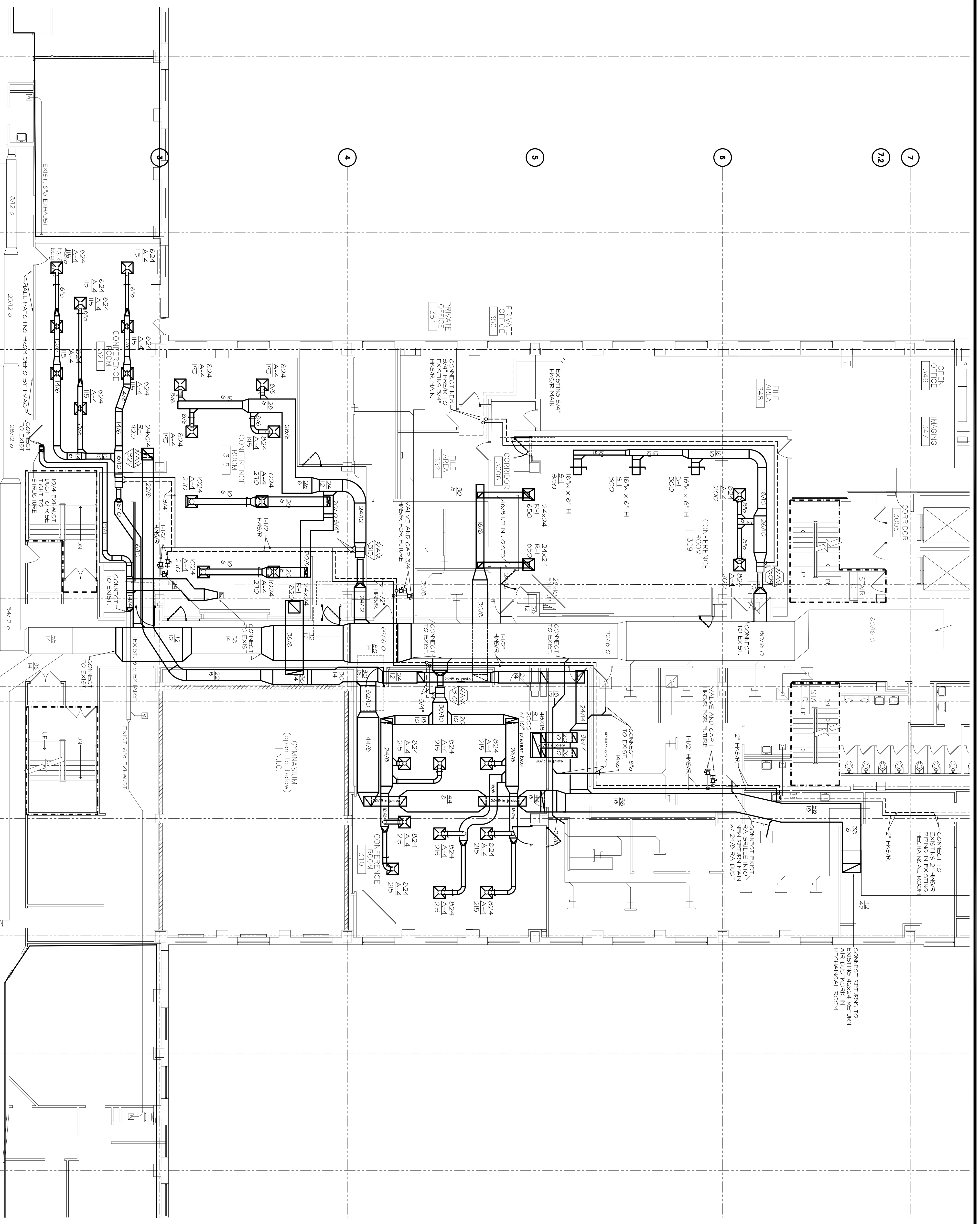
DRAWING
FIRST FLOOR HVAC PLAN-
NEW WORK

DATE
03.24.09

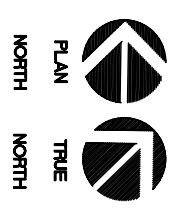
GENERAL NOTES:

- 1. ATTEN: RD 1: CONFERENCE ROOM 221 INCLUDING MANUAL SHUT.

ISSUED



1 THIRD FLOOR PLAN HVAC NEW WORK
1/8"=1'-0"



PLAN THE NORTH NORTH

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
THIRD FLOOR PLAN -
NEW WORK
DATE
03.24.09

H2-3

Architecture
Planning

USE
12x12" MARK NO.
R-2 GRILLE SIZE
300 CFM

KEY

USE
SUPPLY GRILLE S
RETURN GRILLE R
EXHAUST GRILLE E
TRANSFER GRILLE T

SUPPLY, RETURN, EXHAUST & TRANSFER GRILLE SCHEDULE

MARK NO.	GRILLE SIZE	MODEL NO.	FINISH	REMARKS
R1-1	12x12	50F	26	1/2x1/2x1 TITUS ALUM. EGG CRATE
R1-2	24x24	50F	26	1/2x1/2x1 TITUS ALUM. EGG CRATE

MARK
A-1 AIR PATTERN
A-2 ONE WAY
A-3 TWO WAY (OPPOSITE)
A-4 THREE WAY
A-5 FOUR WAY
TWO WAY (CORNER)

KEY

NECK SIZE
MARK NO. 1220
A-4 AIR PATTERN
DIFFUSER 200

FACE SIZE
AIR PATTERN

CEILING DIFFUSER SCHEDULE

MARK NO.	PANEL SIZE	FACE SIZE	NECK SIZE	MODEL NO.	FINISH	REMARKS
A	24x24	24x24	SEE PLANS	OMNI	26	TITUS SQUARE PLAQUE DIFFUSERS

HEAT EXCHANGER SCHEDULE - SHELL AND TUBE / STEAM TO WATER

NO. HX-	AREA AND EQUIPMENT OR SYSTEMS SERVED	MANUFACTURER	MODEL NUMBER	CAPACITY (BTUH)	SHELL		TUBES		APPROXIMATE SIZE (L X DIAMETER)	OPERATING WEIGHT (LBS.)	REMARKS			
					# STEAM/HR. (PSIG)	STEAM PRESS. (PSIG)	MATER. PD. (FT)	AREA (SQ FT)				NUMBER OF PASSES		
HX-1	SERVES 1ST FLOOR, LOCATED ON 2ND FLOOR	B & G	SUO-3-2	1207236	1q11.4	15	185	160	180	4.3	41.9	2	3'-0" X 10"	W/SUPPORT STAND

CIRCULATING PUMP SCHEDULE

PUMP NO. CIRC.	AREA OR SYSTEM SERVED	LOCATION	MANUFACTURER	MODEL NO. SIZE	GPM	HEAD FT	HP	RPM	REMARKS
1	REHEAT/ST. FLOOR	MECH RM, 2ND FLR	B & G	804X4X1/2	185	50	1/2	1750	
2	REHEAT/ST. FLOOR	MECH RM, 2ND FLR	B & G	804X4X1/2	185	50	1/2	1750	
3									
4									
5									

MOTOR STARTER SCHEDULE

ITEM NO.	DESCRIPTION	LOCATION	ELECTRICAL DATA				STARTER DESCRIPTION					STARTER CONTROLLED BY					CYCLE OF OPERATION FROM TEMPERATURE CONTROL				DISCONNECT		REMARKS						
			HP	VOLTS	PHASE	KVA	FURN. BY	LOCATION	TYPE	COVER	BLANK	S/S	H.O.A.	P.L.	TEMP. CONT.	MANUAL	INTEGRAL	REMOTE DEVICE	LOCATION	LOCK #	DAY	INTERM.		NIGHT	INTERM.	FURN. BY	WEATHER-PROOF	FUSED	NON-FUSED
1	CIRC. PUMP-1	MECH RM, 2ND FLR	1 1/2	480	3		MFR	NEAR PUMP MAG	*	*	*	*						BAS											
2	CIRC. PUMP-2	MECH RM, 2ND FLR	1 1/2	480	3		MFR	NEAR PUMP MAG	*	*	*	*						BAS											
3																													
4																													
5																													

VARIABLE AIR VOLUME BOX SCHEDULE

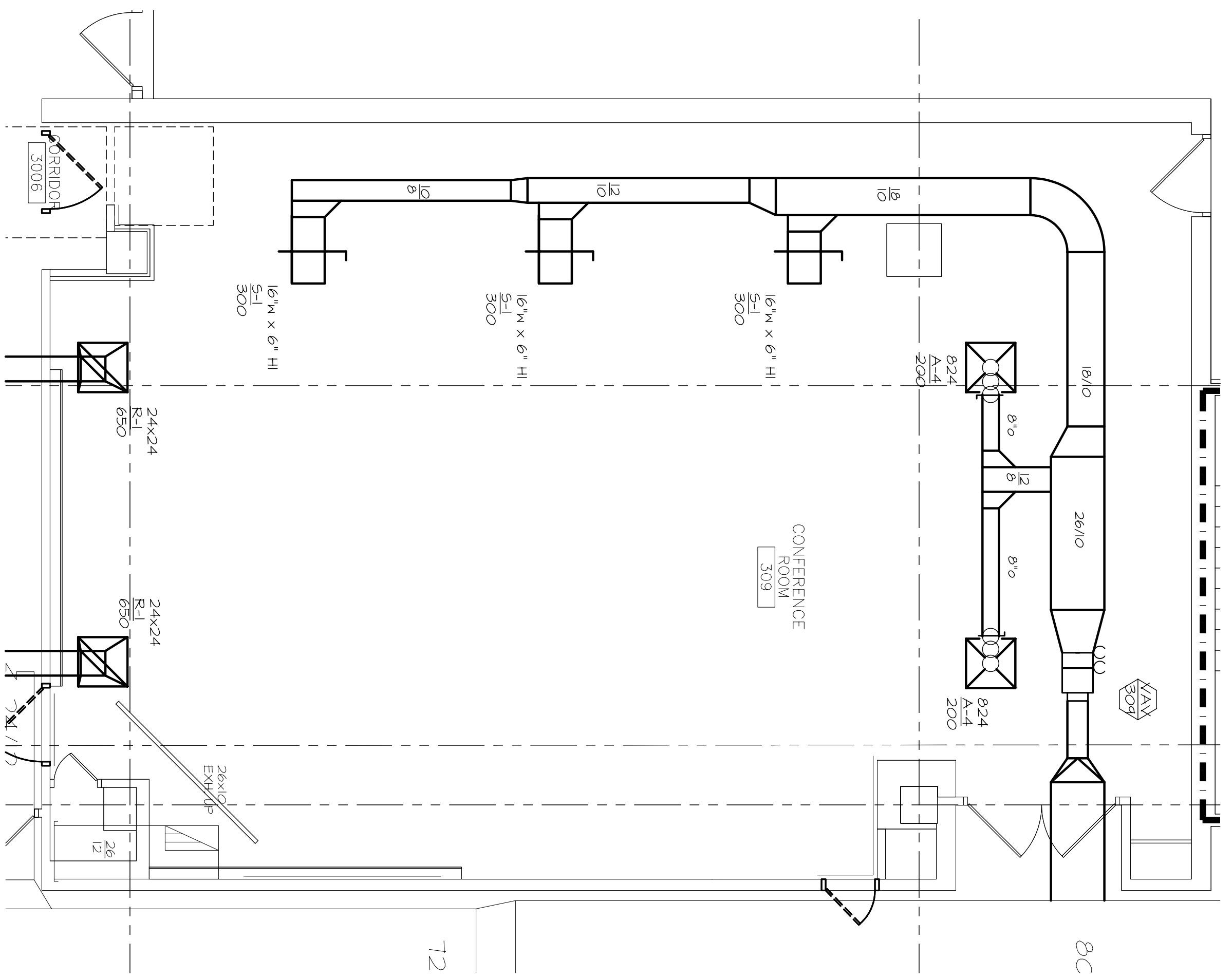
BOX NO. VAV-	AREA SERVED	MIN	CFM		MANUFACTURER	MODEL	SIZE	ROWS	EAT 1/8"	LAT 1/8"	HOT WATER COIL		LMT 1/8"	MBH CAPACITY	GPM	FACE AREA	FACE VELOCITY	DESIGN PRESS. DROP IN. WG	MAXIMUM N.C. AT UNIT OUTLET	REMARKS
			DESIGN	MAXIMUM							EHT 1/8"	LMT 1/8"								
1	LOBBY & OPEN OFF.	200/0	400	500	TT105	DESV	06	1	55	45	180	175	8.7	3.6		66	606	25	20	
2	OFF. CORR & COPY	250/0	500	650	TT105	DESV	07	1	55	45	180	173	11.2	3.2		103	530	25	23	
3	CONF. ROOM	200/0	300	350	TT105	DESV	05	1	55	45	180	154	6.5	0.6		66	530	25	24	
4	WORK AREA	100/0	100	225	TT105	DESV	04	1	55	103	180	144	4.6	0.3		66	340	25	25	
5	WORK ROOM	100/0	125	225	TT105	DESV	04	1	55	103	180	144	4.6	0.3		66	340	25	25	
6	OFFICE	110/0	320	350	TT105	DESV	05	1	55	45	180	168	7.6	1.2		66	484	25	21	
7	WORK RM. OFFICE	115/0	350	350	TT105	DESV	05	1	55	45	180	168	7.6	1.2		66	530	25	21	
8	OFFICE	110/0	320	350	TT105	DESV	05	1	55	45	180	168	7.6	1.2		66	484	25	21	
9	FILE ROOM	215/0	550	650	TT105	DESV	07	1	55	44	180	176	12.4	6.4		83	662	25	24	
10	OFFICE	100/0	200	350	TT105	DESV	05	1	55	45	180	147	5.2	0.3		66	303	25	21	
11	BREAK ROOM	100/0	110	225	TT105	DESV	04	1	55	103	180	149	4.6	3.6		66	257	25	25	
12																				
13																				
14																				
15																				

