



TOWN OF JACKSON PLANNING & BUILDING DEPARTMENT

TRANSMITTAL MEMO

Town of Jackson

- ☒ Public Works/Engineering
- ☒ Building
- ☐ Title Company
- ☒ Town Attorney
- ☒ Police

Joint Town/County

- ☒ Parks and Recreation
- ☒ Pathways
- ☒ Joint Housing Dept

Teton County

- ☐ Planning Division

- ☐ Engineer
- ☐ Surveyor- *Nelson*
- ☐ Assessor
- ☐ Clerk and Recorder
- ☐ Road and Levee

State of Wyoming

- ☐ Teton Conservation
- ☐ WYDOT
- ☐ TC School District #1
- ☐ Game and Fish
- ☐ DEQ

Federal Agencies

- ☐ Army Corp of Engineers

Utility Providers

- ☐ Qwest
- ☐ Lower Valley Energy
- ☐ Bresnan Communications

Special Districts

- ☒ START
- ☒ Jackson Hole Fire/EMS
- ☐ Irrigation Company

<p>Date: January 23, 2020</p> <p>Item #: P20-016</p> <p>Planner: Brendan Conboy</p> <p>Phone: 733-0440 ext. 1302</p> <p>Email: bconboy@jacksonwy.gov</p> <p>Owner C&D Commercial Limited PO Box 1044 Jackson, WY 83001</p> <p>Applicant: First Republic Bank – Corinna Wan 111 Pine Street San Francisco, CA 94111</p>	<p style="text-align: center;">REQUESTS:</p> <p>The applicant is submitting a request for a Basic Use Permit to add the use service for the property located at 565 W. Broadway Avenue, legally known as PT NW1/4NE1/4, SEC. 33, TWP. 41, RNG. 116.</p> <p>For questions, please call Brendan Conboy at 733-0440, x1302 or email to the address shown below. Thank you.</p>
<p>Please respond by: February 6, 2020 (Sufficiency) February 13, 2020 (with Comments)</p>	

RESPONSE: For Departments not using Trak-it, please send responses via email to:
tstolte@jacksonwy.gov



PLANNING PERMIT APPLICATION
Planning & Building Department

150 E Pearl Ave. | ph: (307) 733-0440
P.O. Box 1687 | www.townofjackson.com
Jackson, WY 83001

For Office Use Only

Fees Paid _____

Date & Time Received _____

Application #s _____

Please note: Applications received after 3 PM will be processed the next business day.

PROJECT.

Name/Description: First Republic Bank / Tenant Improvement

Physical Address: 565 W. Broadway Ave.

Lot, Subdivision: _____

PIDN: 22-41-16-33-1-00-030

PROPERTY OWNER.

Name: Donna A. Martin & Cliff K. Martin

Phone: (307) 413-2746

Mailing Address: 720 Rodeo Drive, Jackson

ZIP: WY 83001

E-mail: _____

APPLICANT/AGENT.

Name: Corinna Wan/First Republic Bank

Phone: (415) 288-7559 or (415) 806-9705

Mailing Address: 111 Pine Street, San Francisco

ZIP: CA 94111

E-mail: cwan@firstrepublic.com

DESIGNATED PRIMARY CONTACT.

_____ Property Owner ☒ Applicant/Agent

TYPE OF APPLICATION. Please check all that apply; review the type of application at www.townofjackson/200/Planning

Use Permit

☒ Basic Use

_____ Conditional Use

_____ Special Use

Relief from the LDRs

_____ Administrative Adjustment

_____ Variance

_____ Beneficial Use Determination

_____ Appeal of an Admin. Decision

Physical Development

_____ Sketch Plan

_____ Development Plan

_____ Design Review

Subdivision/Development Option

_____ Subdivision Plat

_____ Boundary Adjustment (replat)

_____ Boundary Adjustment (no plat)

_____ Development Option Plan

Interpretations

_____ Formal Interpretation

_____ Zoning Compliance Verification

Amendments to the LDRs

_____ LDR Text Amendment

_____ Map Amendment

Miscellaneous

_____ Other: _____

_____ Environmental Analysis

PRE-SUBMITTAL STEPS. To see if pre-submittal steps apply to you, go to www.townofjackson.com/200/Planning and select the relevant application type for requirements. Please submit all required pre-submittal steps with application.

Pre-application Conference #: _____ Environmental Analysis #: _____
Original Permit #: _____ Date of Neighborhood Meeting: _____

SUBMITTAL REQUIREMENTS. Please ensure all submittal requirements are included. The Planning Department will not hold or process incomplete applications. Partial or incomplete applications will be returned to the applicant. Go to www.townofjackson.com/200/Planning and select the relevant application type for submittal requirements.

Have you attached the following?

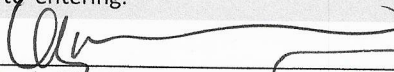
_____ **Application Fee.** Fees are cumulative. Go to www.townofjackson.com/200/Planning and select the relevant application type for the fees.

☒ **Notarized Letter of Authorization.** A notarized letter of consent from the landowner is required if the applicant is not the owner, or if an agent is applying on behalf of the landowner. Please see the Letter of Authorization template at www.townofjackson.com/DocumentCenter/View/102/Town-Fee-Schedule-PDF.

☒ **Response to Submittal Requirements.** The submittal requirements can be found on the TOJ website for the specific application. If a pre-application conference is required, the submittal requirements will be provided to applicant at the conference. The submittal requirements are at www.townofjackson.com/200/Planning under the relevant application type.

Note: Information provided by the applicant or other review agencies during the planning process may identify other requirements that were not evident at the time of application submittal or a Pre-Application Conference, if held. Staff may request additional materials during review as needed to determine compliance with the LDRs.

Under penalty of perjury, I hereby certify that I have read this application and associated checklists and state that, to the best of my knowledge, all information submitted in this request is true and correct. I agree to comply with all county and state laws relating to the subject matter of this application, and hereby authorize representatives of Teton County to enter upon the above-mentioned property during normal business hours, after making a reasonable effort to contact the owner/applicant prior to entering.



Signature of Property Owner or Authorized Applicant/Agent
Corinna Wan/First Republic Bank

Name Printed

January 21, 2020

Date
Sr. VP., Facilities & Admin Services

Title

Basic Use Permit Narrative For Change of Use

Project Location: 565 W. Broadway Ave.

Zone: CR-3

Current Commercial Use: Retail

Current Square Footage: 5,441sf

Project Description: First Republic Bank will be taking over the lease for the ground level space at 565 West Broadway Avenue starting February 1st. They will be performing tenant improvements to the space and changing the use from Retail to Service.

Development of a new house, hotel, or commercial space generates the need for employees. The construction workforce builds the space, the commercial workforce or residential service workforce works in the space, and first responders are needed to protect the space. Only about 27% of the employees generated by development can afford housing in the community, but the community's "community first" character goal is that 65% of employees live locally. To bridge this affordability gap, each development is required to include affordable workforce housing proportional to the employees it generates. These housing mitigation requirements are established in Division 6.3 of the Land Development Regulations. This worksheet is intended to assist in meeting the requirements for a project. However, an error in the worksheet does not amend the actual standard; if you find an error please notify the Planning Department. Fill in the highlighted cells, all the other cells will autopopulate.

Calculating the Requirement (Sec. 6.3.2 & 6.3.3)

Step 1: Location

Town of Jackson

The applicable regulations vary by jurisdiction please identify the location of your project using the above dropdown options.

The required housing is based on the existing and proposed use of the site. Step 2 is to enter the existing use and Step 3 is to enter the proposed use. Section 6.3.2 of the LDRs establishes the applicability of the affordable workforce housing standards and Section 6.3.3 establishes the specifics on calculation of the requirement. Enter each use in its own row, add rows if needed. If a building has multiple units with the same use, describe each unit in its own row. (For example: if a duplex is composed of a 2,300 sf attached unit and a 1,700 sf attached unit, put each unit in its own row do not put in 4,000 sf of attached single-family.) If a unit type (e.g. apartment floor plan, or commercial tennant space) is replicated exactly multiple times, you may use the "Use Quantity" column to avoid adding multiple rows.

Step 2: Existing Development

Housing is only required for new development. Please describe the existing use of the site so that it can be credited from the housing requirement. The definition of existing use is Section 6.3.2.A.1 of the LDRs. Generally, the existing use to enter is the use with the highest housing requirement that either existed in 1995, or has been permitted since 1995. Please attach proof of existence.

Existing Use (Sec. 6.3.2.A)	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	Housing Required
Retail	0.000431*sf	0	5441	1	2.343

Existing Workforce Housing Credit2.343

Step 3: Proposed Development

Please describe the proposed use of the site to determine if affordable workforce housing is required as part of the development. Describe the end result of the proposed development. (For example: in the case of an addition do not enter the square footage of the addition, enter the size of the unit upon completion of the addition.)

Proposed Use	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	Housing Required
Service	0.000431*sf		5441	1	2.343

Affordable Workforce Housing Required:0.000 unitsFee-in-Lieu Amount:\$-

If the amount of required affordable workforce housing is less than one unit, you may pay the above fee in-lieu of providing the required housing. If you elect to pay the fee, your Housing Mitigation Plan is complete. If the requirement is greater than one unit, or you would like to provide a unit to meet the requirement, please proceed to the Unit Type Sheet.

LETTER OF AUTHORIZATION

C & D Commercial Limited Partnership, "Owner" whose address is: _____

720 Rodeo Drive., #1044, Jackson, WY 83001

(NAME OF ALL INDIVIDUALS OR ENTITY OWNING THE PROPERTY)

Clifford A. Martin and Donna K. Martin

, as the owner of property
more specifically legally described as: 565 W. Broadway Ave., Jackson, WY83001

(If too lengthy, attach description)

HEREBY AUTHORIZES Corinna Wan, SVP, Facilities & Admin. Services of First Republic Bank as agent to represent and act for Owner in making application for and receiving and accepting on Owners behalf, any permits or other action by the Town of Jackson, or the Town of Jackson Planning, Building, Engineering and/or Environmental Health Departments relating to the modification, development, planning or replatting, improvement, use or occupancy of land in the Town of Jackson. Owner agrees that Owner is or shall be deemed conclusively to be fully aware of and to have authorized and/or made any and all representations or promises contained in said application or any Owner information in support thereof, and shall be deemed to be aware of and to have authorized any subsequent revisions, corrections or modifications to such materials. Owner acknowledges and agrees that Owner shall be bound and shall abide by the written terms or conditions of issuance of any such named representative, whether actually delivered to Owner or not. Owner agrees that no modification, development, platting or replatting, improvement, occupancy or use of any structure or land involved in the application shall take place until approved by the appropriate official of the Town of Jackson, in accordance with applicable codes and regulations. Owner agrees to pay any fines and be liable for any other penalties arising out of the failure to comply with the terms of any permit or arising out of any violation of the applicable laws, codes or regulations applicable to the action sought to be permitted by the application authorized herein.

Under penalty of perjury, the undersigned swears that the foregoing is true and, if signing on behalf of a corporation, partnership, limited liability company or other entity, the undersigned swears that this authorization is given with the appropriate approval of such entity, if required.

OWNER:

Donna K. Martin
(SIGNATURE) (SIGNATURE OF CO-OWNER)

Title: Owner

(if signed by officer, partner or member of corporation, LLC (secretary or corporate owner) partnership or other non-individual Owner)

STATE OF Arizona)
COUNTY OF moHAVE)SS.

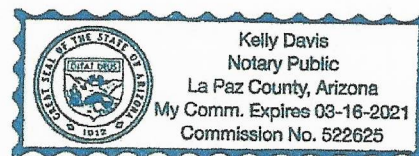
The foregoing instrument was acknowledged before me by Donna K Martin this 9th day of January, 2020.

WITNESS my hand and official seal.