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

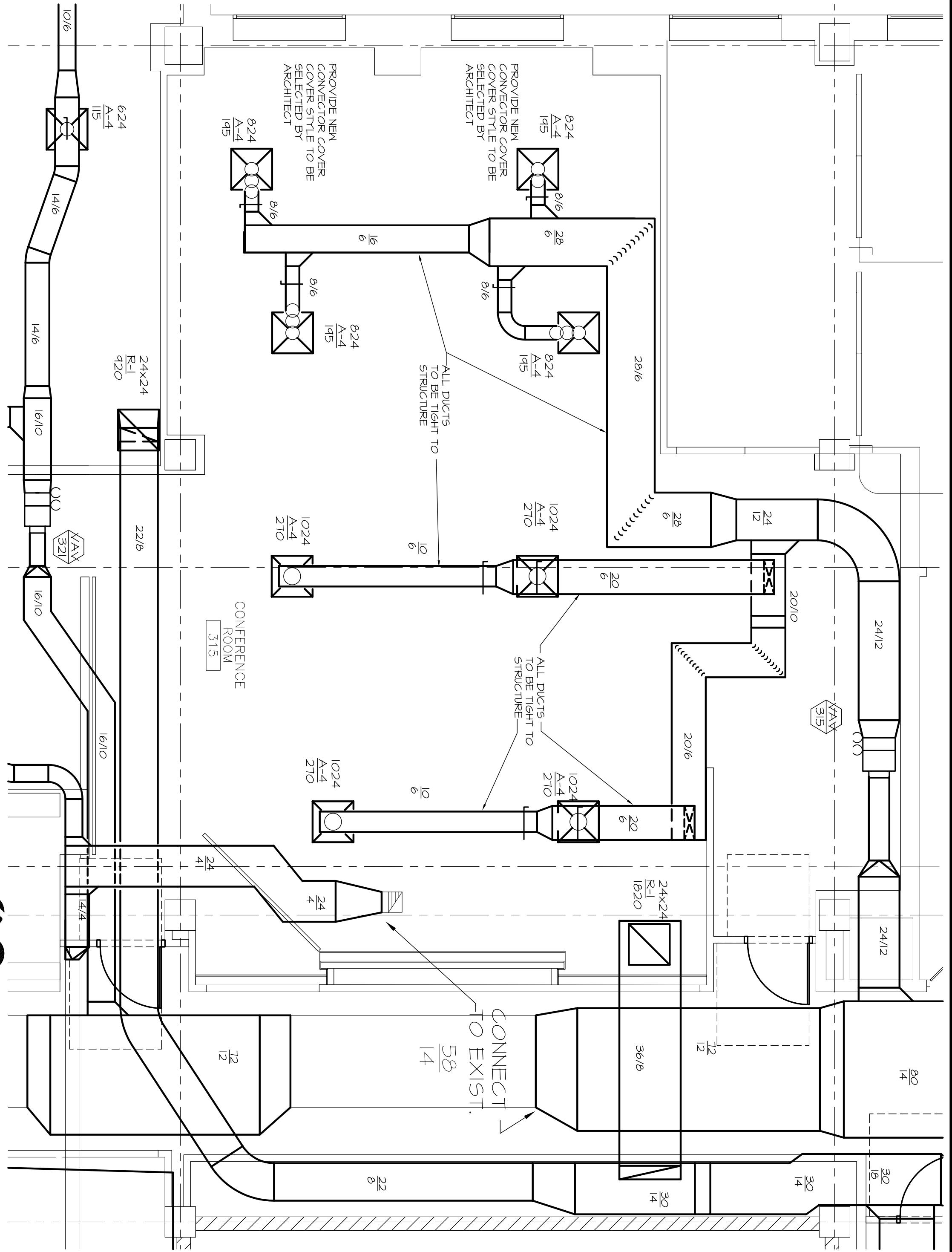
DRAWING
SCHEDULES

DATE
03.24.09

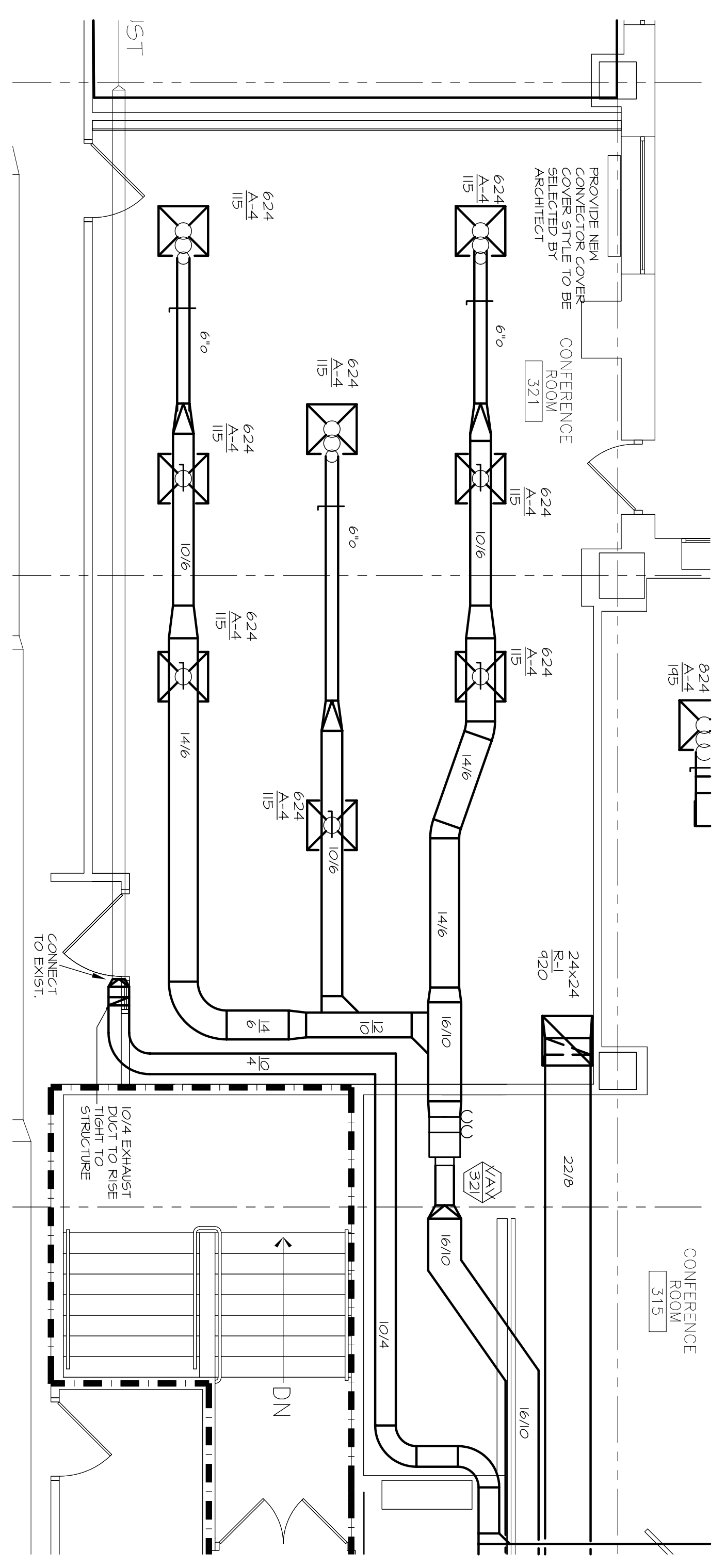
HS-1



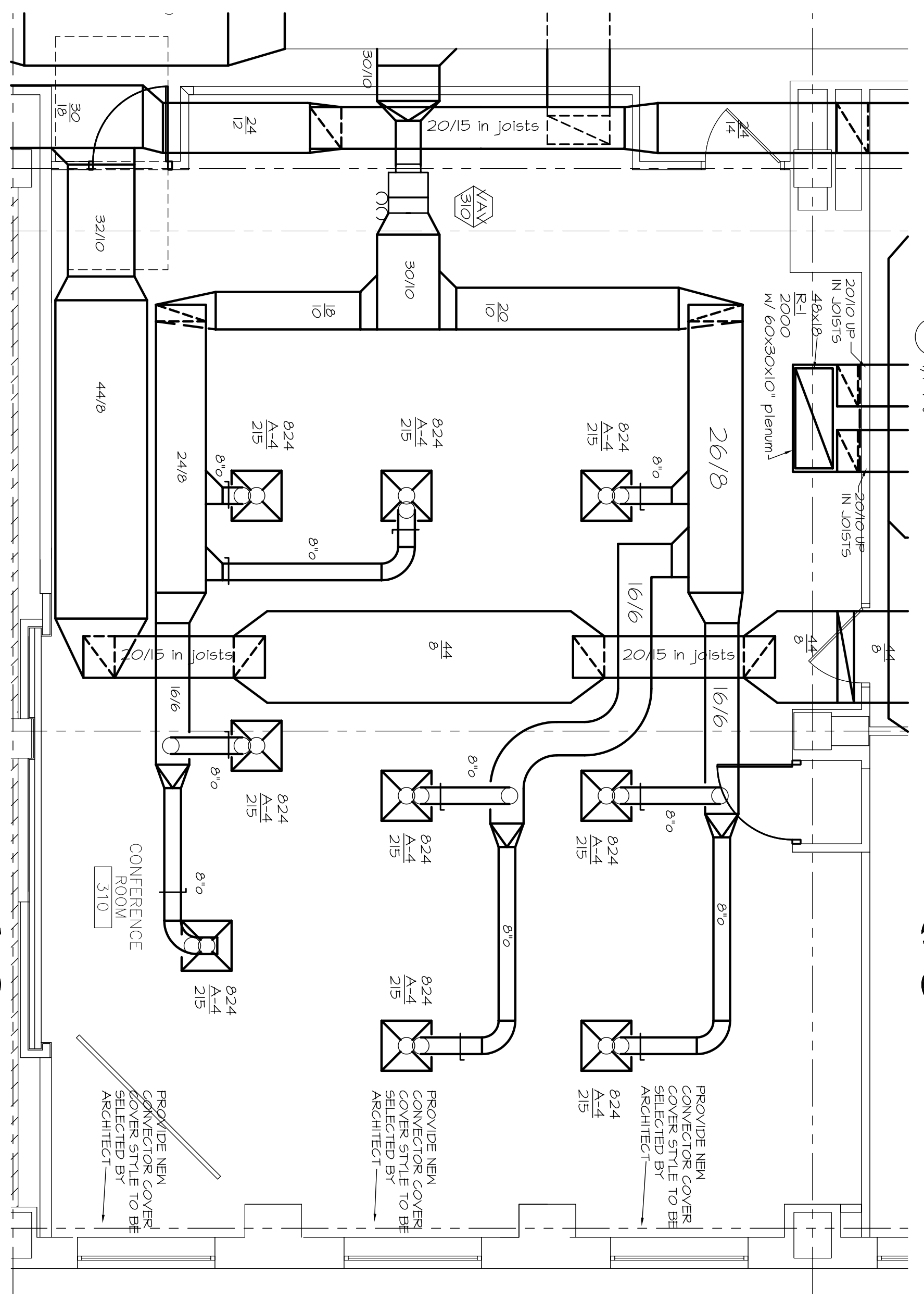
1 CONF. ROOM 309 HVAC NEW WORK
1/4"=1'-0"



2 CONF. ROOM 315 HVAC NEW WORK
1/4"=1'-0"

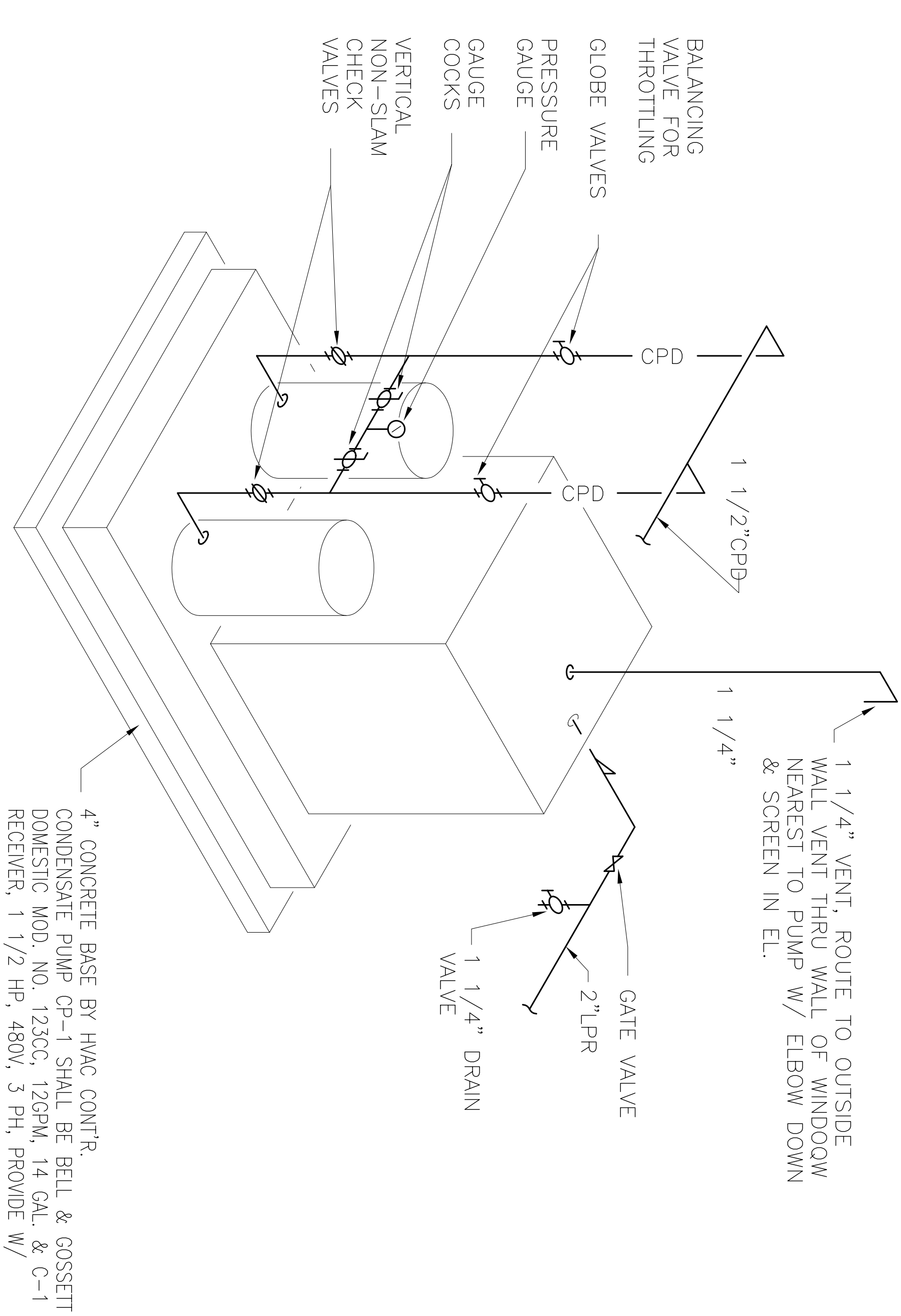


3 CONF. ROOM 321 HVAC NEW WORK (ALT. BID 1)
1/4"=1'-0"

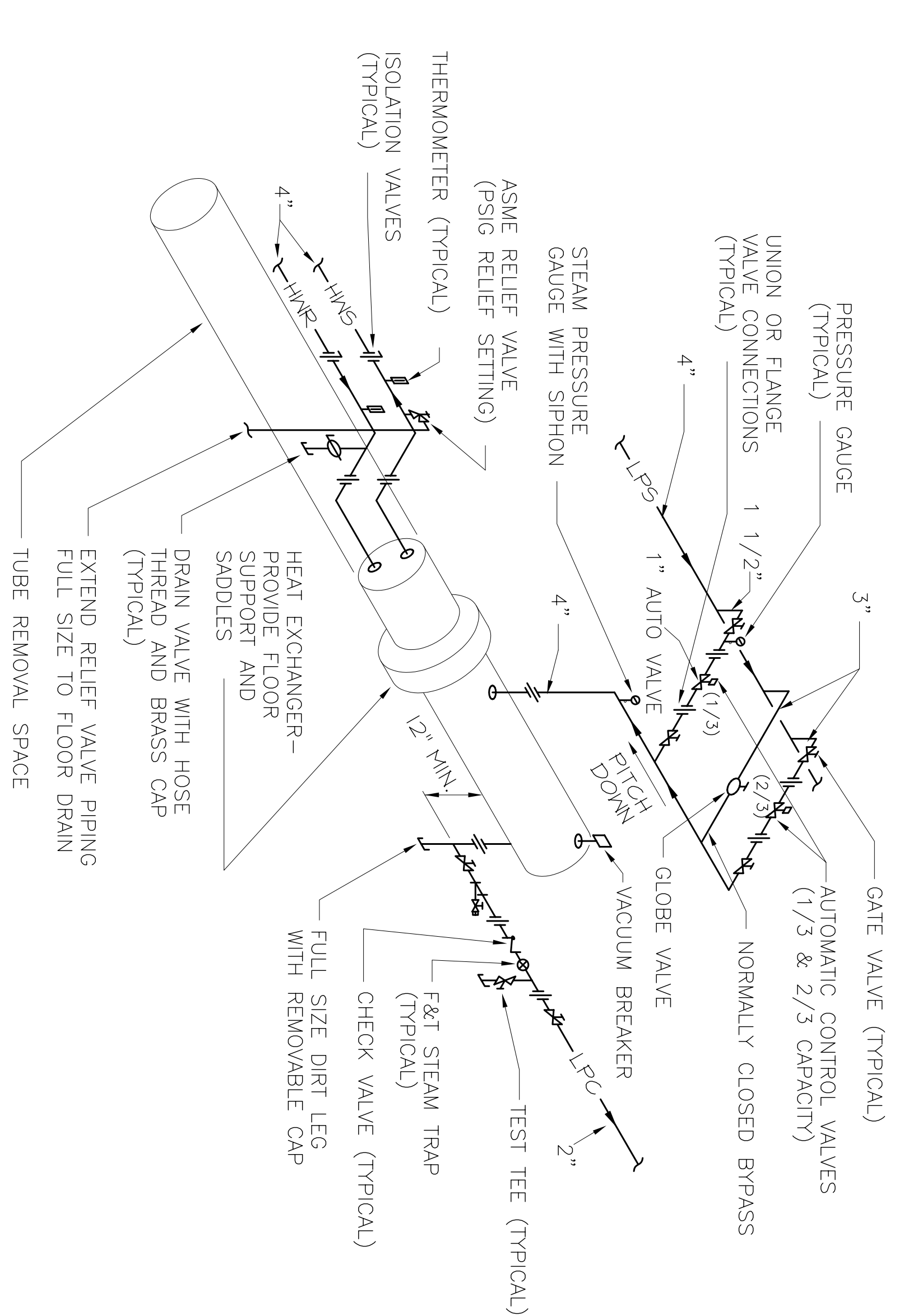


4 CONF. ROOM 310 HVAC NEW WORK
1/4"=1'-0"

**PIPING CONNECTIONS AT
DUPLIX CONDENSATE PUMP**
NO SCALE

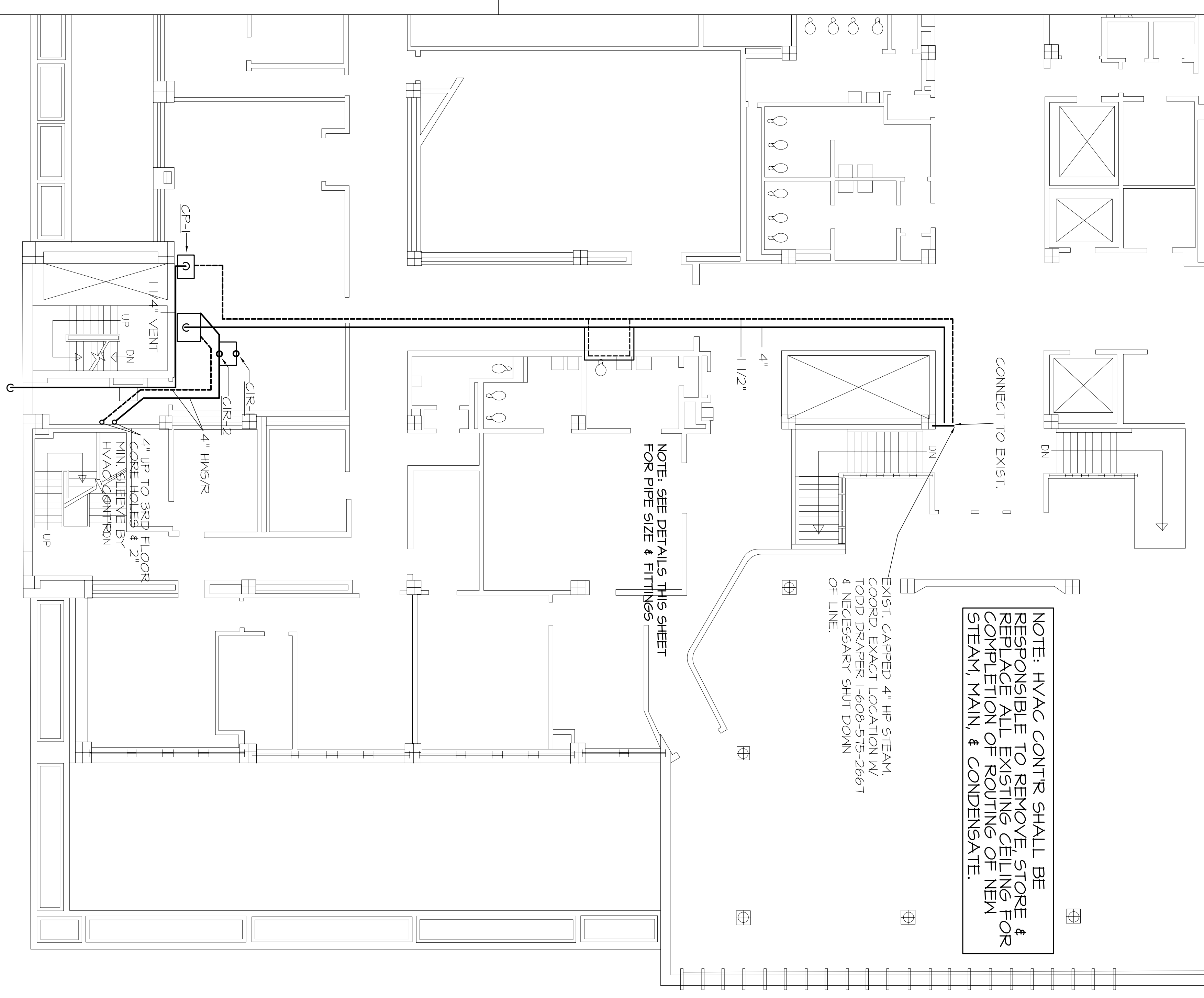


4" CONCRETE BASE BY HVAC CONTR.
CONDENSATE PUMP CP-1 SHALL BE BELL & GOSSETT
DOMESTIC MOD. NO. 1230C, 12GPM, 14 GAL. & C-1
RECEIVER, 1 1/2 HP, 480V, 3 PH, PROVIDE W/
ALTERNATOR, CONTROL PANEL, INLET STRAINER,
THERMOMETERS, LIFTING EYES.



**LOW PRESSURE STEAM TO HOT WATER
HEAT EXCHANGER PIPING DETAIL**
NO SCALE

NOTE: PROVIDE OFF-SETS AND FITTINGS AS REQUIRED FOR TUBE REMOVAL.



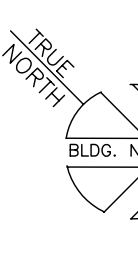
NOTE: HVAC CONTR SHALL BE RESPONSIBLE TO REMOVE STORE & REPLACE ALL EXISTING CEILING FOR COMPLETION OF ROUTING OF NEW STEAM, MAIN, & CONDENSATE.

NOTE: SEE DETAILS THIS SHEET FOR PIPE SIZE & FITTINGS

EXIST. CAPPED 4" HP STEAM,
COORD. EXACT LOCATION W/
TODD DRAPER 1-608-575-2661
& NECESSARY SHUT DOWN
OF LINE.

ALL WORK SHOWN ON THIS FLOOR
IS ALTERNATE BID NO. 6

CITY-COUNTY BUILDING
PARTIAL SECOND FLOOR PLAN
1/8"=1'



Architecture
Planning

Dorshner/Associates, Inc.
849 E. Washington Ave., Ste 112
Madison, Wisconsin 53703

PROJECT
TEWANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLDG., MADISON, WI

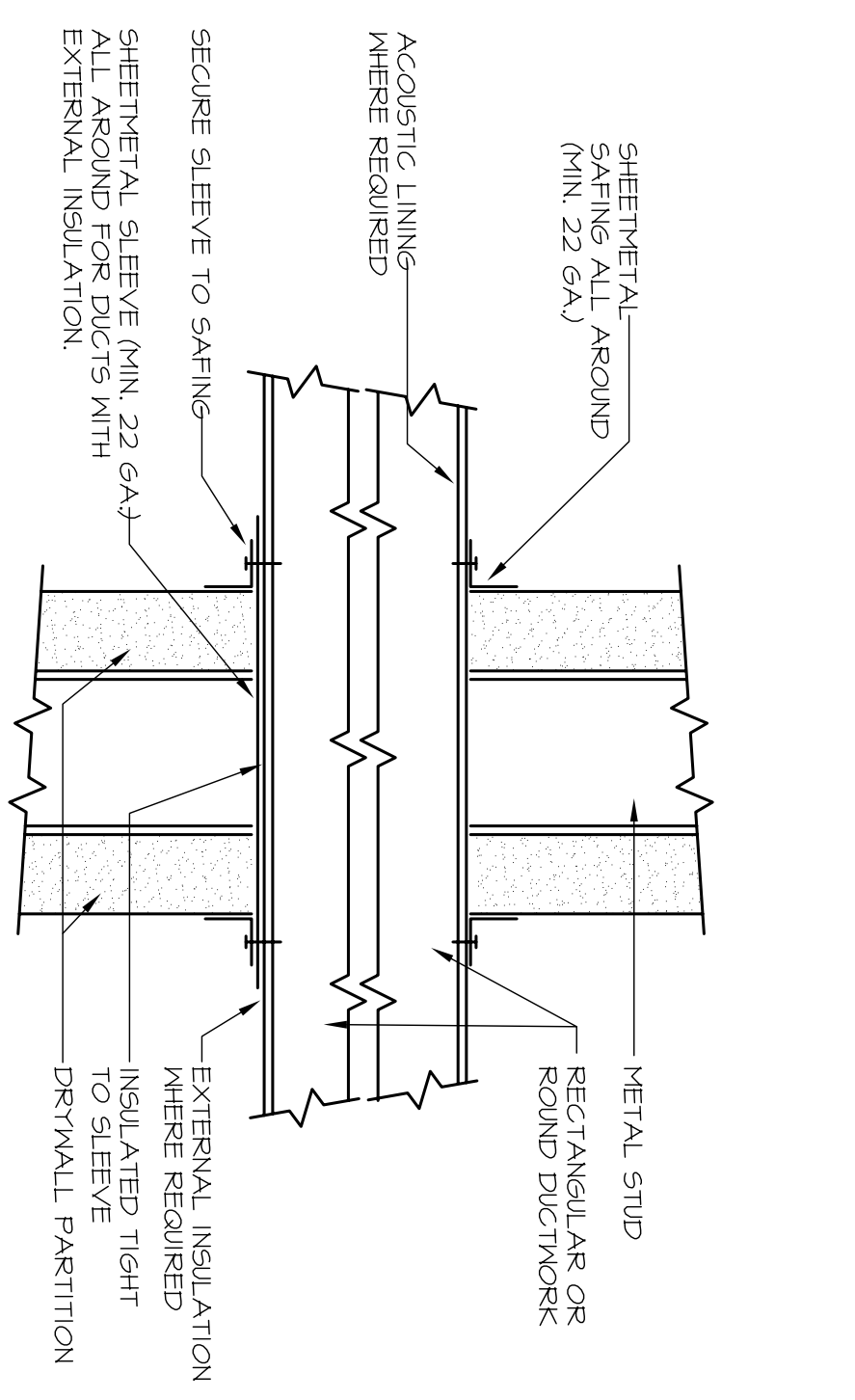
DRAWING
HVAC SCHEDULES AND
DETAILS

DATE
03.24.09

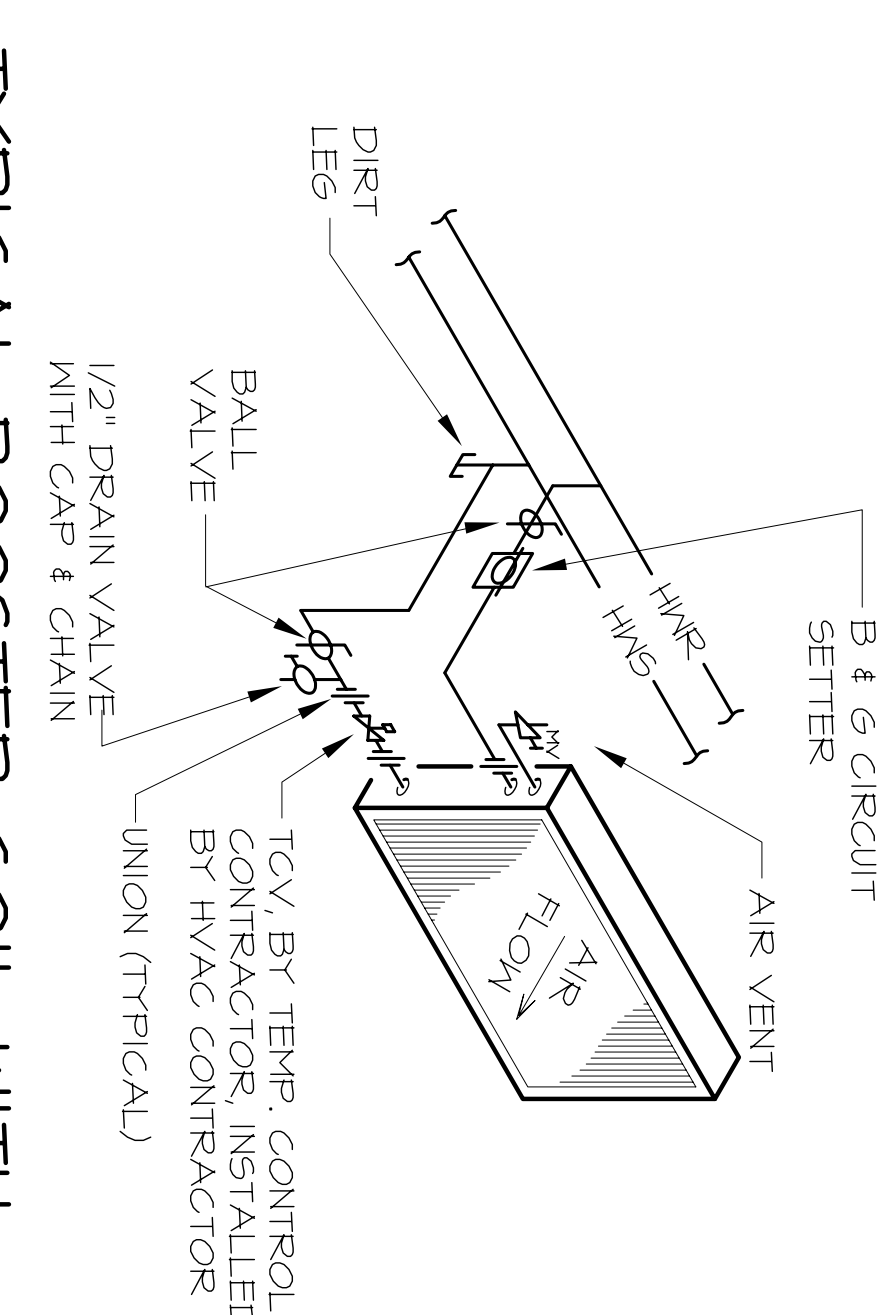
H4-3

		VAV BOX SCHEDULE																	
Tag	Manuf.	Model	Size			CFM			Static Pressure			Hot Water Heating Coil							
			Inlet	Outlet	Max	Inlet	Down	Min	Road	Disch.	CFM	MBH	EAT/LAT	ABQ	GMF	EMT/LMT	MPD	Rows	
VAV-304	TTUS	DESV	10	14x12.5	1300	340	1	0.25	0.25	25	23	750	36.4	55/100	0.64	2.5	180/148	0.4	1
VAV-310	TTUS	DESV	12	16x15	1935	580	1	0.25	0.25	25	23	965	46.4	55/100	0.64	2.5	180/148	1.1	2
VAV-315	TTUS	DESV	12	16x15	1860	560	1	0.25	0.25	25	23	950	45.2	55/100	0.60	2.5	180/139	1.0	2
VAV-521	TTUS	DESV	04	14x12.5	420	280	1	0.25	0.25	20	18	480	22.5	55/100	0.30	1	180/131	0.2	2

Notes:
1. Room NC level shown includes attenuation transfer functions from tables in ARI Standard 885-84.
2. Sound data shall be obtained from tests conducted in accordance with ARI Standard 880-44.
3. Selections based on TTUS as Manufacturer.
4. Duct dimensions are approximate. Check submittal drawings for exact dimensions.