Kelly Davis
(Notary Public)

My commission expires: 03/16/2021

(Seal)

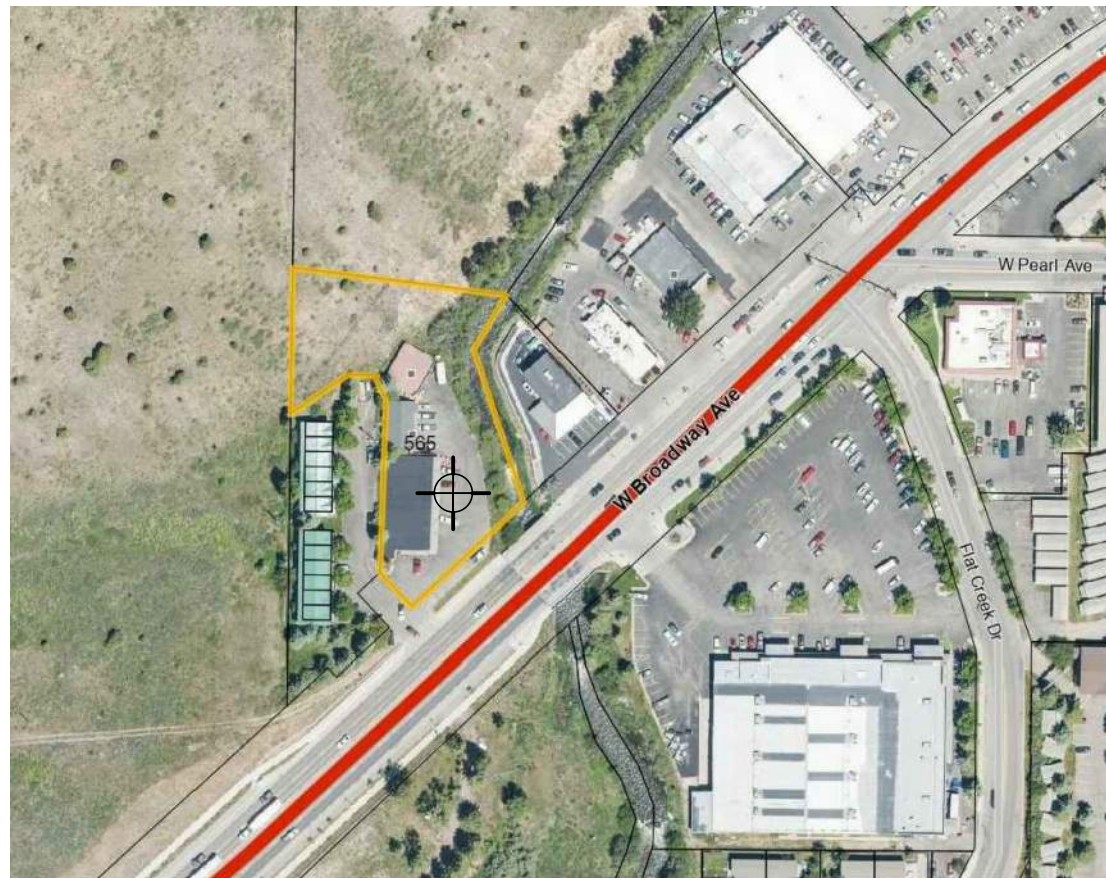


01.22.2020

JACKSON WY
FIRST REPUBLIC BANK

PROJECT LOCATION
565 W. BROADWAY AVE.
Jackson, WY
Parcel: 22-41-16-33-1-00-030

VICINITY MAP: Locator



OWNER
C&D COMMERCIAL LIMITED PARTNERSHIP
Rodeo Drive
Jackson, WY 83001

ARCHITECT
Hoyt Architects
1110 Maple Way Suite F
PO Box 7364 (83002)
Jackson, WY (83001)
307.733.9955
collind@hoytarchitects.design

STRUCTURAL ENGINEER
Jorgensen Associates
1315 hwy 89 S., Suite 203
Jackson, WY 83002
307.733.5150

MECHANICAL ENGINEER
WSP
999 3rd ave., Suite 3200
Seattle, WA 98104
206.342.9900

ELECTRICAL DESIGNER
Dave Niles
1130 Maple Way
Jackson, WY 83001

GENERAL CONTRACTOR
Aufderheide Construction Management (ACM)
307-690-4741
ben@acmwyoming.com

SHEET INDEX

GENERAL	
G101	COVER SHEET
G102	CODE REVIEW
EX	PARKING EXHIBIT
ARCHITECTURAL	
A001	DEMO PLANS
A101	CONSTRUCTION LAYOUT PLAN
A301	BUILDING SECTION & DETAILS
A601	WINDOW ELEVATIONS, SCHEDULES & DETAILS
A901	REFLECTED CEILING PLAN
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S2.0	MAIN LEVEL FRAMING PLAN
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M002	GENERAL NOTES
M003	MECHANICAL SCHEDULES
M004	MECHANICAL SPECIFICATIONS
M005	MECHANICAL SPECIFICATIONS
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E1	ELECTRICAL POWER AND SIGNAL PLAN
E101	ELECTRICAL/FURNITURE PLAN
E2	LIGHTING CONTROL
E3	ELECTRICAL SERVICE

GENERAL CONSTRUCTION NOTES

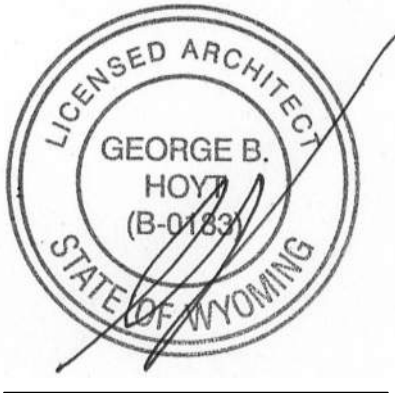
- THIS PROJECT SHALL COMPLY WITH THE 2018 VERSION OF THE IBC AND THE CURRENT TOWN OF JACKSON LDRS INCLUDING ALL AMENDMENTS. ANY BUILDING OFFICIAL, SUBCONTRACTOR OR TRADES PERSON NOTING DISCREPANCIES SHALL NOTIFY THE ARCHITECT IMMEDIATELY UPON DISCOVERY.
- CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS BY TETON COUNTY BUILDING AND FIRE DEPARTMENTS, HUD, FHA, STATE ELECTRICAL INSPECTOR OR OTHER GOVERNING AUTHORITIES, AS NECESSARY.
- ALL CONSTRUCTION DEBRIS IS TO BE STOCKPILED NEATLY ON SITE UNTIL DISPOSAL, WHICH SHALL BE DONE AT COUNTY LANDFILL OR RECYCLING FACILITY. ONLY, NO DEBRIS IS TO BE DISPOSED OF IN LOCAL WASTE COLLECTION FACILITIES. ON-SITE REFUSE BURNING WILL BE DONE ONLY WITH APPROVAL OF OWNER AND TETON COUNTY SHERIFF.
- EXCEPT IN INTERIOR ELEVATIONS, AND UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE GIVEN TO FACE OF ROUGH FRAMING, CENTERLINE OF COLUMNS, OR FACE OF CONCRETE AND C.M.U. WALL. INTERIOR ELEVATION DIMENSIONS ARE GIVEN TO FACE OF FINISH MATERIAL GIVEN DIMENSIONS TAKE PRECEDENCE OVER SCALE. STRUCTURAL DRAWINGS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION, VERIFY DISCREPANCIES WITH ARCHITECT.
- CONTRACTOR SHALL PROVIDE STORAGE FOR ALL BUILDING MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. STORAGE OF SUPPLIES SHALL REMAIN DRY.
- ALL SUBSTITUTIONS ARE TO BE APPROVED BY ARCHITECT/OWNER. ALONG WITH WRITTEN REQUESTS CONTRACTOR SHALL PROVIDE ALL INFORMATION REGARDING THE SUBSTITUTION IN QUESTION, INCLUDING COST, AVAILABILITY AND REASON FOR SUBSTITUTION.
- SOLID WOOD BLOCKING, INSULATION OR OTHER FIRESTOP MATERIAL IS TO BE PROVIDED BETWEEN STORIES, BETWEEN TOP STORY AND ROOF SPACE, BETWEEN STAIR STRINGERS AT TOP AND BOTTOM, BETWEEN STUDS ALONG STAIR RUNS AND AT ALL OTHER PLACES THAT COULD ALLOW THE PASSAGE OF FLAME. FIRESTOPS BETWEEN CHIMNEY AND WOOD FRAME SHALL BE NON-COMBUSTIBLE.
- CONTRACTOR SHALL PROVIDE SAMPLES OF ALL FINISHES AND STAIN COLORS FOR APPROVAL BY ARCHITECT/OWNER. THIS INCLUDES BUT IS NOT LIMITED TO INTERIOR AND EXTERIOR STAINS, INTERIOR PAINT, SHEETROCK TEXTURES, CHEMICALLY APPLIED METAL PATINAS, AND STONE VENEER MATERIAL & MASONRY TECHNIQUE.
- PROVIDE GROUNDING SYSTEM AS PER NEC ARTICLE 250-1C, SIZED IN ACCORDANCE WITH TABLE 250-94, ATTACHED TO REBAR IN CONCRETE FOOTING, ALSO ATTACHED TO SINGLE DRIVEN GROUNDING ROD WITH SECONDARY GROUNDING PROTECTIONS AT METAL WATER SUPPLY SYSTEM.
- ALL MATERIALS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND IN ACCORDANCE WITH WARRANTY GUIDELINES.
- ALL SITE MATERIALS SHALL BE COMPACTED IN 6" TO 8" LIFTS, UNLESS OTHERWISE NOTED TO PREVENT SETTLING OF FINISH GRADE, WALKS, DRIVEWAYS, TERRACES, ETC.
- CONTRACTOR RESPONSIBLE FOR PROVIDING, COORDINATION AND SUPERVISING TRENCHING OF UTILITIES AND SERVICES TO AND FROM BUILDING. COORDINATION SHALL INCLUDE CONTRACTOR'S REASONABLE EFFORTS TO COMBINE AS MANY DIFFERENT UTILITIES IN COMMON TRENCHES AS PRACTICAL AND GOOD PRACTICE PERMIT.

CODES UTILIZED

ZONING DISTRICT - CR-3
OCCUPANCY/USE - BI-PERSONAL WEALTH MANAGEMENT
TYPE OF CONSTRUCTION - VB
FIRE SPRINKLERS - NO
CODES UTILIZED - IBC 2018, IPC 2018, IMC 2018, NEC 2017, IECC 2012
SEISMIC DESIGN - CATEGORY D2
SNOW LOAD - 120PSF
WIND LOAD - 115MPH
LOT AREA - 1.20ac
PARKING - 14 SPACES

AREA CALCULATIONS	EXISTING
MAIN LEVEL	5,441sf

565 W. BROADWAY
JACKSON, WY
FIRST REPUBLIC BANK



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PERMIT SET

01.22.2020
DRAWN BY | DELANO
CHECKED BY | HOYT
REVISIONS

COVER SHEET

G101

PROJECT INFORMATION

PROJECT DESCRIPTION:

RENOVATION OF THE EXISTING GROUND LEVEL COMMERCIAL SPACE LOCATED AT 565 W. BROADWAY AVE. JACKSON, WYOMING. THE BUILDING WILL BE USED BY FIRST REPUBLIC BANK FOR PERSONAL BANKING AND WEALTH MANAGEMENT.

ZONING CODE ANALYSIS:

ZONING DISTRICT: CR-3 COMMERCIAL RESIDENTIAL.

PARKING REQUIREMENTS:

COMMERCIAL USES: SERVICE 2.23(1.000sf)
(5,441sf/1,000)(2.25) = 12.24 PARKING SPACES

13 SPACES REQUIRED. 24 SPACES PROVIDED.

BUILDING CODE ANALYSIS:

PROPOSED WORK SHALL COMPLY WITH THE FOLLOWING:

INTERNATIONAL BUILDING CODE, 2018 EDITION W/AMENDMENTS
DESIGN CRITERIA UTILIZED: SEISMIC DESIGN CATEGORY D,
WIND LOAD: 120 MPH SUSTAINED FOR 3 SEC
SNOW LOAD: 115 PSF

ICC/ANSI A117.1, 2003 EDITION
NATIONAL ELECTRICAL CODE, 2017 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE, 2012 EDITION, W/AMENDMENTS
INTERNATIONAL MECHANICAL CODE, 2018 EDITION, W/AMENDMENTS
INTERNATIONAL PLUMBING CODE, 2018 EDITION, W/AMENDMENTS

REGULATORY AGENCY
TOWN OF JACKSON, WYOMING

OCCUPANCY:

BUILDING OCCUPANCY:
BANK (B)

TOTAL OCCUPANT LOAD = 37

FIRE RESISTANCE RATING REQUIREMENTS:

TABLE 601 & 602: TYPE VB CONSTRUCTION	
BUILDING ELEMENT:	RATING IN HRS
STRUCTURAL FRAME INCLUDING COLUMNS, BEAMS, GIRDERS & TRUSSES*	0
BEARING WALLS EXTERIOR INTERIOR	0 0
NON BEARING WALLS EXTERIOR INTERIOR	0 0
FLOOR CONSTRUCTION INCLUDING SUPPORT BEAMS & JOISTS	0
ROOF CONSTRUCTION INCLUDING SUPPORT BEAMS & JOIST	0

TYPE OF CONSTRUCTION:

TYPE VB CONSTRUCTION WHERE THE EXTERIOR AND INTERIOR WALLS ARE OF COMBUSTIBLE MATERIAL.

EGRESS WIDTH:

SECTION 1005
DOORWAYS: 37 OCCUPANTS x 0.20' = 7.4' REQ'D < 36" PROVIDED
NUMBER OF EXITS: 2 REQUIRED = 3 PROVIDED

EXIT DOORS WILL BE EQUIPPED WITH PERMANENT "THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED" SIGN IN 1 INCH LETTERS ON CONTRASTING BACKGROUND.

EXIT ACCESS:

EXIT ACCESS DISTANCE: TABLE 1017.2
B OCCUPANCY: 200' MAX - 71' MAX PROVIDED

SIGNAGE:

RESTROOM SIGNS TO FOLLOW REQUIREMENTS AS DEFINED IN CHAPTER 7 OF ICC/ANSI A117.1-2003.
ALL SIGNS TO BE BLACK ON SILVER IN COLOR OR AS APPROVED BY ARCHITECT/OWNER.

CONSTRUCTION / HEIGHT & AREA:

BUSINESS OCCUPANCY NON-SPRINKLERED TYPE VB CONSTRUCTION.
ALLOWABLE HEIGHT: 40' (2 STORIES)
ALLOWABLE AREA: 9,000sf

ACTUAL HEIGHT: NA
ACTUAL AREA: 5,441sf < 9,500sf ALLOWABLE PER STORY

PLUMBING FIXTURE COUNT:

TABLE 2902.1						
GENDER	OCC	WC	UR	LAV	SVC SINK	DRINKING FOUNTAIN
	TOTAL	REQ'D/PROV'D	REQ'D/PROV'D	REQ'D/PROV'D	REQ'D/PROV'D	
MALE	19	1/1	0/0	1/1		
FEMALE	19	1/2	0/0	1/2	1/1	1/1 WATER DISPENSER

FIRE EXTINGUISHER:

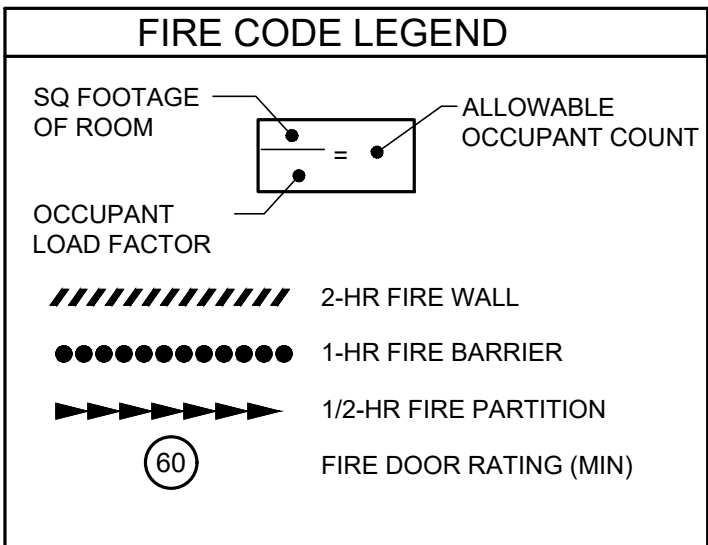
FE FIRE EXTINGUISHER LOCATED, SIZED, AND INSTALLED PER IFC SECTION 906.