DUCT PENETRATION THROUGH NON-FIRE RATED WALL
NOT TO SCALE



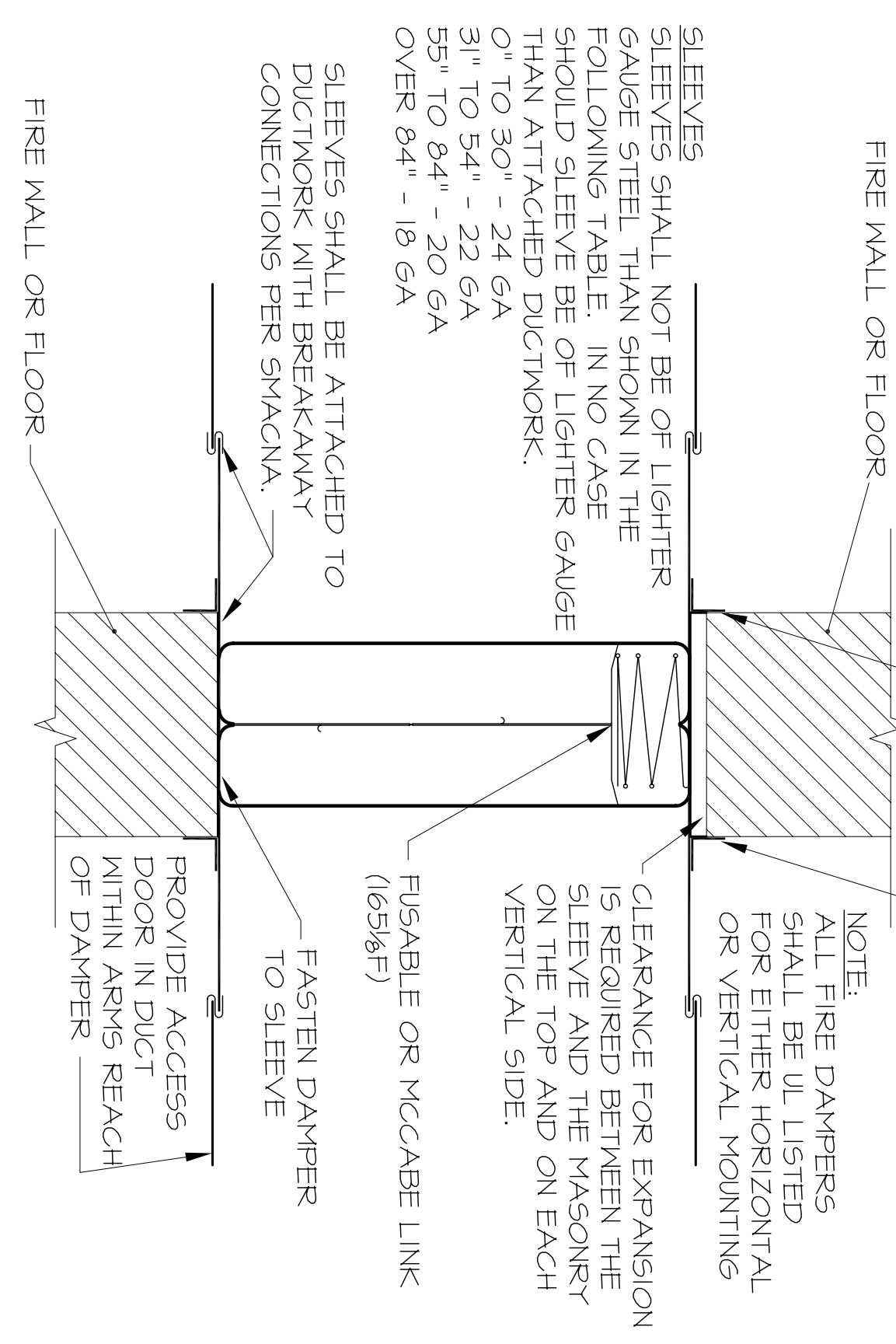
TYPICAL BOOSTER COIL WITH 2-WAY CONTROL VALVE HOT WATER PIPING CONNECTIONS
NOT TO SCALE

RETAINING ANGLES
ON ALL FOUR SIDES OF SLEEVE ON BOTH SIDES OF WALL. ANGLE SHALL BE OF THE FOLLOWING SIZES AND GAUGES. THEY SHALL BE SECURED A MINIMUM OF TWO INCHES FROM CORNERS.

DIMENSIONS ANGLES
0" TO 48" 1-1/2" x 1-1/2" x 12 GA
44" TO 72" 2" x 2" x 12 GA
OVER 72" 2" x 2" x 1/8"

RETAINING ANGLES SHALL LAP THE ENTIRE OPENING, THE ENTIRE OPENING.

1/2" WELDS 1/4" BOLTS #10 S.M. SCREEN
8" OL 8" OC 6" OC
6" OL 6" OC 6" OC
6" OL 6" OC NOT APPLICABLE



TYPICAL FIRE DAMPER INSTALLATION DETAIL FOR FLOOR OR WALL PENETRATION
NO SCALE

USE
SUPPLY GRILLE — S
RETURN GRILLE — R
EXHAUST GRILLE — E
TRANSFER GRILLE — T

SUPPLY, RETURN, EXHAUST & TRANSFER GRILLE SCHEDULE

MARK NO.	GRILLE SIZE	MODEL NO.	FINISH	REMARKS
E-14	SEE PLANS	50	BOW	TTUS ALUM. EDGEGRATE GRILLE
5-1	16M x 64H	300	BOW	TTUS DOUBLE DEFLECTION SIDEWALL SUPPLY GRILLE

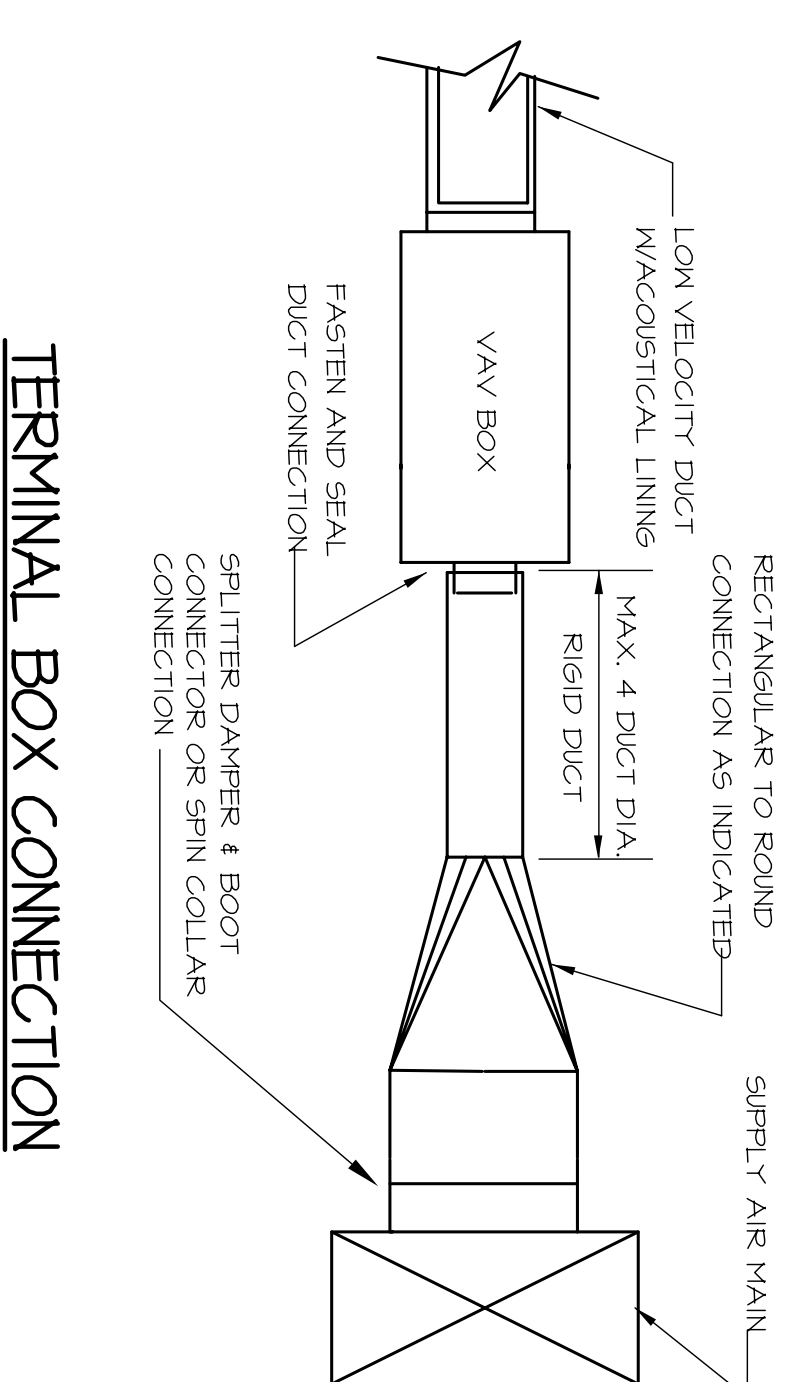
MARK — AIR PATTERN

A-1 ONE WAY
A-2 TWO WAY (OPPOSITE)
A-3 THREE WAY
A-4 FOUR WAY
A-5 TWO WAY (CORNER)

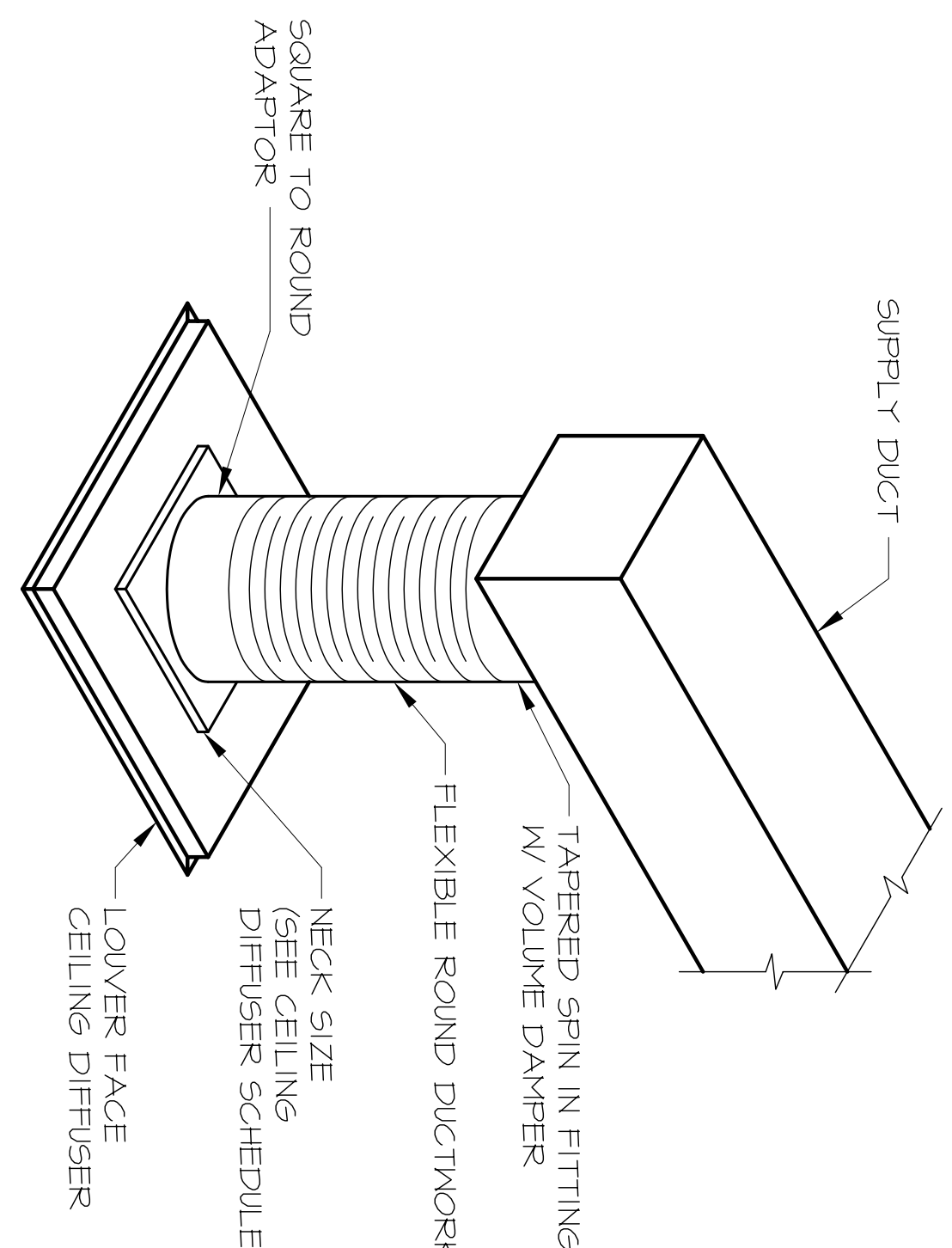
NECK SIZE —
MARK NO. 1220 AIR PATTERN
A-4 CFM
DIFFUSER 200

CEILING DIFFUSER SCHEDULE

MARK NO.	PANEL SIZE	FACE SIZE	NECK SIZE	MODEL NO.	FINISH	REMARKS
A	24x24	24x24	SEE PLANS	QMMI	BOW	SQUARE PLAQUE DIFFUSER



TERMINAL BOX CONNECTION
NOT TO SCALE



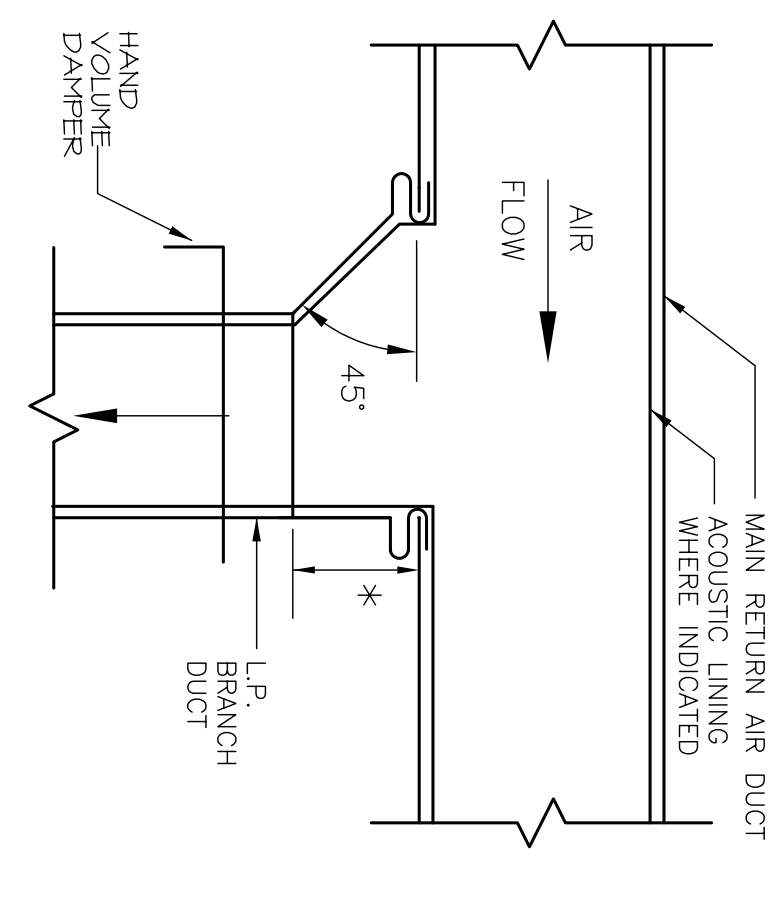
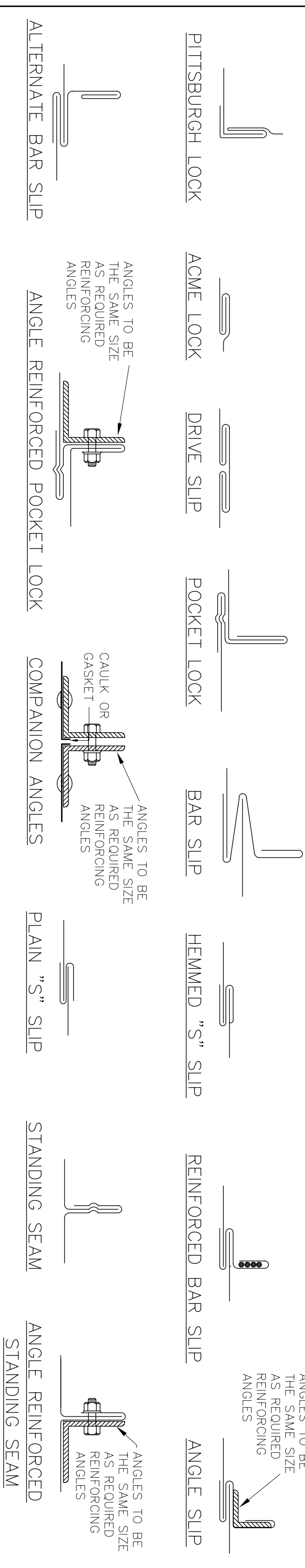
CEILING DIFFUSER DETAIL
NOT TO SCALE

ISSUED

THICKNESS & REINFORCING SCHEDULE - * LOW PRESSURE DUCTWORK

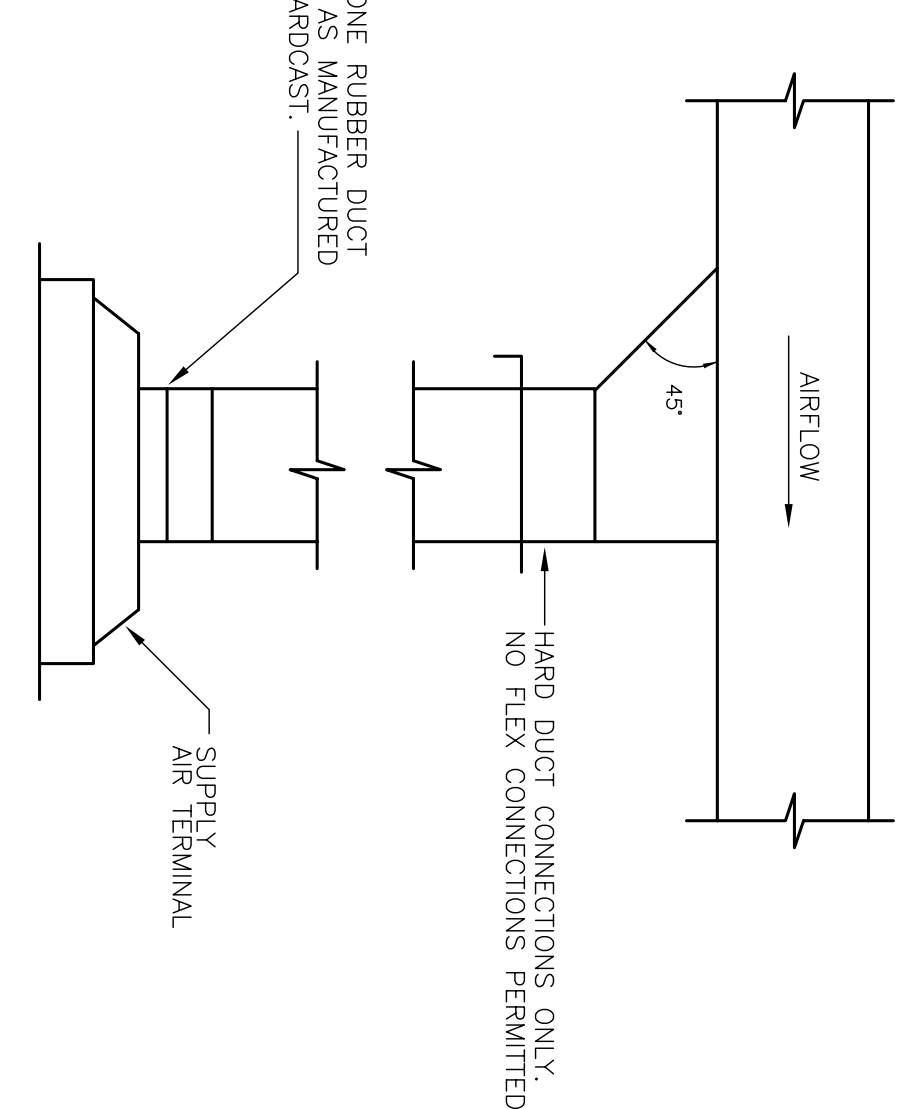
*NOTE: LOW PRESSURE DUCTWORK SHALL BE DUCTWORK IN WHICH THE PRESSURE DOES NOT EXCEED 2" WATER GAUGE.

GREATEST DUCT DIMENSION	STEEL DUCTS U.S. STANDARD GAUGE	ALUMINUM DUCTS B & S GAUGE	LONGITUDINAL SEAM	TRANSVERSE JOINT SMALLEST DIMENSION	TRANSVERSE JOINT GREATEST DIMENSION	REINFORCING (ALL DUCTS 18" THRU 54" SHALL BE CROSSBROKEN)
12" OR LESS	26	24(0.020)	PITTSBURGH OR ACME LOCK	DRIVE SLIP OR POCKET LOCK OR BAR SLIP	PLAIN "S" SLIP OR POCKET LOCK OR BAR SLIP	NONE REQUIRED
13" THRU 18"	24	22(0.025)	PITTSBURGH OR ACME LOCK	DRIVE SLIP OR POCKET LOCK OR BAR SLIP	PLAIN "S" SLIP OR POCKET LOCK OR BAR SLIP	NONE REQUIRED
19" THRU 30"	24	22(0.025)	PITTSBURGH OR ACME LOCK	HEMMED "S" SLIP OR BAR SLIP OR DRIVE SLIP OR POCKET LOCK	HEMMED "S" SLIP OR BAR SLIP OR DRIVE SLIP OR POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1/8" ANGLES AT 4 FT. O.C.
31" THRU 42"	22	20(0.032)	PITTSBURGH OR ACME LOCK	DRIVE SLIP 18" REINFORCED BAR SLIP OR LESS BAR SLIP REINFORCED BAR SLIP OR POCKET LOCK	BAR SLIP OR REINFORCED BAR SLIP OR POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1/8" ANGLES AT 4 FT. O.C.
43" THRU 54"	22	20(0.032)	PITTSBURGH LOCK	1 1/4" BAR SLIP OR REINFORCED BAR SLIP OR 1 1/2" POCKET LOCK	1 1/4" BAR SLIP OR REINFORCED BAR SLIP OR 1 1/2" POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1/8" ANGLES AT 4 FT. O.C.
55" THRU 60"	20	18(0.040)	PITTSBURGH LOCK	1 1/4" BAR SLIP OR REINFORCED BAR SLIP OR 1 1/2" POCKET LOCK	1 1/4" BAR SLIP OR REINFORCED BAR SLIP OR 1 1/2" POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1/8" ANGLES AT 4 FT. O.C.
61" THRU 84"	20	18(0.040)	PITTSBURGH LOCK	REINFORCED BAR SLIP OR ANGLE SLIP OR ALTERNATE SLIP OR ANGLE REINFORCED POCKET LOCK	REINFORCED BAR SLIP OR ANGLE SLIP OR ALTERNATE SLIP OR ANGLE REINFORCED POCKET LOCK	REINFORCE ALL SIDES OVER 60" WITH 1 1/2"x1 1/2"x1/8" ANGLES ON 2'-0" CENTERS. SIDES UNDER 60" NEED NO REINFORCING IF JOINTS ARE ON 4'-0" CENTERS. IF JOINTS ARE ON 8'-0" CENTERS REINFORCE WITH 1 1/2"x1 1/2"x1/8" ANGLES ON 4'-0" CENTERS.
85" THRU 96"	18	16(0.051) (LONGITUDINAL SEAM MAY BE STANDING SEAM)	PITTSBURGH LOCK	1 1/2" COMPANION ANGLE, OR ANGLE REINFORCED POCKET LOCK, OR 1 1/2" ANGLE SLIP OR REINFORCED BAR SLIP	1 1/2" COMPANION ANGLE, OR ANGLE REINFORCED POCKET LOCK, OR 1 1/2" ANGLE SLIP OR REINFORCED BAR SLIP	REINFORCE ALL SIDES OVER 84" WITH 1 1/2"x1 1/2"x3/16" ANGLES ON 2'-0" CENTERS. SIDES 61" THRU 84" REINFORCE WITH 1 1/2"x1 1/2"x1/8" ANGLES ON 2'-0" CENTERS. IF JOINTS ARE ON 8'-0" CENTERS REINFORCE WITH 1 1/2"x1 1/2"x1/8" ANGLES ON 4'-0" CENTERS. NO REINFORCING IF JOINTS ARE 4'-0" ON CENTER.
OVER 96"	18	16(0.051) (LONGITUDINAL SEAM MAY BE STANDING SEAM)	PITTSBURGH LOCK	2" COMPANION ANGLE, OR 2"x2"x1/4" ANGLE SLIP, OR 2"x2"x1/4" ANGLE REINFORCED POCKET LOCK, OR REINFORCED BAR SLIP	2" COMPANION ANGLE, OR 2"x2"x1/4" ANGLE SLIP, OR 2"x2"x1/4" ANGLE REINFORCED POCKET LOCK, OR REINFORCED BAR SLIP	REINFORCE ALL SIDES OVER 96" WITH 2"x2"x1/4" ANGLES ON 2'-0" CENTERS. SIDES 61" THRU 96" WITH 1 1/2"x1 1/2"x3/16" ANGLES ON 2'-0" CENTERS. SIDES 96" OR LESS NEED NO REINFORCING IF JOINTS ARE ON 4'-0" CENTERS. REINFORCE ALL SIDES UNDER 60" WITH 1 1/2"x1 1/2"x1/8" ANGLES IF JOINTS ARE 8'-0" ON CENTER. NO REINFORCING IF JOINTS ARE 4'-0" ON CENTER.

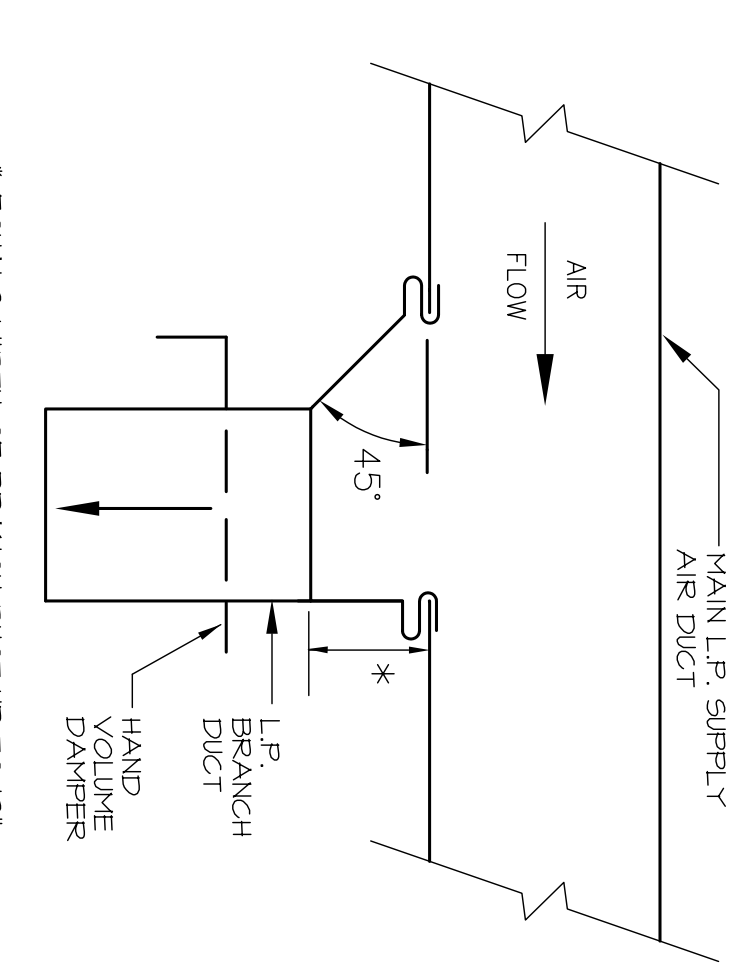


TYPICAL SUPPLY AIR BRANCH DUCT TAKE-OFF
NOT TO SCALE

*-EQUALS WIDTH OF BRANCH DUCT UP TO 12".
12" FOR ALL BRANCH DUCTS LARGER THAN 12".