ALARM SYSTEM:

FIRE ALARM TO BE COORDINATED & SUBMITTED FOR APPROVAL TO JACKSON HOLE FIRE EMS BY GENERAL CONTRACTOR.

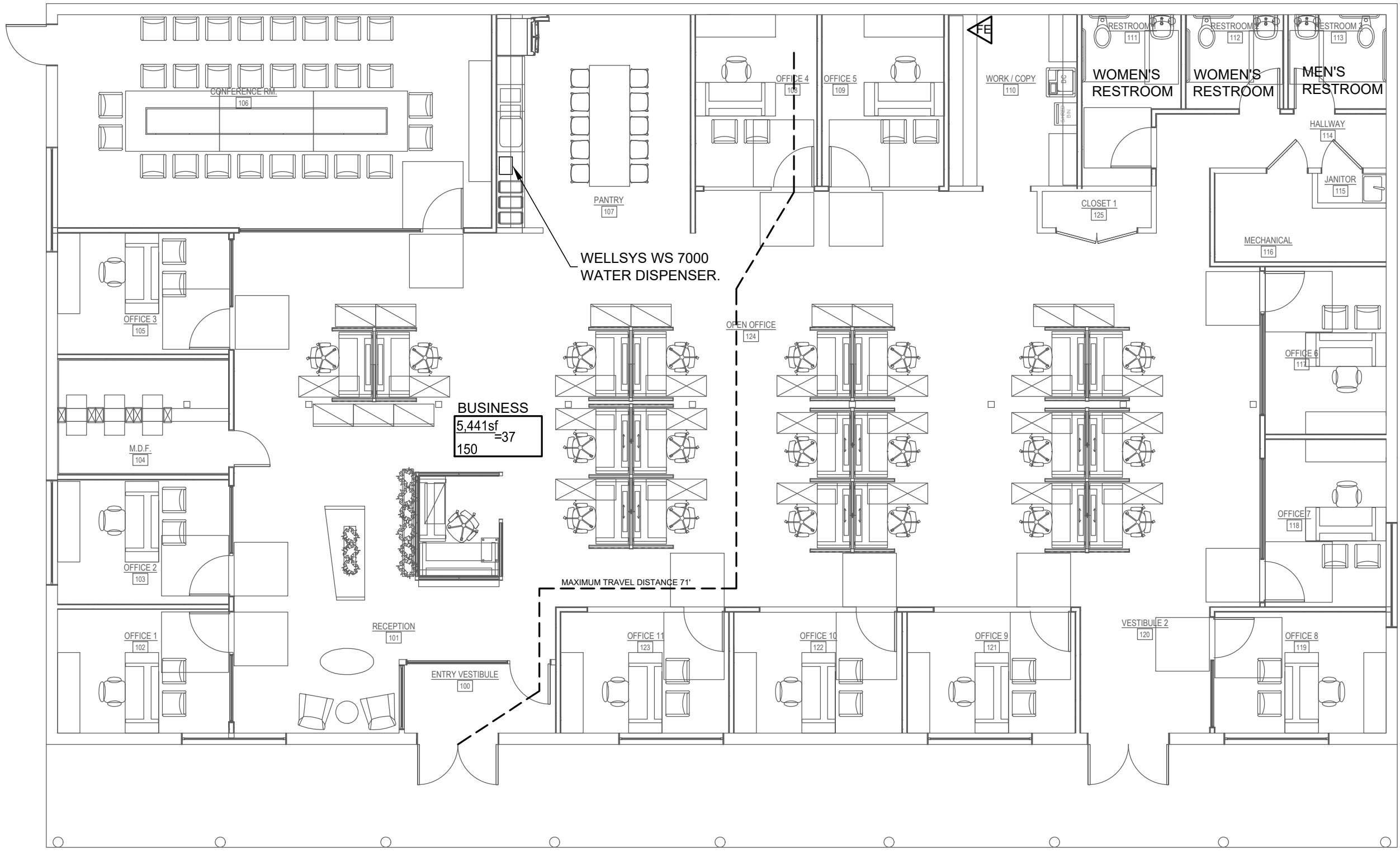
GENERAL NOTES:

- IT IS EACH CONTRACTOR'S RESPONSIBILITY TO THOROUGHLY REVIEW AND BECOME FAMILIAR WITH ALL PERTINENT DOCUMENTS AVAILABLE REGARDING THE CONSTRUCTION OF THIS PROJECT. ANY AMBIGUITY OR DISCREPANCY DISCOVERED IN THE DOCUMENTS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT WHO SHALL MAKE CLARIFICATIONS AND INTERPRETATIONS IN A TIMELY MANNER. THE CONTRACTOR'S FAILURE TO DISCOVER AND NOTIFY THE ARCHITECT OF SAID AMBIGUITY OR DISCREPANCY PRIOR TO THE START OF CONSTRUCTION SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY RELATING TO THE MATTER.
- CHANGES OR DEVIATIONS FROM THE DOCUMENTS, MADE BY THE CONTRACTOR OR THEIR SUPPLIERS, WITHOUT THE WRITTEN CONSENT OF THE ARCHITECT, ARE UNAUTHORIZED CHANGES TO THE WORK AND AS SUCH SHALL RELIEVE THE ARCHITECT OF ALL RESPONSIBILITY FOR THE CONSEQUENCES ARISING THEREFROM.
- PRIOR TO BEGINNING ANY NEW WORK OR INSTALLATION, IT IS EACH CONTRACTOR'S RESPONSIBILITY TO INSPECT PREVIOUSLY INSTALLED WORK AND/OR SUBSTRATE AND VERIFY THAT ALL SUCH WORK IS SATISFACTORY AND COMPLETE TO THE REQUIRED LEVEL OF ACCEPTANCE TO ALLOW FOR THE START OF SUBSEQUENT WORK. THE COMMENCEMENT OF ANY WORK SHALL INDICATE THAT ALL PREVIOUSLY INSTALLED WORK AND/OR SUBSTRATE WAS FOUND TO BE ACCEPTABLE AND INSTALLED ACCORDING TO INDUSTRY STANDARDS. ANY WORK FOUND TO BE IN UNACCEPTABLE CONDITION SHALL BE REMOVED AND REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- EACH CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO ESTIMATING THE COST OF THE SCOPE OF WORK AND PRIOR TO ORDERING OR FABRICATING MATERIALS OR BEGINNING ANY CONSTRUCTION RELATED ACTIVITIES FOR THE PURPOSE OF BECOMING COMPLETELY FAMILIAR WITH THE SITE AND ALL EXISTING CONDITIONS WHICH MIGHT IMPACT THE COST OF, OR PERFORMANCE OF THE SCOPE OF WORK.
- ALL CONSTRUCTION IS TO BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES AND THE REQUIREMENTS OF ALL REGULATORY AGENCIES HAVING JURISDICTION OVER THE PROJECT. UNDER NO CONDITION DOES THE ARCHITECT HAVE RESPONSIBILITY FOR THE MEANS OR METHODS USED BY A CONTRACTOR IN THE PERFORMANCE OF THE WORK OR FOR CONDITIONS OF SAFETY AT THE JOB SITE.
- CONTRACTOR SHALL COORDINATE ALL FINISHES, MATERIALS, AND COLORS WITH THE ARCHITECT AND OWNER AND INTERIOR DESIGNERS
- DIMENSIONS OF AND FROM EXISTING CONDITIONS HAVE BEEN TAKEN FROM EXISTING DRAWINGS AND/OR FIELD MEASUREMENTS. ALL EXISTING DIMENSIONS ARE TO FINISH FACE UNLESS NOTED OTHERWISE ON DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PERTAINING TO THE EXISTING CONDITIONS, INCLUDING ALL WORK ALREADY IN PLACE, PRIOR TO ORDERING OR FABRICATING MATERIALS, AND PRIOR TO START OF CONSTRUCTION.
- CONTRACTORS SHALL KEEP PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS AND DEBRIS.
- DO NOT SCALE THE DRAWINGS. IF QUESTIONS ARISE AS TO DIMENSIONAL REQUIREMENTS, CONTACT THE ARCHITECT FOR CLARIFICATION.
- ALL MATERIALS, FIXTURES AND EQUIPMENT PROVIDED UNDER THIS CONTRACT ARE TO BE PROVIDED IN NEW CONDITION WITH FULL MANUFACTURER'S WARRANTY, UNLESS OTHERWISE SPECIFIED BY THE OWNER, AND ARE TO BE STORED AND INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS. DAMAGED ITEMS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

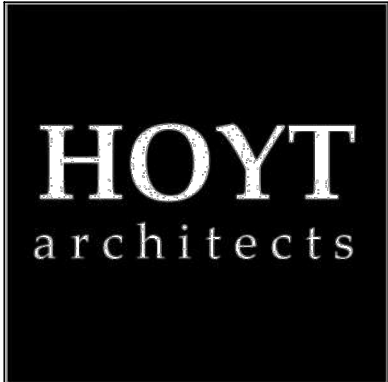


TYPICAL MOUNTING HEIGHT LEGEND FOR ALL FIXTURES

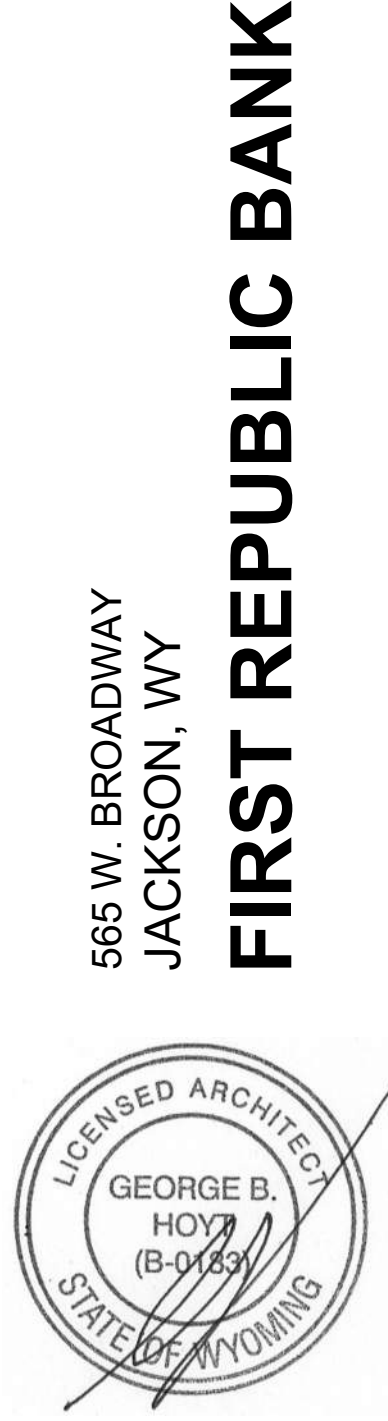
FIXTURE	DIM#	MOUNTING HEIGHT
GRAB BAR	A	12" MINIMUM
TOILET (ADA)	B	18" TO CENTER FROM ADJACENT WALL
URINAL	C	24" TO RIM ABOVE FINISH FLOOR
URINAL (ADA)	C	17" TO RIM ABOVE FINISH FLOOR
SINK (ADA)	D	34" MAX TO RIM ABOVE FINISH FLOOR
SINK (ADA)	E	9" HIGH X 8" DEEP TOE CLEARANCE
SINK (ADA)	F	27" MIN X 8" DEEP KNEE CLEARANCE
TOILET	G	14" TO TOP OF RIM
TOILET (ADA)	G	17" - 19" TO TOP OF SEAT
GRAB BAR (ADA)	H	12" MAXIMUM
TOILET PAPER HOLDER	J	7" - 9" TO CENTER FROM FRONT OF WC
GRAB BAR	K	33" - 36" TO TOP A.F.F.
GRAB BAR	L	36" MINIMUM
GRAB BAR	M	54" MINIMUM
MIRROR	N	40" MAX TO BOT MIRROR SURFACE
TOILET PAPER HOLDER	O	15" MIN TO OUTLET ABOVE FINISH FLOOR
TOILET PAPER HOLDER	P	1 1/2" MIN FROM BOT OF GRAB BAR
GRAB BAR	Q	39" - 41" TO CENTER FROM ADJACENT WALL
GRAB BAR	R	39" - 41" TO BOTTOM A.F.F.
GRAB BAR	S	18" MINIMUM



1 Main Level Floor Plan
G102
1/8"=1'-0"



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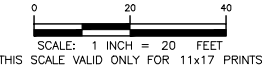
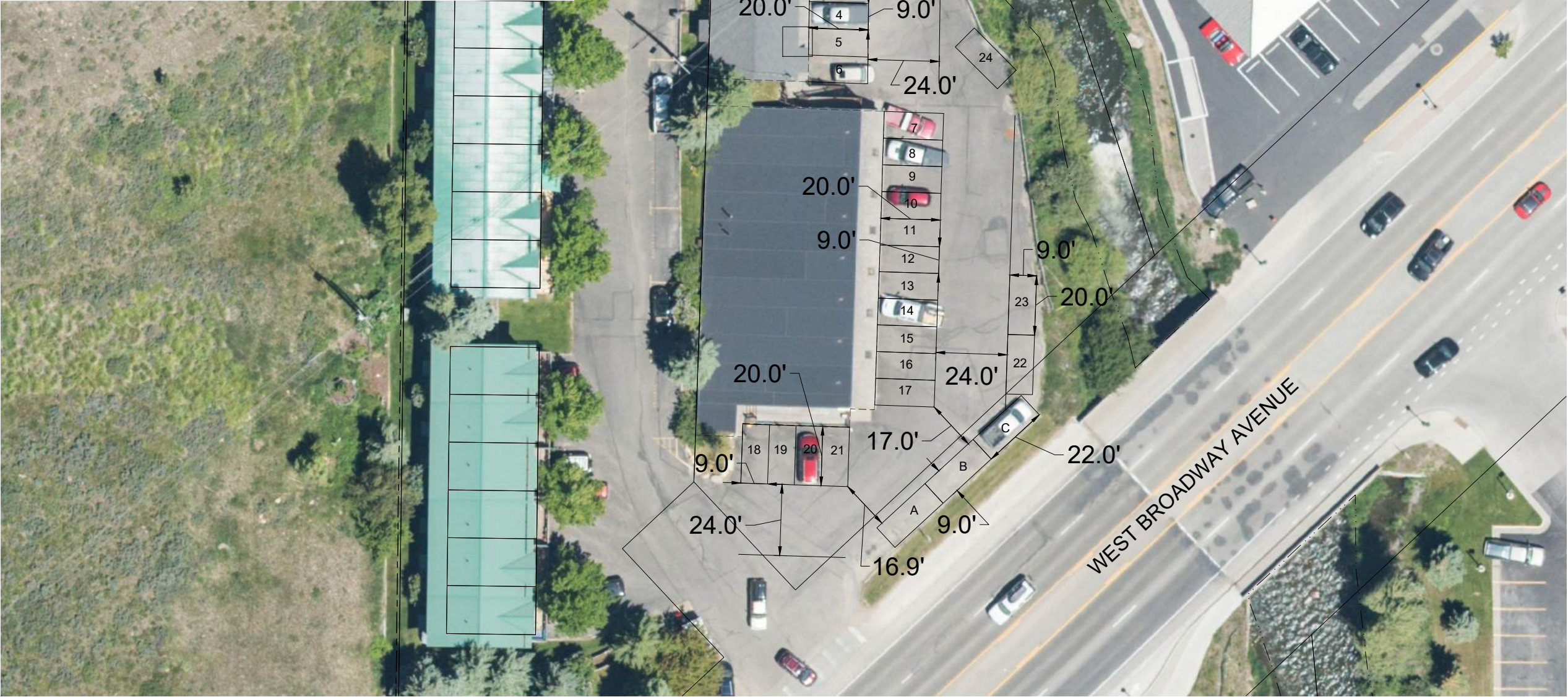
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REVISIONS

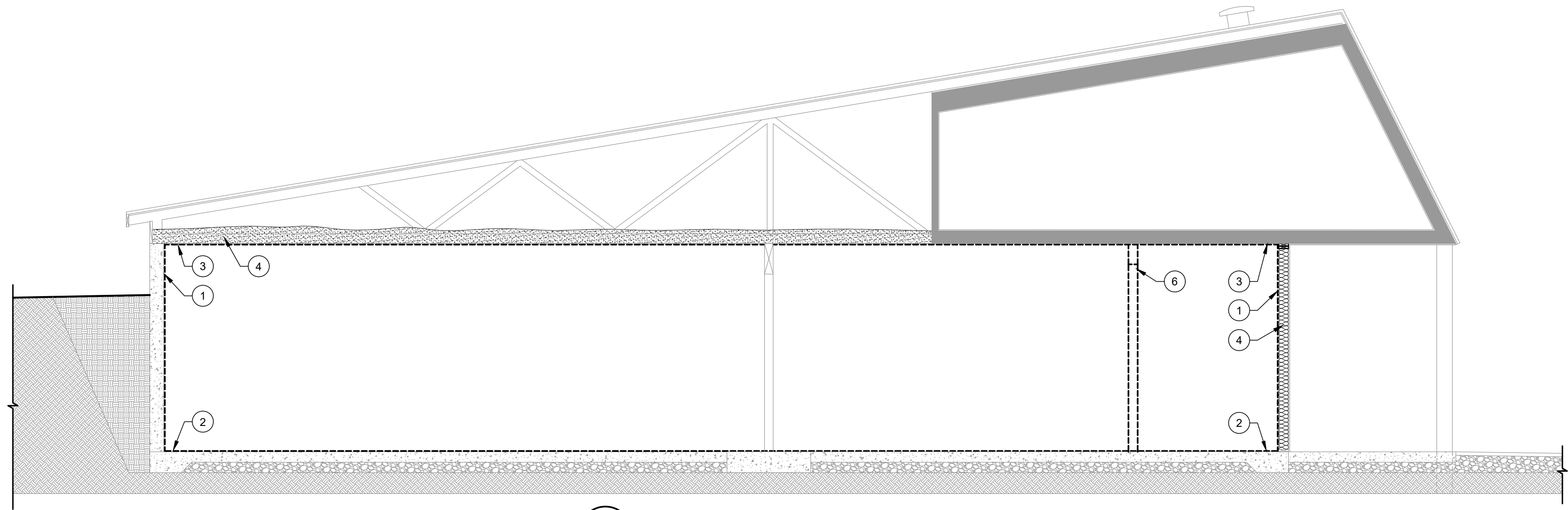
CODE REVIEW

G102

EXISTING CONDITIONS

- * 24 ON PROPERTY PARKING SPACES PROVIDED AT 9'X20' (1-23)
- * 3 ON STREET PARKING SPACES PROVIDED AT 9'X22' (A, B, C)
- * REQUIRED PARKING = 25 SPACES, PROVIDED SPACES = 27
- * 24' AISLE HAS BEEN PROVIDED
- * 14 SPACES ARE REQUIRED FOR SERVICE OCCUPANCY ($\frac{5554}{1000}$
*2.25) - FIRST REPUBLIC BANK (19 RQD. FOR FLOORING
STORE, 3.37) REDUCTION OF 5 SPACES
- * 3 SPACES ARE REQUIRED FOR SERVICE OCCUPANCY ($\frac{1188}{1000}$
*2.25) - COMPUTER REPAIR
- * 3 SPACES ARE REQUIRED FOR SERVICE OCCUPANCY ($\frac{1188}{1000}$
*2.25) - DENTAL / RACKET
- * 2 SPACES ARE REQUIRED FOR APARTMENT UNIT
- * 3 SPACES ARE REQUIRED FOR SERVICE OCCUPANCY ($\frac{1344}{1000}$
*2.25) - SEAMSTRESS / EMBROIDERY





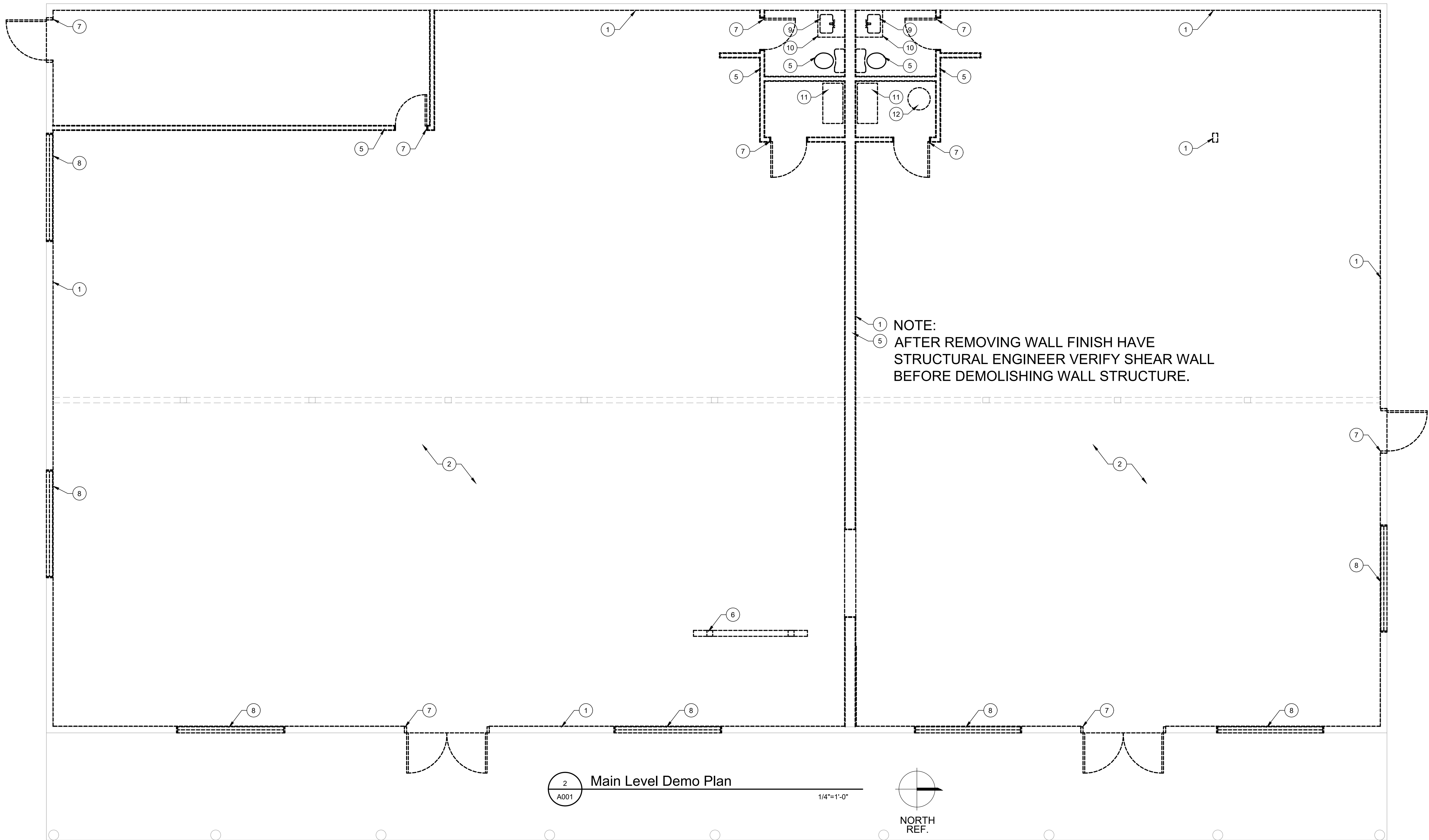
1
A001

Section Demo Plan

1/4"=1'-0"

DEMO NOTES

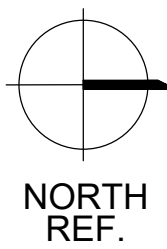
- ① REMOVE WALL FINISH.
- ② REMOVE FLOOR FINISH.
- ③ REMOVE CEILING FINISH.
- ④ REMOVE INSULATION.
- ⑤ REMOVE WALL STRUCTURE AND FINISHES.
- ⑥ REMOVE POSTS AND BEAM. SEE STRUCTURAL FOR NEW POSTS AND BEAM SIZES.
- ⑦ REMOVE DOOR.
- ⑧ REMOVE WINDOW.
- ⑨ REMOVE PLUMBING FIXTURES.
- ⑩ REMOVE CASEWORK.
- ⑪ REMOVE MECHANICAL EQUIPMENT.
- ⑫ REMOVE WATER HEATER.



2
A001

Main Level Demo Plan

1/4"=1'-0"



NORTH
REF.