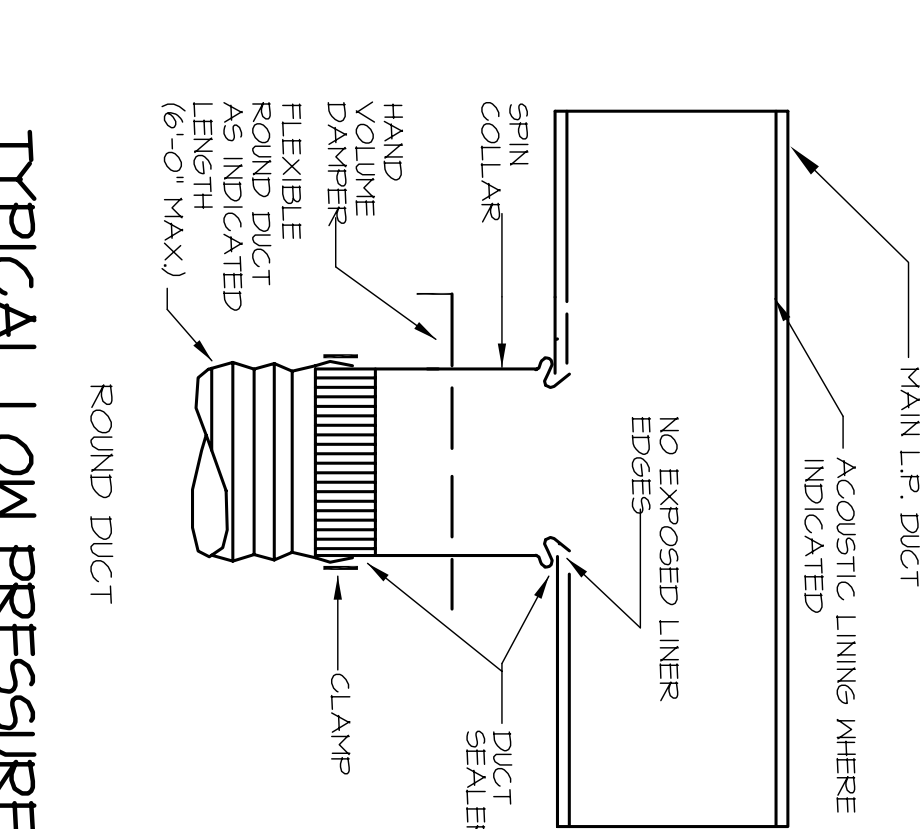


TYPICAL LOW PRESSURE BRANCH DUCT TAKE-OFF
NOT TO SCALE



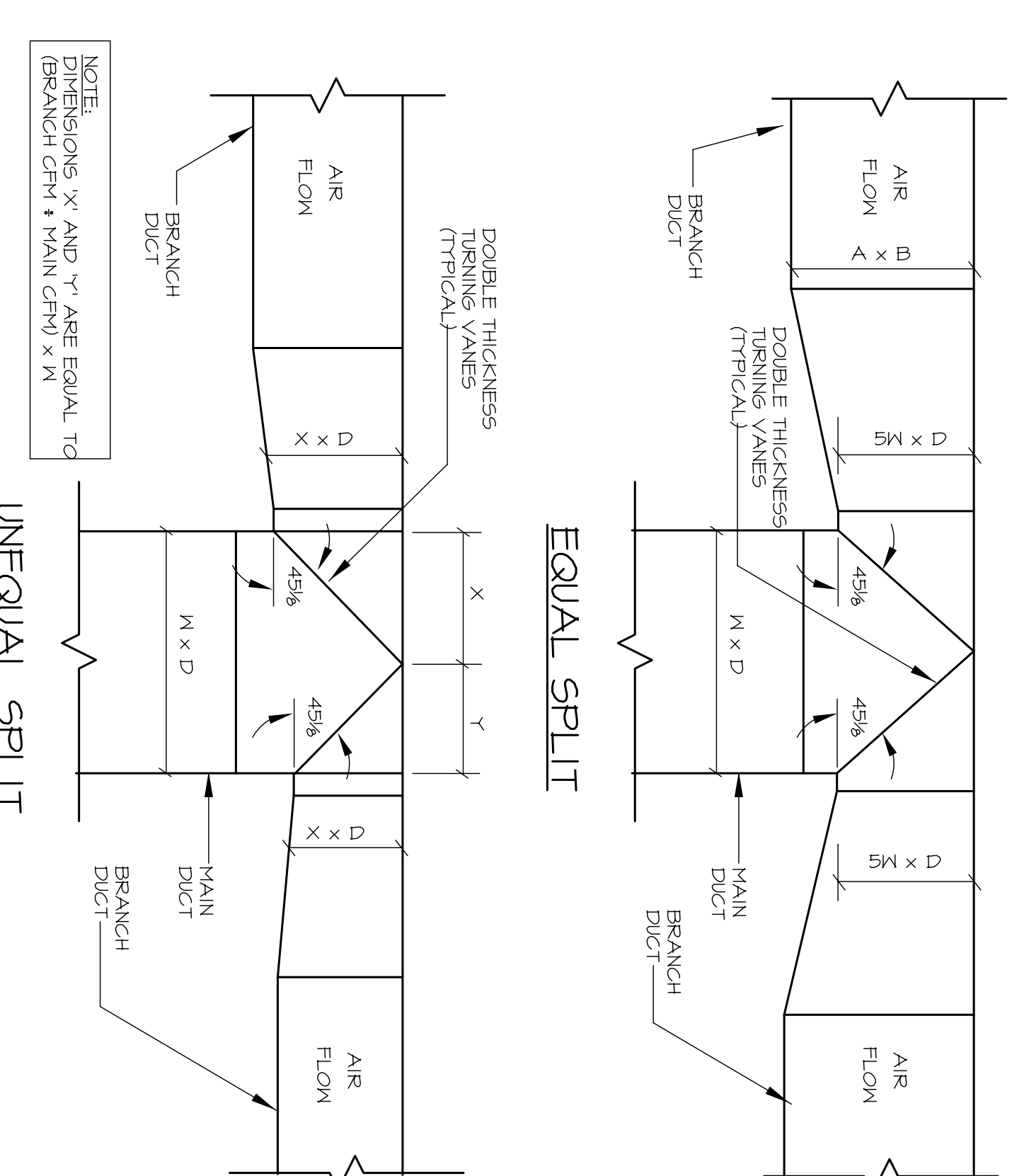
TYPICAL LOW PRESSURE BRANCH DUCT TAKE-OFF
NOT TO SCALE

*-EQUALS WIDTH OF BRANCH DUCT UP TO 12".
12" FOR ALL BRANCH DUCTS LARGER THAN 12".



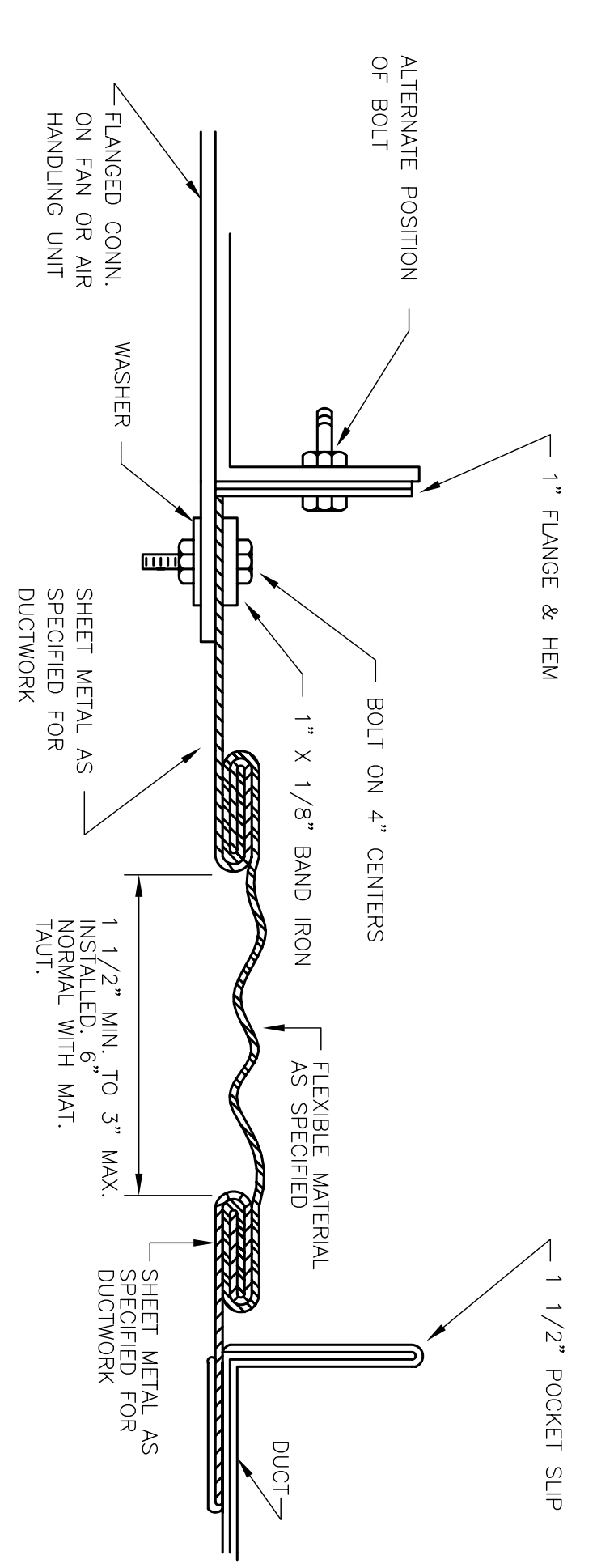
TYPICAL LOW PRESSURE BRANCH DUCT TAKE-OFF
NOT TO SCALE

*-EQUALS WIDTH OF BRANCH DUCT UP TO 12".
12" FOR ALL BRANCH DUCTS LARGER THAN 12".



EQUAL SPLIT
UNEQUAL SPLIT
DUCT TEE CONNECTION DETAIL
NOT TO SCALE

NOTE: DIMENSIONS 'X' AND 'Y' ARE EQUAL TO (BRANCH CFM + MAIN CFM) x M



RECTANGULAR FLEXIBLE CONNECTION DETAIL
N.T.S.

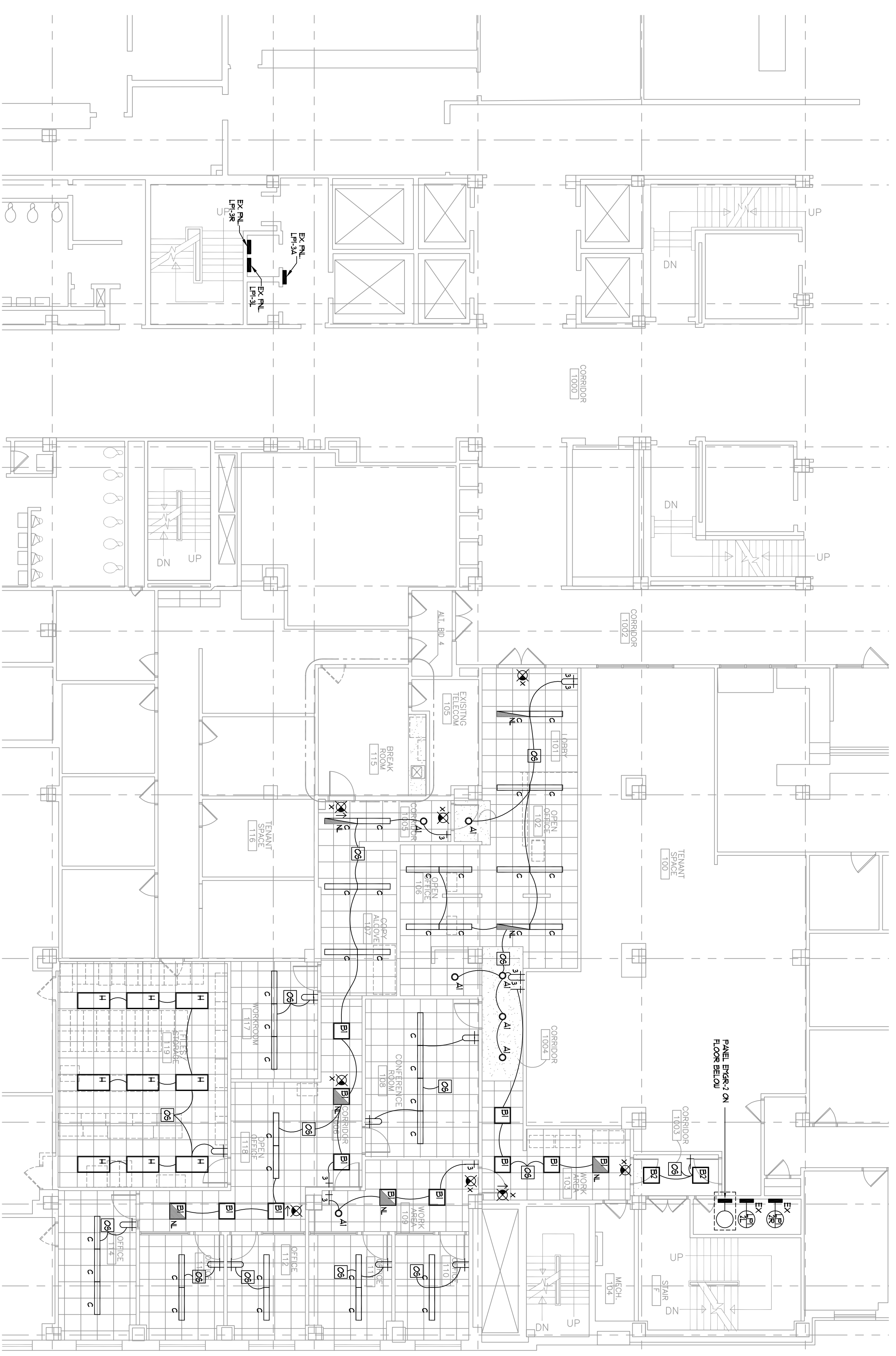
PROJECT
TEWANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLDG., MADISON, WI

DRAWING
HVAC DETAILS

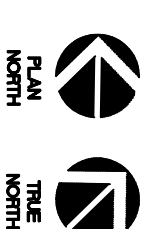
DATE
03.24.09

H5-3

ISSUED



1 PARTIAL FIRST FLOOR LIGHTING PLAN
7/8 8/1-9



- GENERAL NOTES:**
1. WIRE NIGHT LIGHT FIXTURES (NLI) TO CIRCUIT FROM GROUND FLOOR EMERGENCY PANEL, BREAK-2 (ONE LAMP BALLAST). OTHER LAMP SWITCHED AS SHOWN.
 2. WIRE NEW LIGHTING TO CIRCUITS ORIGINALLY SERVING REWBELED AREA. OBTAIN CIRCUITS AT PANEL(S).
 3. WIRE EXIT LIGHTS TO EXIT LIGHT CIRCUIT ORIGINALLY SERVING FLOOR.
 4. ELECTRICAL CONTRACTOR TO REMOVE ALL ABANDONED LIGHTING CONDUIT, WIRE AND CABLING.