Jackson Wyoming
307.733.9955

565 W. BROADWAY
JACKSON, WY
FIRST REPUBLIC BANK



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DEMO PLANS

A001

SPECIAL SHEET NOTES

- 1
- DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN. IN CASE OF CONFLICT NOTIFY ARCHITECT IN WRITING. PARTITION PLAN BY ARCHITECT SUPERSEDES OTHER PLANS.
- 2
- DIMENSIONS SHOWN ON FLOOR PLAN ARE TO FACE OF FINISHED WALL, COLUMN CENTERLINE, UNLESS OTHERWISE NOTED.
- 3
- PARTITIONS: INSTALL NEW PARTITION AS PER CONSTRUCTION PLAN. ALL NEW AND EXISTING COLUMN AND WALL SURFACES ARE SCHEDULED TO RECEIVE FINISHES AS SHOWN. REFER TO FINISH DISTRIBUTION NOTES AND SCHEDULE FOR SPECIFICATIONS.
- 4
- DOOR AND DOOR FRAMES: OPENINGS NOT LOCATED BY DIMENSION SHALL BE CENTERED IN WALL AS SHOWN OR LOCATED 4" FROM FINISH WALL TO FINISH JAMB.
- 5
- PROVIDE ADEQUATE BACKING IN WALLS FOR WALL-MOUNTED CASEWORK AND ACCESSORIES. SEE DETAIL 8/A-7.
- 6
- ALL WALLS AROUND CONFERENCE ROOMS, OFFICES, SHALL BE PROVIDED WITH SOUND/BATT INSULATION.
- 7
- ALL HEIGHTS ARE DIMENSIONED FROM FINISHED FLOOR, U.O.N.
- 8
- PANTRY:** PROVIDE & INSTALL A COLD WATER LINE & SHUT-OFF VALVE AT THE PROPOSED REFRIGERATOR LOCATION FOR ICE MAKER & COUNTER MOUNTED COFFEE MAKER, WATER COOLER. VERIFY EXACT LOCATION IN FIELD FOR WATER LINE TO COFFEE MAKER
- 9
- PROVIDE & INSTALL 8'-0" HEIGHT 3/4" FIRE-RATED PLYWOOD IN MDF CLOSET PAINTED TO MATCH WALL COLOR, TYP., SHOWN DASHED. DO NOT PAINT OVER FIRE-RATING LABEL
- 10
- VERIFY LOCATIONS OF EXISTING TELEPHONE/ ELECTRICAL SERVICES PRIOR TO THE START OF WORK.
- 11
- VERIFY ALL EXISTING VALVES AND/OR EQUIPMENT WHICH NEED ACCESS. NOTIFY ARCHITECT AT ONCE TO LOCATE ACCESS PANELS.
- 12
- NOT USED.
- 13
- EXAMINE EXISTING FLOOR AND WALLS, PATCH AND REPAIR AS REQUIRED TO RECEIVE NEW FINISHES.
- 14
- ALL PARTITIONS ARE DIMENSIONED FROM FINISH FACE TO FINISH FACE, UNLESS OTHERWISE NOTED. ALL DIMENSIONS MARKED "CLEAR" OR "CLR." SHALL BE MAINTAINED AND SHALL ALLOW FOR THICKNESS OF ALL MATERIAL.
- 15
- COLUMN CENTER LINES (OR GRID LINES) ARE SHOWN FOR DIMENSIONING; VERIFY EXACT LOCATIONS IN FIELD.
- 16
- PARTITIONS AT BUILDING PERIMETER SHALL BE LOCATED PER PLAN..
- 17
- CONTRACTOR SHALL MARK LOCATIONS OF PARTITIONS AND DOORS FOR REVIEW BY ARCHITECT PRIOR TO INSTALLATION FOR DESIGN INTENT. CONTRACTOR SHALL COORDINATE AND VERIFY ALL CONDITIONS TO ENSURE PROPER FIT.
- 18
- ALL PARTITIONS SHALL BE ANCHORED FIRMLY AS REQUIRED BY CODE. PROVIDE SEISMIC BRACING FOR PARTITIONS AND CEILING AS REQUIRED BY CODE. BRACE PARTITIONS AS INDICATED ON DRAWINGS AND AS REQUIRED BY CODE.
- 19
- DIMENSIONS LOCATING DOORS BY EDGE ARE TO THE INSIDE EDGE OF JAMB, UNLESS OTHERWISE NOTED.
- 20
- INTERIOR SIDELIGHT AND GLASS PANEL INFORMATION REFER TO PARTITION TYPE 2.
- 21
- ALL MANUFACTURED ARTICLES, MATERIALS AND EQUIPMENT SHALL BE APPLIED, ERECTED, CONNECTED, INSTALLED, CLEANED AND CONDITIONED PER MANUFACTURER'S INSTRUCTIONS.
- 22
- SEE PLUMBING DWGS. FOR PLUMBING SCHEDULE.
- 23
- INFILL TO MATCH ADJACENT

PARTITION LEGEND

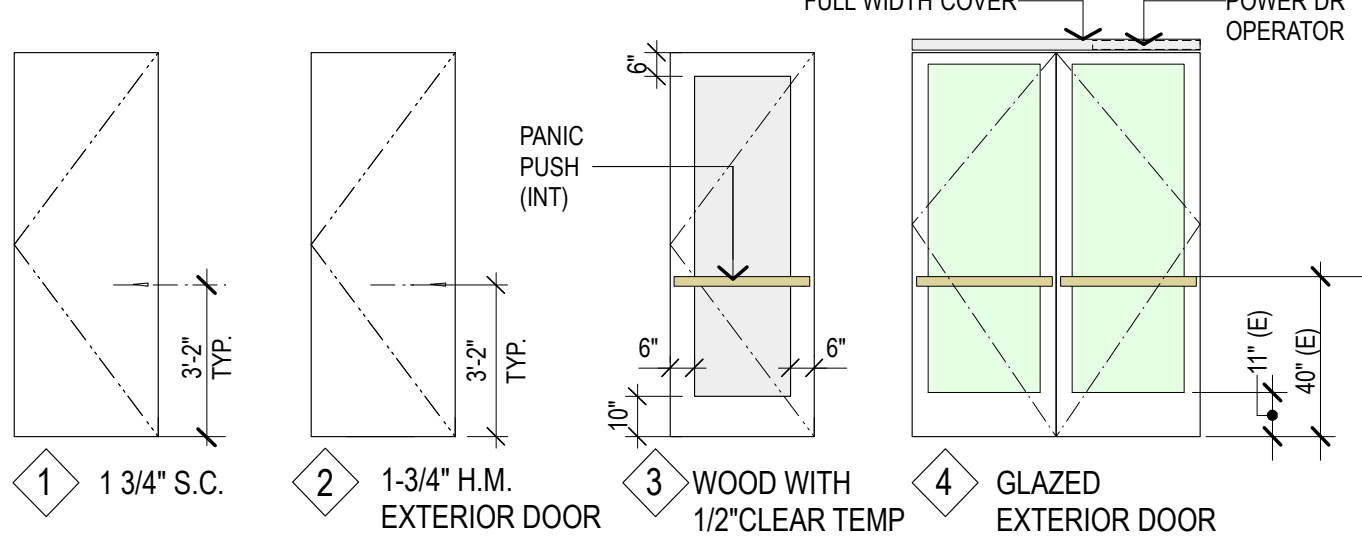
(X) REFER TO PARTITION TYPES SHEET A-7.1

SYMBOL	DESCRIPTION
	(E) "SHELL" WALL / PARTITION TO REMAIN
	NEW NON-RATED CEILING HEIGHT PARTITION WITH SOUND INSULATION ①
	NEW NON-RATED PARTITION ②
	NON-RATED FULL HEIGHT PARTITION ③ 3a
	NON-RATED WALL FURRING ④
	NEW NON-RATED GLAZING PARTITION ⑤

DOOR SCHEDULE

NUMBER	OPENING		FRAME			DOOR			HARDWARE GRP.	REMARKS
	WIDTH	HEIGHT	DETAIL	MATERIAL	FINISH	TYPE	MATERIAL	FINISH		
①	6'-0"	MATCH (E)	—	(E)	(E)	④	(E)	(E)	1	ENTRANCE
②	3'-0"	MATCH (E)	—	—	—	②	HM	P	2	EXTERIOR SIDE DOOR
③	3'-0"	8'-0"	12/A-3.1	AL	P	②	WD	ST	5	CONFERENCE ROOM
3A	3'-0"	8'-0"	12/A-3.1	AL	P	③	WD GL	ST	5	ALL OFFICES, VESTIBULE
④	3'-0"	8'-0"	—	AL	—	①	WD	ST		MDF
⑤	6'-0"	8'-0"	12/A-3.1	AL	P	①	WD	P	3	CLOSET
⑥	3'-0"	8'-0"	12/A-3.1	AL	P	①	WD	ST	4	RESTROOM
⑦	3'-0"	8'-0"	12/A-3.1	AL	P	①	WD	P	-	JANITOR

DOOR TYPES



DOOR ABBREVIATIONS

AL.	ALUMINUM	MET.	METAL
GL.	GLASS	P	PAINT
H.C.	HOLLOW CORE	S.C.	SOLID CORE
H.M.	HOLLOW METAL	WD	WOOD
		ST.	STAINED FINISH

FINISH HARDWARE SCHEDULE

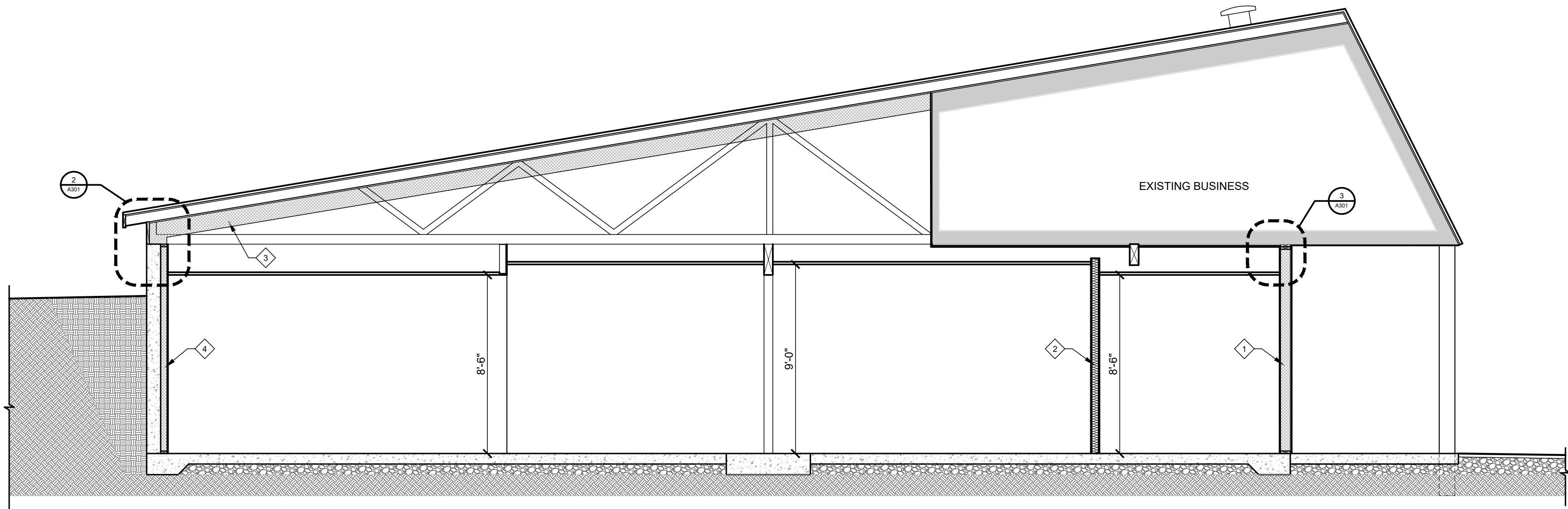
1. HARDWARE GROUP 1 (EXISTING MAIN ENTRANCE)(TBD)
- ELECTRIFIED LOCKSET, WIRE TRANSFER HINGE,
2. HARDWARE GROUP 2 (CONF. ROOMS, ALL OFFICES)
- HINGES: 4 - 5 KNUCKLE HAGER BB1279, 4 1/2" x 4 1/2", BHMA 625
- LATCHSET: SCHLAGE L9050 - PASSAGE LATCH W/AUTO UNLOCK
- STOP: GLYNN-JOHNSON FB14, US26
- DOOR SILENCER: CLEAR SILICONE
- COAT HOOK : IVES #581, 625 FINISH @ 5'-0" A.F.F. @ OFFICES ONLY.
3. HARDWARE GROUP 3 (MDF CLOSET)
- HINGES: 3 - 5 KNUCKLE HAGER BB1279, 4 1/2" x 4 1/2", BHMA625
- 1 - 4 1/2" x 4 1/2" 4 WIRE TRANSFER HINGE
- LOCKSET: SCHLAGE L9050EL - FAIL SAFE ELECTRIFIED LOCK
- CLOSER: LCN 4041, REGULAR ARM, BHMA 696
- STOP: GLYNN-JOHNSON FB14, US4
- DOOR SILENCER: CLEAR SILICONE
4. HARDWARE GROUP 4 (CLOSET, JANITOR)
- HINGES: 4 - 5 KNUCKLE HAGER BB1279, 4 1/2" x 4 1/2", BHMA 606
- LOCKSET: SCHLAGE L9010 - PASSAGE LATCH
- STOP: GLYNN-JOHNSON FB14, US4
- DOOR SILENCER: CLEAR SILICONE

16 CONSTRUCTION LAYOUT PLAN

'X' → SEE SPECIAL SHEET NOTES



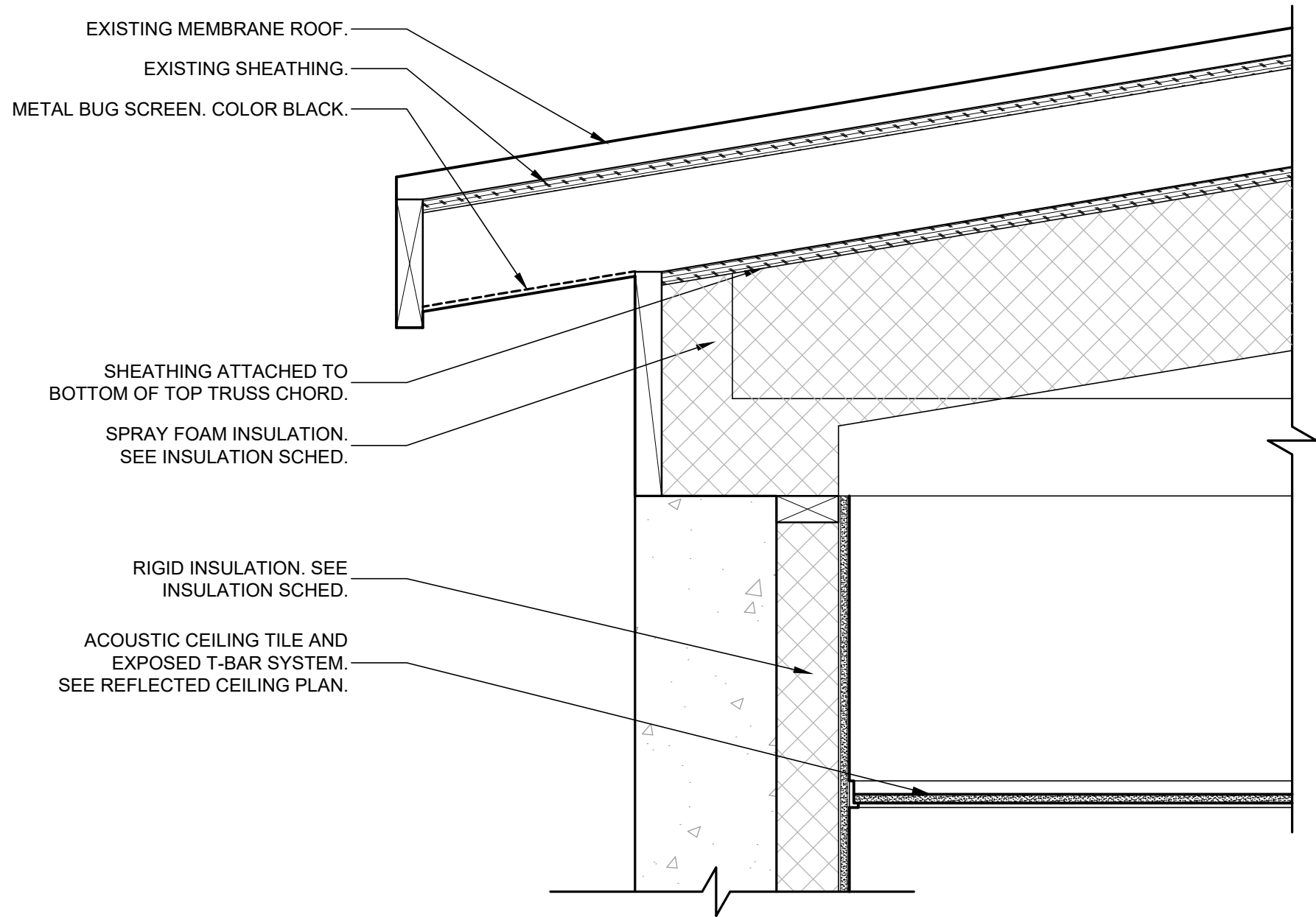
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1
A301

Section

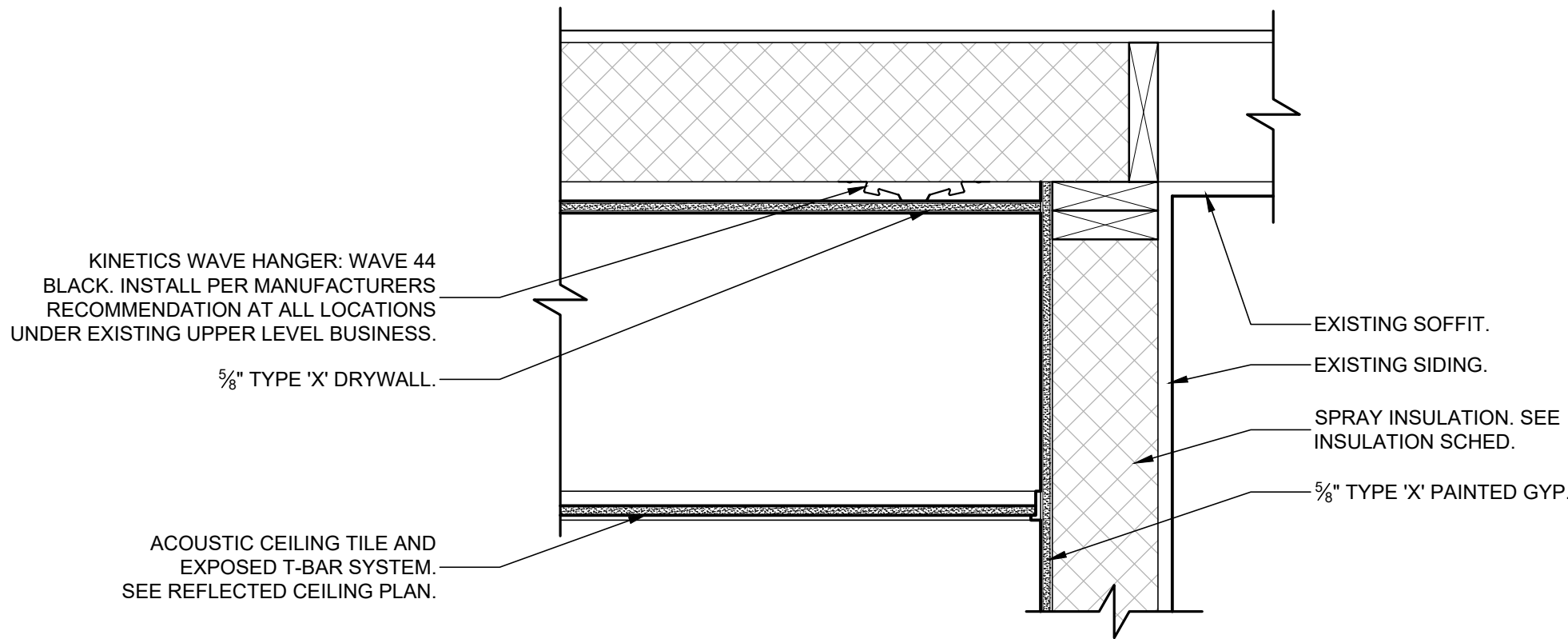
1/4"=1'-0"



2
A301

Eave Detail

1 1/2"=1'-0"

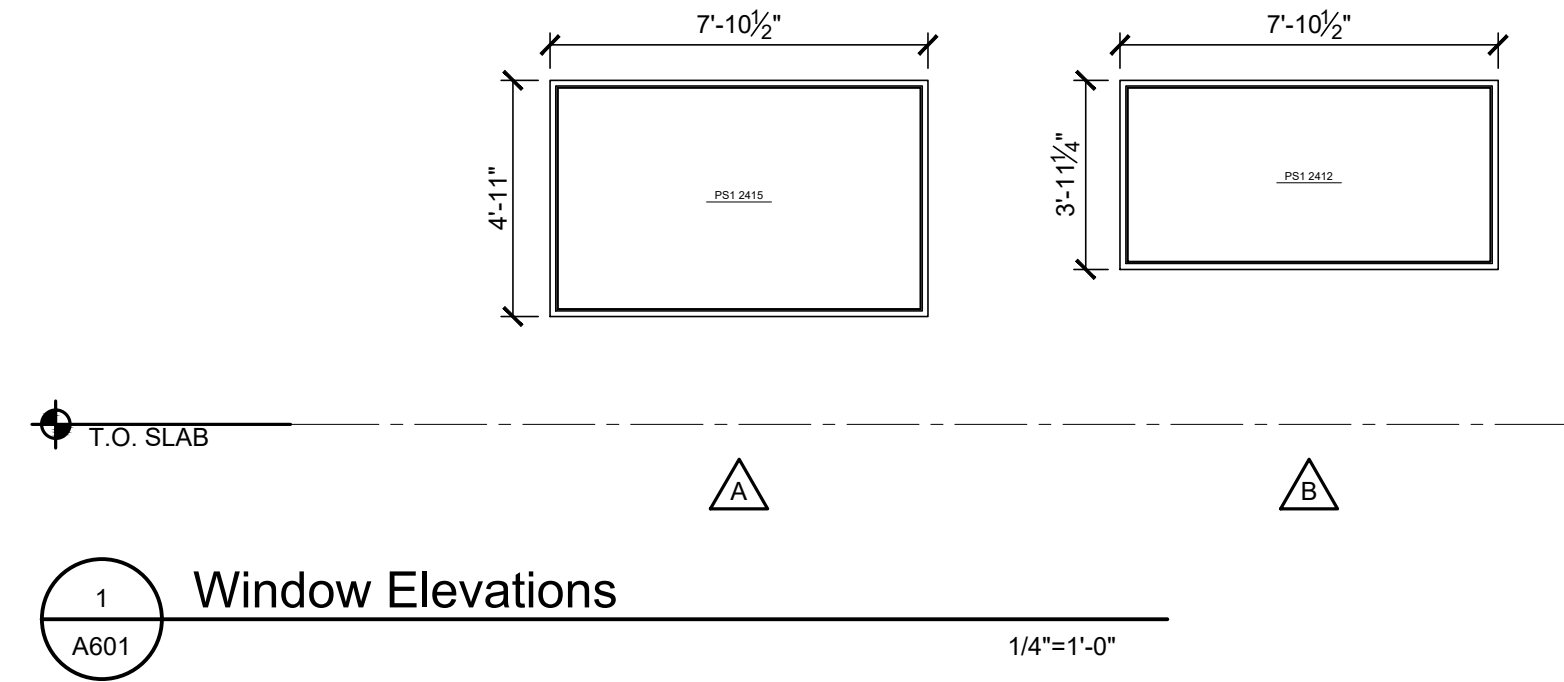


3
A301

Sound Isolation @ Ceiling

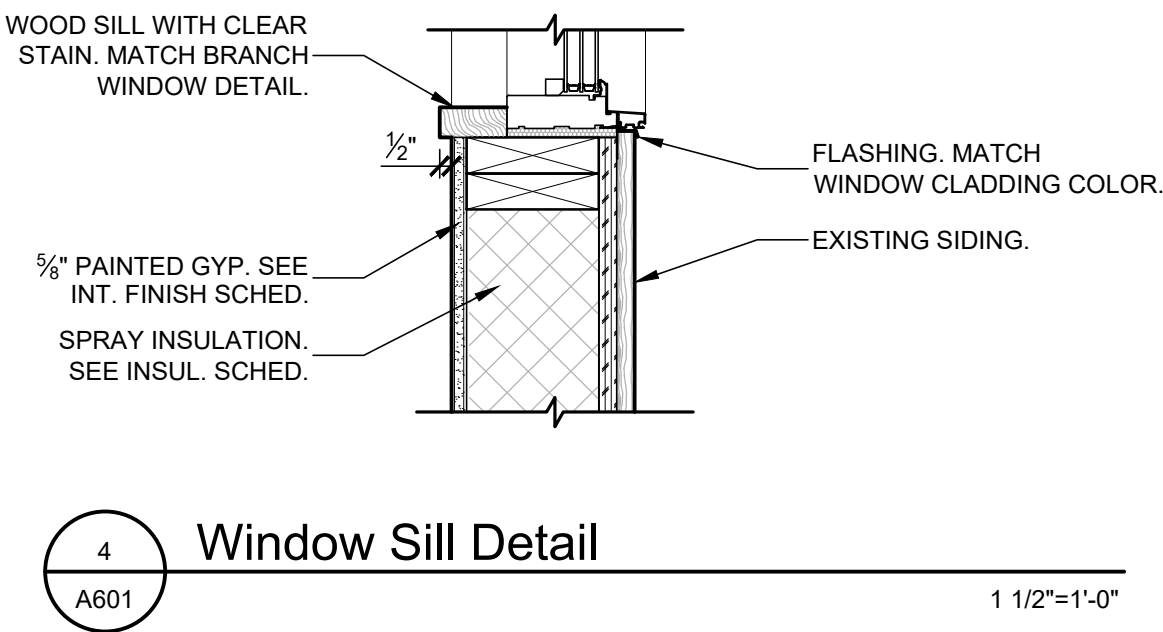
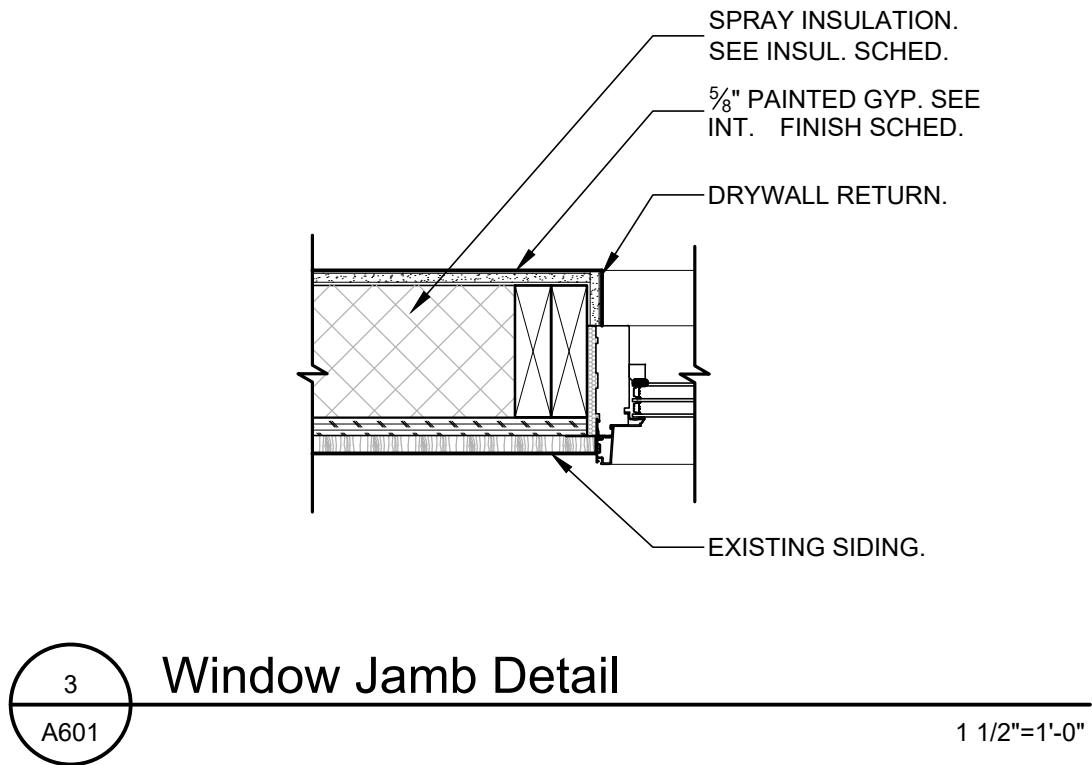
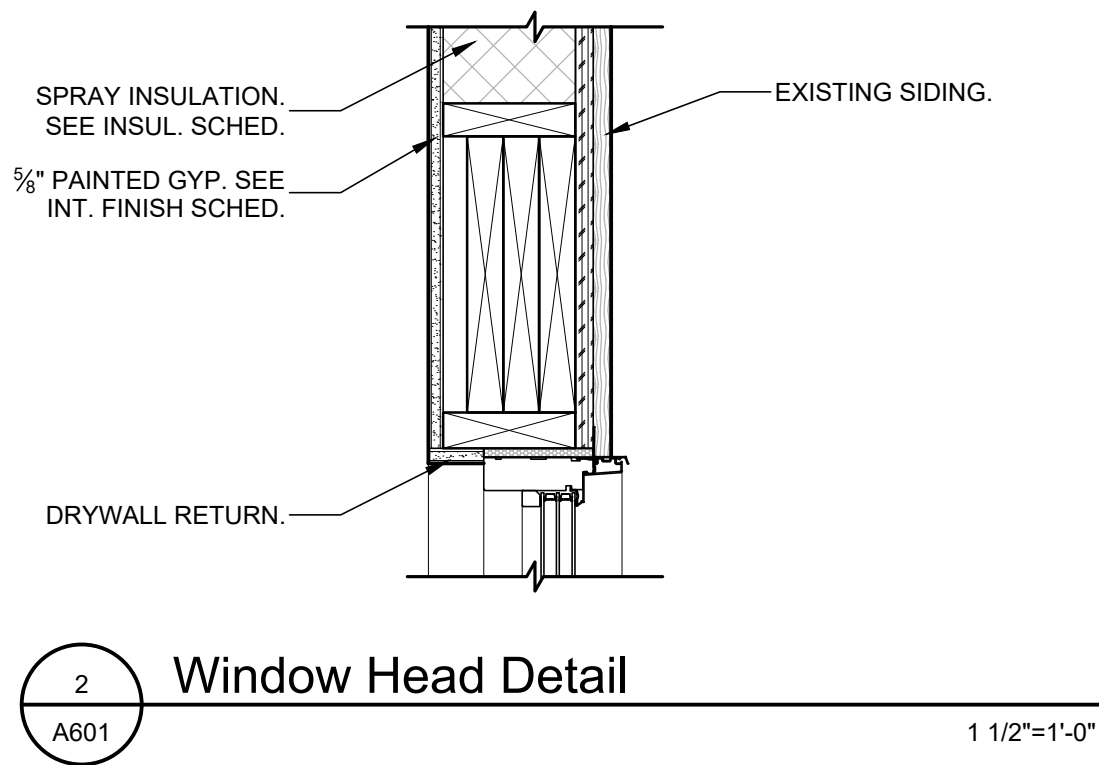
1 1/2"=1'-0"