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

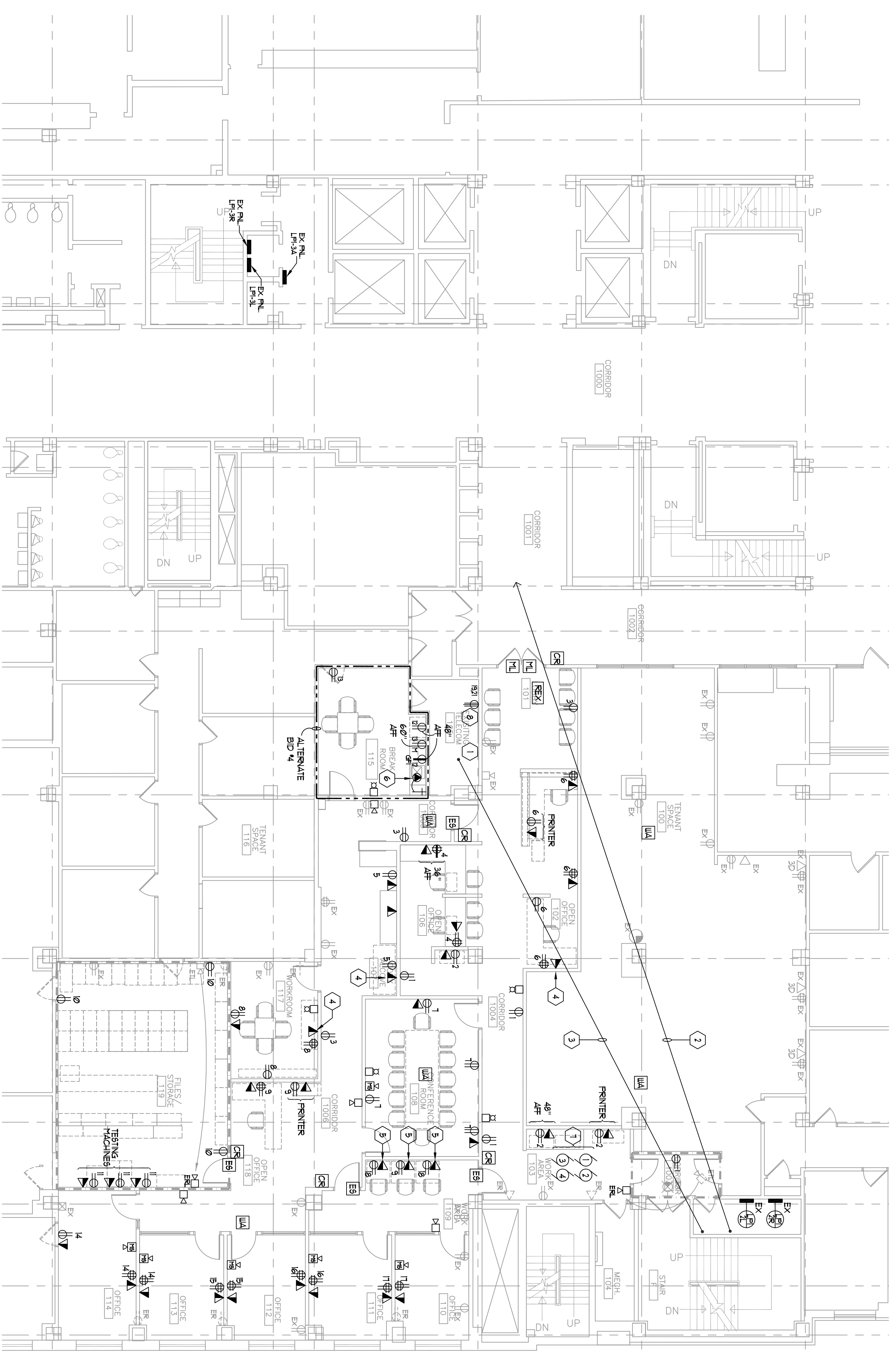
DRAWING
PARTIAL FIRST FLOOR
LIGHTING PLAN
DATE
03.24.09

E1.1

ISSUED

PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
PARTIAL
FIRST FLOOR
POWER PLAN
DATE
03.24.09



1 PARTIAL FIRST FLOOR POWER PLAN
7/8 31-9



- GENERAL NOTE:**
1. ELECTRICAL CONTRACTOR TO REMOVE ALL ABANDONED CONDUIT, WIRE AND CABLES.
 2. ALL CIRCUITS SHOWN TO BE WIRED TO PANEL, LPH/2, UNLESS OTHERWISE NOTED.

- KEYED NOTES:**
1. LOCATION OF CITY NETWORK CLOSET WITH TWO EXISTING RACKS.
 2. EXISTING FIBER INTERCONNECT PATH TO OLD NETWORK CLOSET. THIS SHALL BE PULLED BACK AND RE-ROUTED AS SHOWN TO ROOM 105.
 3. NEW ROUTE FOR EXISTING FIBER TO NEW RACK. PROVIDE NEW RACK LOCATED IN REAR SPACE ADJACENT TO OTHERS. THIS NEW RACK WILL BE USED TO LOCATE A TAPER PATCH PANEL, SWITCHES AND THE UPS.
 4. PROVIDE ONE (1) A/TT PHONE LINE FOR FAX MACHINE. REMAINDER OF CABLES TO BE PATCHABLE. ALL CABLES TO BE CAT 6.
 5. PROVIDE ONE (1) A/TT PHONE LINE FOR WIRELESS DIRECT LINE. REMAINDER FOR CABLES TO BE PATCHABLE. ALL CABLES TO BE CAT 6.
 6. GARBAGE DISPOSER.
 7. LOCATION OF CONC-12 AND CONC-12 ON SECOND FLOOR SEE ADDENDUM FOR CIRCUITS.
 8. PROVIDE A 20A 3P 3 WIRE GROUNDING RECEPTACLE AT THE NEW ELECTRONICS RACK. PROVIDE NEW 20A-3P BREAKER IN LPH/2 TO FEED LOCATION.

Architecture
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849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703

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ISSUED

KEYED NOTES:

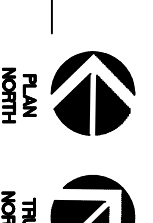
- 1 OCCUPANT SENSOR TO CONTROL ALL FIXTURES IN ROOM PROVIDE LITRON SIVOLA OR COMPATIBLE DEVICES IN THIS ROOM INCLUDING CONTROL DEVICES.
- 2 NOT USED
- 3 ALL ELECTRICAL WORK IN ROOM 521 ARE UNDER ALTERNATE BID #
- 4 PROVIDE LITRON SIVOLA EYE OR FORK CONTROL STATION MODEL 683-4026-ENG.
- 5 PROVIDE LITRON SIVOLA OR WALL STATION CONNECT TO CONTROL STATION VIA LITRON EXH-CEL-14L.

GENERAL NOTES:

- 1 ELECTRICAL CONTRACTOR SHALL REMOVE ALL ABANDONED LIGHTING CONDUIT, WIRE AND CABLING.
- 2 WIRE NEW LIGHTING TO CIRCUITS ORIGINALLY SERVING REMODELED AREA OBTAIN CIRCUITS AT PANEL(S).
- 3 WIRE EXIT LIGHTS TO EXIT CIRCUIT ORIGINALLY SERVING FLOOR.
- 4 ELECTRICAL CONTRACTOR TO REMOVE ALL ABANDONED LIGHTING CONDUIT, WIRE AND CABLING.
- 5 ALL SIGHTING DESIGNATIONS SHOWN ON PLANS FOLLOW THE FORMAT OF ROOM NUMBER-ZONE NUMBER-EX 3102-1.



1 PARTIAL THIRD FLOOR LIGHTING PLAN
1/8"=1'-0"



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
PARTIAL THIRD FLOOR
LIGHTING PLAN
DATE
03.24.09

E2.1

Architecture
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030824
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1099 QUAIL COURT, SUITE 100 - FENWICK, WI 53072
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WEB PAGE: www.cengr.com

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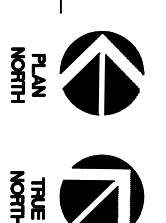
- KEYED NOTES:**
- 1 FINISH WIRELESS ACCESS POINT.
 - 2 ROUTING FOR ELECTRIC STRIKE AND CARD READER, CARD READER, ELECTRIC STRIKE AND CAGING ARE PROVIDED BY OWNER. COORDINATE WITH INNOVATIVE SYSTEMS (CALL JEFF STIER AT 441-161-1350).
 - 3 EXHAUST FAN TO BE REMOVED AND REINSTALLED COORDINATE WITH HVAC CONTRACTOR.
 - 4 PROVIDE WIREMOLD & EVOLUTION & ATP SERIES POKE THROUGH DEVICE WITH A/F FEED THROUGH COLOR FERR ARCHITECT.
 - 5 ROUTE 2" HT FIBER FROM THIS LOCATION TO 3RD FLOOR IT ROOM ALONG ROUTE SHOWN. ALL DATA FOR THIS PROJECT SHALL ORIGINATE FROM THIS ROOM.
 - 6 ELECTRICAL CONNECTION FOR MOTORIZED SHADERS ARE UNDER ALTERNATE BID #1.
 - 7 ELECTRICAL CONNECTION FOR MOTORIZED SHADERS ARE UNDER ALTERNATE BID #1. CONTROL THROUGH GRAK ETE SYSTEM.
 - 8 ALL ELECTRICAL WORK IN ROOM 521 AND CARD READER ARE UNDER ALTERNATE BID #1.
 - 9 PROVIDE CEILING MOUNTED JUNCTION BOX ABOVE CENTER OF CEILING GRADE WITH 1/2" CONDUIT BACK TO ELECTRICAL PANEL. INCLUDE 2" HT IN CONDUIT FOR FIBER PROJECTION SCREENS. EXTEND 1/2" CONDUIT TO WALL BOX FOR CONTROLLER. VERIFY LOCATION WITH OWNER.

GENERAL NOTE:

1. ELECTRICAL CONTRACTOR SHALL REMOVE ALL ABANDONED CONDUIT, WIRE AND CAGING.
2. WIRE NEW RECEPTACLES TO EXISTING CONSTANT CIRCUIT SERVING AREA.



1 PARTIAL THIRD FLOOR POWER PLAN
1/8"=1'-0"



PROJECT
TENANT IMPROVEMENTS
FIRST AND THIRD FLOOR
CITY-COUNTY BUILDING
210 MARTIN LUTHER KING,
JR. BLVD., MADISON, WI

DRAWING
PARTIAL THIRD FLOOR
POWER PLAN
DATE
03.24.09

E2.2

ELECTRICAL SYMBOLS

- FLUORESCENT STRIP
- FLUORESCENT RECESSED FIXTURE
- FLUORESCENT SURFACE OR PENDANT FIXTURE
- FLUORESCENT WALL BRACKET
- RECESSED FIXTURE
- SURFACE FIXTURE
- WALL WASH FIXTURE
- WALL MOUNTED FIXTURE
- SINGLE POLE TOGGLE SWITCH (3) THREE WAY (4) FOUR WAY (K) KEY (P) PILOT LIGHT (OS) OCCUPANCY SENSOR MOUNT 48" ABOVE FLOOR TO TOP OF BOX
- DUAL LEVEL SWITCH (3) THREE WAY (4) FOUR WAY (K) KEY (P) PILOT LIGHT (OS) OCCUPANCY SENSOR MOUNT 48" ABOVE FLOOR TO TOP OF BOX
- PROVIDE LUTRON NOVA-1 NF-10 WALL BOX DIMMER (COLOR PER ARCHITECT)
- LIGHTING CONTROL STATION
- DUPLEX RECEPTACLE B" ABOVE FLOOR TO BOTTOM OF BOX OR HEIGHT AS INDICATED
- DOUBLE DUPLEX RECEPTACLE B" ABOVE FLOOR TO BOTTOM OF BOX OR HEIGHT AS INDICATED
- DUPLEX RECEPTACLE HORIZONTAL ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE HORIZONTAL ABOVE COUNTER
- DUPLEX RECEPTACLE FLUSH IN FLOOR OR (P) PRECAST MOUNTED
- TELEPHONE OUTLET B" ABOVE FLOOR TO BOTTOM OF BOX - (U) WALL PHONE B" MAX. IF SIDE ACCESSIBLE OR 48" MAX. IF FORWARD ACCESSIBLE ONLY. HEIGHT MEASURED FROM FLOOR TO TOP OF BOX (P) PAY PHONE
- VOICE DATA OUTLET
- SPECIAL OUTLET
- MOTOR
- DISCONNECT SWITCH
- JUNCTION BOX
- FLUORESCENT FIXTURE
- TELEVISION OUTLET B" ABOVE FLOOR TO BOTTOM OF BOX OR HEIGHT AS INDICATED - PROVIDE 3/4" GLEBE TO ACCESSIBLE CEILING
- CARD READER - EC TO ROUGH IN
- ELECTRIC STRIKE - EC TO ROUGH IN
- MAG LOCK - EC TO ROUGH IN PROVIDE FIRE ALARM CONTROL MODULE TO RELEASE DOOR ON ALARM
- REQUEST TO EXIT SENSOR - EC TO ROUGH IN
- APPLIER BY AV CONTRACTOR - SEE RISER ON THIS SHEET FOR ROUGH IN
- BREAKER BY AV CONTRACTOR - SEE RISER ON THIS SHEET FOR ROUGH IN
- OCCUPANCY SENSOR
- WIRELESS ACCESS POINT PROVIDE (1) CAT 6 CABLE TERMINATED ON R45 JACK COIL UP 8X FEET STRIP CABLE AT WIRELESS ACCESS POINT. PLACE 3 OF BLACK ELECTRICAL TAPE ON THE BAR JUST BELOW WIRELESS ACCESS POINT.
- CEILING MOUNTED EXIT SIGN
- WALL MOUNTED EXIT SIGN
- ELECTRICAL PANEL
- DETAIL NUMBER
- NOTE OR DETAIL SYMBOL
- SHEET LOCATION

FIRE ALARM SYMBOLS

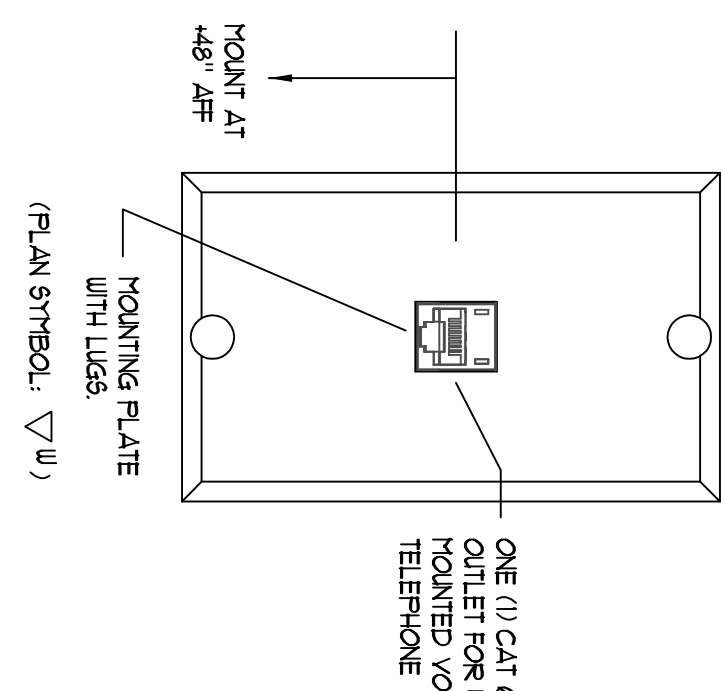
- NEW SPEAKER/STROKE 80' AP TO BOTTOM OF BOX OR 6' DOWN FROM CEILING TO TOP OF BOX (WHICHEVER IS LOWER)
- NEW FIRE ALARM STROKE - ADA RATED 80' TO BOTTOM OF BOX OR 6' DOWN FROM CEILING TO TOP OF BOX (WHICHEVER IS LOWER)