INSULATION SCHEDULE			
LOCATION	R-VALUE	TOWN REQ'D R-VALUE	DESCRIPTION
1. EXTERIOR FRAMED WALL CAVITIES	R-29	R-20 + R-3.8ci	INSTALL 4.5" SPRAY FOAM INSULATION (R-29).
2. SOUND ISOLATION AT <u>ALL</u> INTERIOR WALLS & FLOORS	N/A	N/A	FILL SPACE WITH FRICTION-FIT FORMALDEHYDE FREE FIBERGLASS SOUND-ATTENUATION BATTS.
3. TRUSS FRAMED ROOF	R-60	R-49	INSTALL 9.5" SPRAY FOAM INSULATION (R-60) AT TOP OF TRUSS. PROVIDE DC315 INTUMESCENT COATING AT ANY EXPOSED INSULATION.
4. CONCRETE WALL	R-15		FUR OUT WALL AND FILL STUD SPACE WITH FOAMULAR 250 (R-15).
5. EXTERIOR WINDOWS	MAX U=0.13	MAX U=0.29	FILL RO SPACE WITH LOW EXPANDING SPRAY URETHANE (CLOSED CELL) INSULATION.
6. OPAQUE DOORS	MAX U=0.37	MAX U=0.37	FILL RO SPACE WITH LOW EXPANDING SPRAY URETHANE (CLOSED CELL) INSULATION.
7. MECHANICAL AND ELECTRICAL PENETRATIONS.	N/A	N/A	FILL RO SPACE WITH LOW EXPANDING SPRAY URETHANE (CLOSED CELL) INSULATION.
1• PROVIDE "TYVEK DRAINWRAP" OR EQUAL HOUSE WRAP OVER PLYWOOD SHEATHING AT ALL FRAMED EXTERIOR WALLS - TAPE ALL SEAMS W/ "TYVEK TAPE". • AT WINDOW AND DOOR ROUGH OPENINGS, CUT HOUSEWRAP IN A MODIFIED-I PATTERN PRIOR TO INSTALLING UNIT. • USE "TYVEK FLEXWRAP" OR EQUAL FOR FLASHING AT PANS & "TYVEK STRAIGHT FLASH" @ HEADS & LEGS. • PROVIDE APPROPRIATE "QUICKFLASH" OR EQUAL PRODUCT TO SEAL HOUSEWRAP AT ALL OTHER PENETRATIONS • LAP HOUSEWRAP OVER TOP EDGE OF ALL FLASHING AND DRIP EDGE METAL.			
2.CAULK ALL PLATES. CAULK ALL CRACKS (TRIMMERS, PANEL JOINTS, ETC...) TO ENSURE AIR TIGHTNESS.			
3. CONTRACTOR TO ARRANGE INSPECTION AT COMPLETION OF INSULATION'S INSTALLMENT AND PRIOR TO THE INSTALLATION OF ANY GYPSUM BOARD OR INTERIOR FINISH TRIM.			
4. PROVIDE INSULATION WRAP(R-5) ON ALL HOT WATER PIPING.			



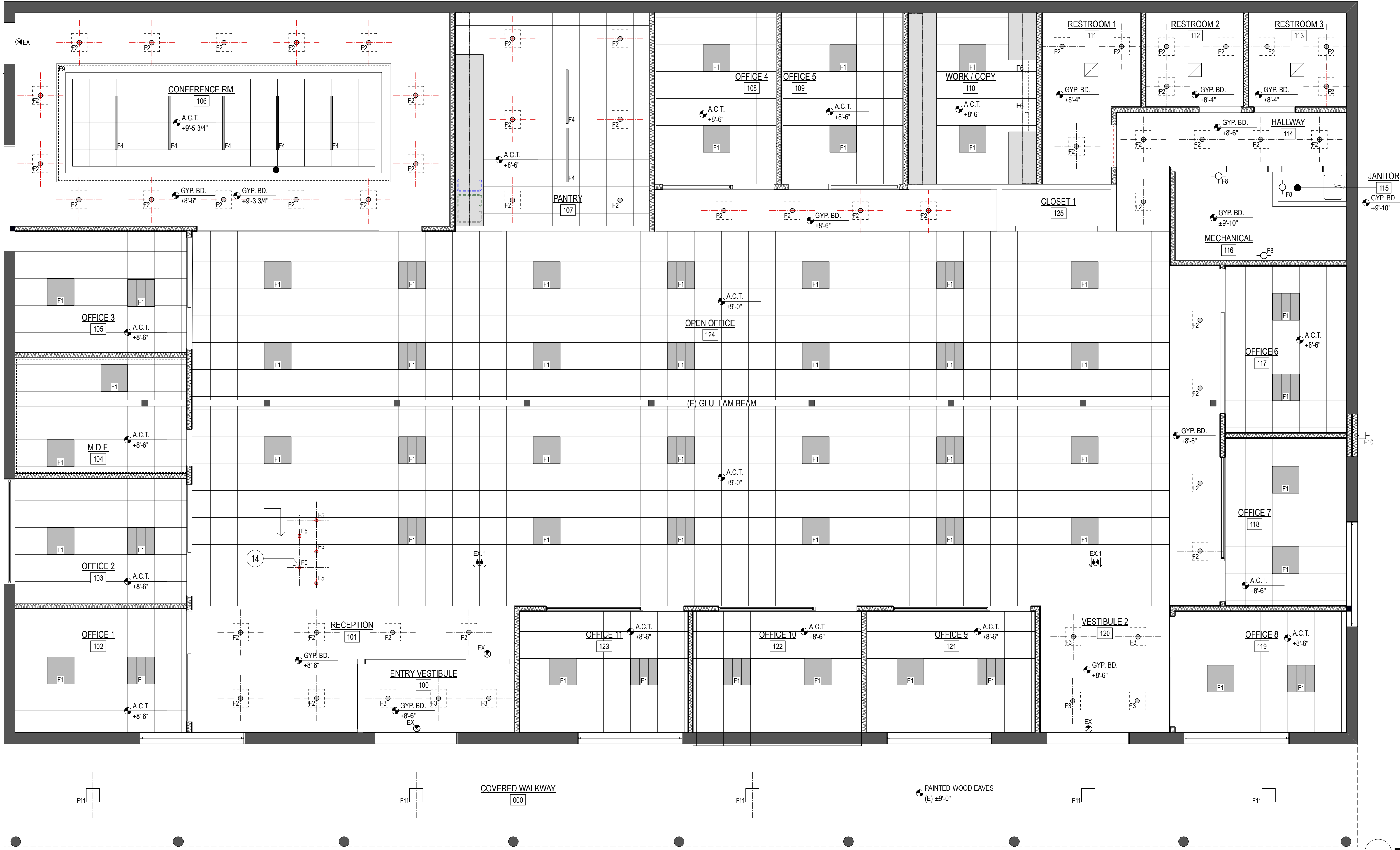
WINDOW & EXTERIOR DOOR SCHEDULE									
MARK	MANUFACTURER	WIDTH (INCHES)	X	HEIGHT (INCHES)	HEAD HGT ABOVE S.F.	DESCRIPTION	GLAZING AREA (SQ. FT.)	#	TOTAL AREA
A	LOEWEN	94.5	x	59	MATCH EXISTING	PICTURE	39.55	4	158.20
B	LOEWEN	94.5	x	47.25	MATCH EXISTING	PICTURE	31.74	3	95.22

NOTE 1. ALL WINDOWS TO BE METAL CLAD TRIPLE PANE. COLOR: MIDNIGHT BRONZE. CASING: CONTEMPORARY.
2. ALL WINDOW INTERIORS TO BE CLEAR DOUGLAS FIR WITH NO FINGER JOINTS.
3. ALL GLAZING TO BE TEMPERED HIGH ALTITUDE, LOW E INSULATING GLASS WITH U-VALUE OF .16 OR LESS.
4. GENERAL CONTRACTOR TO REVIEW EXISTING OPENING SIZES PRIOR TO ORDERING WINDOWS AND DOORS.



REFLECTED CEILING NOTES

- 1
- ALL REGISTERS AND LIGHTING FIXTURES SHALL OCCUR WITHIN GRID LINES, LIGHT FIXTURES, OR OTHER CEILING ELEMENTS SHALL BE LOCATED ON THE CENTER LINE OF ACOUSTIC PANELS, UNLESS OTHERWISE NOTED OR SHOWN. SEE MECHANICAL DRAWINGS FOR REGISTER LOCATIONS.
- 2
- SEE ELECTRICAL LIGHTING PLAN FOR SWITCHING.
- 3
- ALL LIGHT SWITCHES SHALL BE LOCATED +3'-4" TO CENTER LINE FROM TOP OF FINISH FLOOR, UNLESS OTHERWISE NOTED.
- 4
- ALL THERMOSTATS SHALL BE +4'-0" TO CENTER LINE FROM TOP OF FINISH FLOOR.
- 5
- LIGHT SWITCHES LOCATED ADJACENT TO EACH OTHER SHALL BE GANGED AND COVERED WITH A SINGLE PLATE. COLOR OF PLATES SHALL BE **WHITE** 'DECORA', UNLESS OTHERWISE NOTED.
- 6
- ALL CEILING HEIGHTS ARE REFERENCED FROM THE TOP OF FINISHED FLOOR.
- 7
- ACOUSTIC TILE CEILING:
ARMSTRONG WORLD INDUSTRIES., INC., CIRRUS #589, 24" X 24"
- 8
- EXPOSED T-BAR SYSTEM:
ARMSTRONG SUPRAFINE, XL 9/16" EXPOSED TEE SYSTEM
 - MAIN BEAMS : 7501 (144", ROUTS 6" O.C., HEAVY-DUTY)
 - CROSS TEE : XL7520 (24")
- 9
- CEILING GRID SHALL BE CENTERED WITHIN ROOM WHERE WALLS EXTEND SLAB TO STRUCTURE, U.O.N. OR DIMENSIONED.
- 10
- UNDERCABINET LIGHT FIXTURES, PROVIDED IN WORK/COPY & CDU ROOMS & THE 'KITCHEN' SHALL BE SWITCHED SEPARATE FROM ROOM LIGHTS.
- 11
- COORDINATE LIGHT FIXTURE SCHEDULE WITH ELECTRICAL DRAWINGS. DISCREPENCIES TO BE BROUGHT TO THE ARCHITECT'S ATTENTION.
- 12
- ADJUSTABLE RECESSED LIGHT FIXTURES: FINAL ADJUSTMENT OF LAMPS TO OCCUR PRIOR TO BRANCH OPENING.
- 13
- ACCESS PANELS: GLASS FIBER REINFORCED GYPSUM CEILING ACCESS PANELS:
 - 18" X 18"
 - TAPERED EDGE FOR TAPE JOINT
 - PAINTABLECOORDINATE LOCATIONS WITH MECHANICAL TO ALLOW ACCESS TO VOLUME DAMPERS.
- 14
- FIXTURE TYPE 'F8 MOUNTING HEIGHTS WILL BE VERIFIED IN THE FIELD WITH ARCHITECT & TENANT PRIOR TO FINAL MOUNTING/INSTALLATION.
- 15
- WIRELESS ACCESS POINT (WAP):
BANK'S CABLING VENDOR WILL RUN CABLE & INSTALL DEVICES AT MARKED LOCATIONS.
- 16
- SIGNAGE POWER. COORDINATE EXACT LOCATION & HEIGHTS WITH SIGNAGE VENDOR. SEE ELECTRICAL FOR ADDITIONAL INFORMATION.
- 17
- POWER ASSIST CONCEALED DOOR OPERATOR.