ELECTRICAL ABBREVIATIONS

- AFR ABOVE FINISHED FLOOR
- AFB ABOVE FINISHED GRADE
- BOG BUILT IN OVERHEAD CONDUIT
- CB CIRCUIT
- COMB COMBINATION STARTER
- D DEDICATED
- DD DOUBLE DUPLEX
- EC ELECTRICAL CONTRACTOR
- EUC ELECTRICAL UTILITY COOLER
- ER EXISTING RELOCATED (NEW LOCATION)
- ETL EXISTING TO REMAIN (OLD LOCATION)
- EX EXISTING TO REMAIN
- EXC EXISTING TO REMAIN
- FACP FIRE ALARM CONTROL PANEL
- GC GENERAL CONTRACTOR
- GFI GROUND FAULT INTERRUPTER
- HV HEATING AND VENTILATION CONTRACTOR
- IG ISOLATED GROUND
- IR IN ROOM
- N ROOM
- MANUAL MANUAL STARTER
- MAG MAGNETIC STARTER
- MCA MINIMUM CIRCUIT AMPACITY
- NC NOT IN CONTRACT
- NL NEAR LIGHT
- NU NEAR UNIT
- PB PULL BOX
- PC PULLING CONTRACTOR
- PCB RELOCATED VOLTAGE STARTER
- RV REPAIRMAN 48 IS
- R41 SEPARATE CIRCUIT
- SC SPEED SWITCH
- SW SWITCH
- TC THERMOCOOL
- TS THERMOSTAT
- TC UNIT MANUFACTURER
- UP UNDERPASS

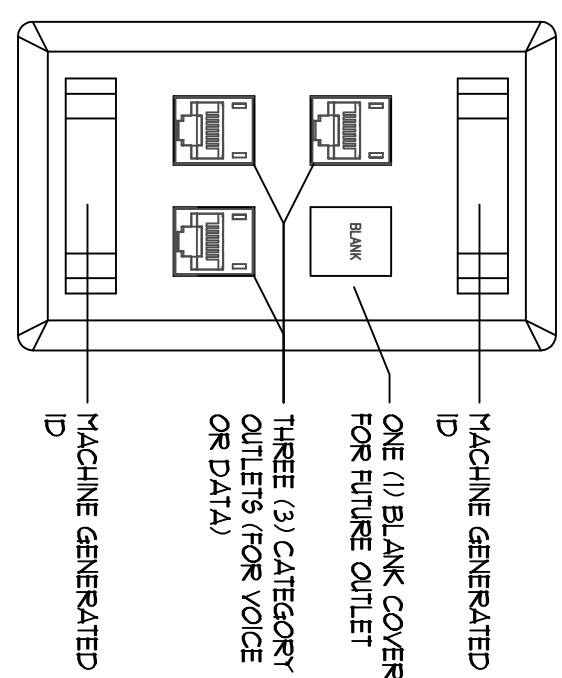
WALL PHONE OUTLET DETAIL

SCALE: NONE



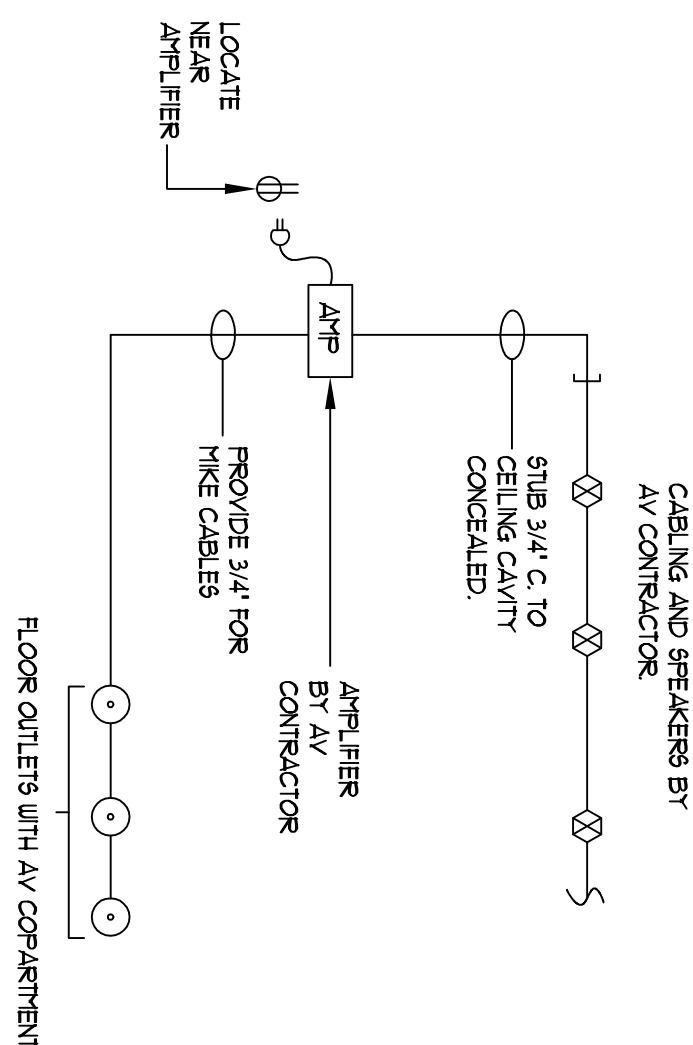
TYPICAL WORKSTATION DATA OUTLET DETAIL

SCALE: NONE



AV ROUGH IN RISER

NO SCALE



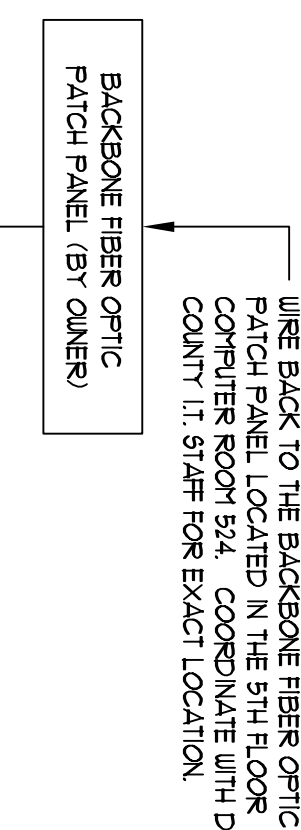
MOTOR WIRING SCHEDULE

TAG	BRNNG	LOC.	HP	VOLT	PH	FEED FROM		SERVING			BRANCH WIRING			STARTER			DISCONNECT			SEE NOTE	
						CIRCUIT	SIZE	POLE	NO.	SIZE	COND.	FURN.	INST.	WIRED	LOC.	TYPE	TYPE	LOC.	TYPE		NOTE
1	ORG PUMP 1	SEE PLANS	7 1/2	480	3		20	3	3	12	3#	HW	EC	EC	NU	WKS	EC	EC	NU	FD	1
2	ORG PUMP 2	SEE PLANS	7 1/2	480	3		20	3	3	12	3#	HW	EC	EC	NU	WKS	EC	EC	NU	FD	1
3	COND UNIT 1	SEE PLANS	1	480	3		20	3	3	12	3#	HW	EC	EC	NU	WKS	EC	EC	NU	FD	1
4	COND UNIT 2	SEE PLANS	1	480	3		20	3	3	12	3#	HW	EC	EC	NU	WKS	EC	EC	NU	FD	1

ABBREVIATIONS:
 3SP - 3 SPEED MAGNETIC STARTER
 BOL - BUILT IN OVERLOAD
 CS - COMBINATION STARTER
 EC - ELECTRICAL CONTRACTOR
 ECP - ELEVATOR CONTROL PANEL
 BV - ELEVATOR CONTRACTOR
 PD - POSSIBLE DISCONNECT

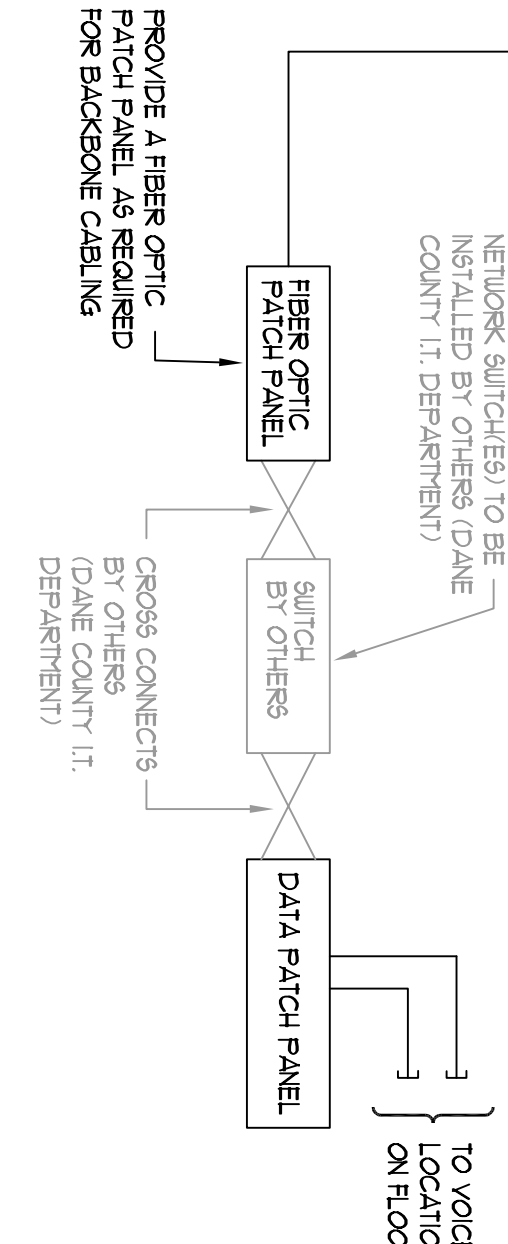
HI - HVAC CONTRACTOR
 IU - IN UNIT
 LA - LINEAR MOTOR RATED SWITCH
 LMS - LOCKABLE MOTOR RATED SWITCH
 M - MANUFACTURER
 MS - NON-FUSIBLE DISCONNECT
 MR - MANUFACTURER
 NDS - NON-FUSIBLE DISCONNECT
 NI - NEAR UNIT
 NU - NEAR UNIT
 OI - ON UNIT
 PC - PULLING CONTRACTOR
 R - RIGID LIGHT
 RLS - REDUCED VOLTAGE STARTER
 TSP - TEMPERATURE CONTROL PANEL
 TST - TEMPERATURE
 U - VISIBLE FREQUENCY DRIVE
 VP - VISIBLE FREQUENCY DRIVE
 W - WEATHERPROOF
 STT - STARTSTOP

NOTES:
 1. VERIFY REQUIREMENTS WITH HVAC PRIOR TO WORK



DATA RISER DIAGRAM - CATEGORY 6 PERFORMANCE

NO SCALE

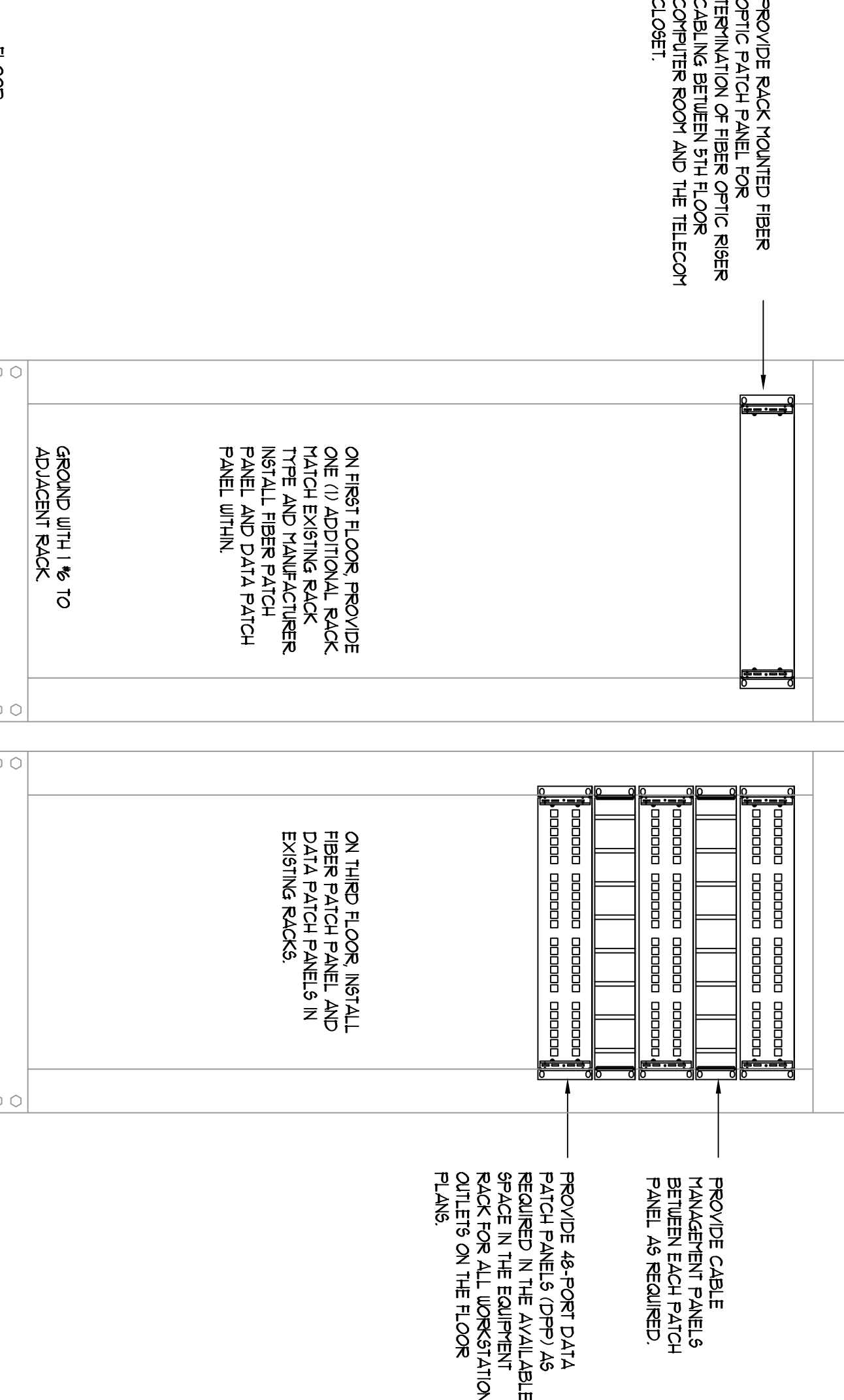


LIGHT FIXTURE SCHEDULE

TAG	NO.	TYPE	DESCRIPTION	MKE	LIGHTING FIXTURE	CATALOG NO.	MOUNT	CEILING	VOLT	SEE NOTE
A	1	32WTR1S95	6\"/>							

NOTES:
 1. SUSPEND OR BELOW CEILING. PROVIDE WATERPROOF BULBUST FOR BULB SWITCHES.
 2. BULBUSTS TO BE INSTANT START WITH PARALLEL LAMP OPERATION ALLOWING REMAINING LAMPS TO OPERATE AT FULL OUTPUT. ONE OR MORE LAMPS FAIL.
 3. PROVIDE INDIVIDUAL BULBUSTS FOR NIGHT LIGHT FIXTURES. SEE PLANS.
 4. WITH WATERPROOF BULBUSTS AND REMOVABLE PARALLEL SWITCHES.
 5. PROVIDE LUTRON COMPACT SET DIMMING BULBUST

PROVIDE RACK MOUNTED FIBER OPTIC PATCH PANEL FOR TERMINATION OF FIBER OPTIC RISER CABLES BETWEEN 5TH FLOOR COMPUTER ROOM AND THE TELECOM CLOSET.



OPEN EQUIPMENT RACK ELEVATION - TELECOM CLOSET

NO SCALE

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ISSUED

PROJECT
 TENANT IMPROVEMENTS
 FIRST AND THIRD FLOOR
 CITY-COUNTY BUILDING
 210 MARTIN LUTHER KING, JR. BLDG., MADISON, WI

DRAWING
 ELECTRICAL SYMBOLS,
 DETAILS AND SCHEDULE

DATE
 03.24.09

E3.0