16 REFLECTED CEILIN PLAN
'X' → SEE REFLECTED CEILING NOTES

Scale: 1/4" = 1'-0"

LIGHT FIXTURE SCHEDULE:

TYPE	DESCRIPTION	MANUFACTURER CATALOG #	VOLT	LAMPS	TYPE	DESCRIPTION	MANUFACTURER CATALOG #	VOLT	LAMPS
F1	2 x 2 RECESSED LED FIXTURE WITH CLEAR PRISMATIC LENS	LITHONIA 2X2 LED LIGHT FIXTURE #2RTL2-33L-MVOLT-EZ1-LP830	MVOLT	3332 LUMENS 26.0 WATTS	EX	LITHONIA LRP-LED-BS-1-GC-120/277	SINGLE FACE EXIT SIGN WITH BATTERY BACKUP,	277	LED
F2	RECESSED 4" ROUND - OPEN REFLECTOR DOWNLIGHT - LED	GOTHAM ARCHITECTURAL DOWNLIGHTS - ROUND EVO-30/07-4AR-MD-LSS-MVOLT-EZ1-TRW	MVOLT	849 LUMENS 10.3 WATTS	EX.1	LITHONIA LRP-LED-BS-1-GC-RA-120/277	SINGLE FACE EXIT SIGN WITH BATTERY BACKUP, ARROWS AS INDICATED ON PLAN	277	LED
F3	RECESSED 4" ROUND - OPEN REFLECTOR DOWN LIGHT - LED	GOTHAM ARCHITECTURAL DOWNLIGHTS - ROUND EVO-30/10-4AR-MD-LSS-MVOLT-EZ1-TRW	MVOLT	1189 LUMENS 12.8 WATTS	EX.2	LITHONIA LRP-LED-BS-2-GMR-DA-277-X2	DOUBLE FACE EXIT SIGN WITH BATTERY BACKUP, ARROWS AS INDICATED ON PLAN	277	
F4	2" X 48 DIRECT/INDIRECT SUSPENDED LINEAR LED FIXTURE	PINNACLE LIGHTING - 'EDGE AB LED' EX2B-A-0-830HQ-830-4-AC489G9-U-ND-1-0-W	UNV	585LUMENS/FT 10.2W/FT 3000K					
F5	SURFACE MOUNTED TUBULAR PENDANT FIXTURE, PROVIDED BY OWNER INSTALLED BY CONTRACTOR. REFER TO REFLECTED CEILING NOTE ON SHEET A-5	TECH LIGHTING 'PIPER' 700 FJ PPR ZZ LEDS930 (N.I.C.)	277	435 LUMENS 8W LED 3000K SORAA LED MODULE					
F6	UNDERCABINET SLIMLINE LED FIXTURE	TECH LIGHTING: 700UCF-31-9-3-W-LED	120	1224 LUMENS 18 WATTS					
F7	UNDERCABINET SLIMLINE LED FIXTURE	TECH LIGHTING: 700UCF-19-9-3-W-LED	120	693 LUMENS 10.5 WATTS					
F8	48" SURFACE MOUNTED FLOURESCENT FIXTURE	LITHONIA CB-1-32-MVOLT-GE8101S EXISTING TO BE RELOCATED	277	1-F32T8 32 WATTS					
F9	HIGH OUTPUT LEDHESIVE LINEAR LED LIGHTING AT COVE LIGHT AT CONFERENCE ROOM 1	KELVIX LEDHESIVE: H3K-3000K-12V DC CONSTANT VOLTAGE W/2 96HE-24V 0-10V DIMMING DRIVERS, 2 FACTORY MADE CORNERS & 2 FACTORY MADE LEADS	120	66 LIN FT (APPROX) 147W (APPROX)		INDEPENDENT ELECTRIC SUPPLY 460 TESCONI CIR SANTA ROSA, CA 95401 PH:707-577-7900 FX:707-577-0306			
F10	OUTDOOR SURFACE MOUNTED LED FIXTURE	LITHONIA WST LED P1 30K VW MVOLT DDBXD	MVOLT	1548 LUMENS 12 WATTS		PLEASE CONTACT KELLY SMARTT (KELLY.SMARTT@IESUPPLY.COM) FOR QUOTE REQUESTS. SHE WILL ALSO BE THE CONTACT FOR ORDERING & PROJECT MANAGEMENT AS WELL			
F11	OUTDOOR CEILING MOUNT OUTDOOR LED FIXTURE	LUMINIS NAUTILUX WITH POLYCARBONATE LENS NT802CLW30-30W-120V-BZT-P6	120	1380 LUMENS 30 WATTS					

HOYT
architects

Jackson Wyoming
307.733.9955

565 W. BROADWAY
JACKSON, WY
FIRST REPUBLIC BANK

LICENSED ARCHITECT
GEORGE B. HOYT
(B-0183)

STATE OF WYOMING

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REVISIONS

REFLECTED CEILING
PLAN

A901

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Ver: 15.1
Revised by: melling on Jan 14, 2020 - 12:03pm

STRUCTURAL NOTES:

GOVERNING DESIGN CODES AND REFERENCES:

International Building Code (IBC), 2018 Edition
International Residential Code (IRC), 2018 Edition
Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE 7-16
Building Code Requirements for Structural Concrete, ACI 318-14
National Design Specification (NDS) for Wood Construction, 2018 Edition

DESIGN LOADS:

DEAD LOADS:
OVERBURDEN SOIL UNIT WEIGHT - 125 pcf. ASSUMED WEIGHT OF BACKFILL
CONCRETE UNIT WEIGHT - 150 pcf.
ROOF DEAD LOAD - 20 psf.
FLOOR DEAD LOAD - 20 psf.
FLOOR w/ CONCRETE DEAD LOAD - 40 psf. ASSUMES 1½" CONCRETE
WALL DEAD LOAD - 15 psf.
STONE MASONRY LOAD - 60 psf. ASSUMES 6" STONE THICKNESS

LIVE LOADS:
ROOF LIVE LOAD - 20 psf., CONSTRUCTION LOAD
FLOOR LIVE LOAD - 50 psf., OFFICE LIVE LOAD

SNOW LOAD (ASCE7-16 CHAPTER 7):
GROUND SNOW LOAD - 107.14 psf.
FLAT ROOF SNOW LOAD - 75 psf. PER TOWN OF JACKSON
EXPOSURE FACTOR (Ce) - 1.00
THERMAL FACTOR (Ci) - 1.00
IMPORTANCE FACTOR (Is) - 1.00

SOILS:
ALLOWABLE SOIL BEARING - 1500 psf. (PER 2018 IBC, TABLE 1806.2)
PASSIVE LATERAL PRESSURE - 360 psf/ft
ACTIVE LATERAL PRESSURE - 40 psf/ft
AT-REST LATERAL PRESSURE - 60 psf/ft
SEISMIC LATERAL PRESSURE - 24.9 ptf APPLIED AT 60% WALL HEIGHT
(ABOVE LISTED LATERAL LOADS BASED ON SOIL UNIT WEIGHT OF 120pcf AND INTERNAL FRICTION ANGLE OF 30°)
(SEE LATERAL LOADING DETAILS ON S1.1 FOR GRAPHICAL REPRESENTATION)

FOUNDATIONS:

- BOTTOM OF ALL FOOTINGS TO BEAR ON RE-COMPACTED NATIVE INORGANIC SOIL.
- BACK FILL UNDER SLABS ON GRADE IS TO CONSIST OF 4" CRUSHED GRAVEL (GRADING H) COMPACTED TO 95% MAXIMUM DRY DENSITY, (ASTM D-698 MODIFIED PROCTOR), OVER RE-COMPACTED NATIVE SOIL.

CAST-IN-PLACE CONCRETE:

- CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE (ACI) BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318-14.
- CAST-IN-PLACE CONCRETE SHALL CONFORM TO:

Walls: Minimum 28 day compressive strength = 4500 psi
Entrained Air Content: 6% ±1%
Slump Range: 2-4 Inches
Maximum water/cement ratio: 0.45

Footings: Minimum 28 day compressive strength = 3500 psi
Entrained Air Content: 6% ±1%
Slump Range: 2-4 Inches
Maximum water/cement ratio: 0.55

Interior Slabs: Minimum 28 day compressive strength = 2500 psi
Entrained Air Content: 6% ±1%
Slump Range: 4-6 Inches
Maximum water/cement ratio: Not Applicable

Exterior Slabs: Minimum 28 day compressive strength = 5000 psi
Entrained Air Content: 6% ±1%
Slump Range: 4-6 Inches
Maximum water/cement ratio: 0.40

- CONCRETE COVER OVER REINFORCING BARS SHALL BE 3" FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, 2" FOR CONCRETE NOT CAST AGAINST BUT PERMANENTLY EXPOSED TO EARTH, 1½" MIN. FOR ALL OTHER CONCRETE EXPOSED TO EARTH OR WEATHER, UNLESS NOTED OTHERWISE IN PLANS.

- ALL EXTERIOR WALLS BELOW GRADE TO BE DAMP PROOFED. FOR BASEMENTS IN HIGH GROUND WATER AREAS, WATERPROOF WALLS TO 1'-0" ABOVE HIGH GROUND WATER ELEVATION.

- LAP REINFORCING BARS AT SPLICES, CORNERS AND INTERSECTIONS.

#3 Reinforcing Bars - 1'-3" #7 Reinforcing Bars - 3'-6"
#4 Reinforcing Bars - 1'-8" #8 Reinforcing Bars - 4'-0"
#5 Reinforcing Bars - 2'-0" #9 Reinforcing Bars - 4'-6"
#6 Reinforcing Bars - 2'-6"

UNLESS OTHERWISE NOTED ON THE FOUNDATION PLAN AND DETAILS.

- USE DEFORMED STEEL BAR CONFORMING TO ASTM A615 GRADE 60, EXCEPT #3 BAR STIRRUPS AND TIES AND FIELD BENT DOWELS WHICH SHALL BE ASTM A615 GRADE 40.

- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A82 OR A185 AND SHALL BE PROVIDED IN FLAT SHEETS.

- ALL REINFORCING IS TO BE SUPPORTED BY CHAIRS OR CONCRETE BRICKS AND SECURELY TIED IN PLACE.

- REINFORCING STEEL SHALL NOT BE WELDED.

10. WET SETTING REINFORCING REQUIREMENTS:

- REBAR TO BE BENT INTO AN "L" SHAPE SUCH THAT THE HOOK END IS 8" MINIMUM MEASURED ALONG THE STRAIGHT SECTION OF THE HOOK AND TO HAVE SUFFICIENT LENGTH ON THE VERTICAL SUCH THAT THE HOOK IS AT THE FOOTING REINFORCING AND EXTENDS ABOVE THE TOP SURFACE OF THE FOOTING BY THE LAP DISTANCE SPECIFIED IN THE CONCRETE NOTES ON SHEET S1.0 OF THE STRUCTURAL PLANS.
- WHEN PLACING THE REBAR INTO THE FRESH CONCRETE, RE-VIBRATE THE CONCRETE TO ENSURE FULL ENGAGEMENT BETWEEN THE BARS AND CONCRETE AND TO FILL ANY VOIDS AROUND THE REINFORCING BARS THAT DEVELOPED DURING INSTALLATION INTO THE CONCRETE. PLACE REBAR SUCH THAT THE WALL REINFORCING CAN BE TIED TO THE VERTICAL BAR AND IS LOCATED AS SPECIFIED IN THE FOUNDATION WALL SCHEDULE AND STRUCTURAL DETAILS.

DIMENSIONAL LUMBER AND TIMBERS:

- SAWN LUMBER MATERIALS, (U.N.O. ON PLANS AND DETAILS):
-MULTI-PLY LUMBER BEAMS, RAFTERS, JOISTS, AND COLUMNS TO BE SELECT STRUCTURAL DOUGLAS FIR - LARCH.
-SOLID SAWN TIMBER BEAMS AND COLUMNS TO BE DENSE No. 1 OR BETTER DOUGLAS FIR-LARCH.
-TOP AND BOTTOM WALL PLATES TO BE No. 1 & BTR DOUGLAS FIR-LARCH.
-STUDS TO BE No. 2 OR BETTER DOUGLAS FIR - LARCH.

- ALL DIMENSIONAL LUMBER TO BE NOMINAL SIZES UNLESS SPECIFIED AS FULL SIZE IN THE PLANS AND DETAILS.

- EXTERIOR WALL HEADERS TO BE MINIMUM DOUBLE 2x8 WITH 4ea. 12d NAILS @ 16" o.c., UNLESS OTHERWISE NOTED ON FRAMING PLANS. INTERIOR WALL HEADERS TO BE MINIMUM DOUBLE 2x4 WITH 2ea. 12d NAILS @ 16"o.c. UNLESS NOTED OTHERWISE.

- PRE-ENGINEERED "PLATE" TRUSSES SHALL BE DESIGNED BY THE TRUSS FABRICATOR TO SUPPORT THE FULL DEAD LOADS AND THE SUPERIMPOSED DESIGN LOADS NOTED ABOVE OR ON THE DRAWINGS. WEB ARRANGEMENTS AND MEMBER FORCES SHALL BE DETERMINED BY THE FABRICATOR. STAMPED AND SEALED TRUSS ENGINEERING SHEET SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO FABRICATION OF THE TRUSSES.

- FRAMING ANCHORS AND CONNECTORS TO BE "STRONG TIE" BY SIMPSON OR APPROVED AND EQUAL INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.

- SILL PLATES TO BE ATTACHED TO THE FOUNDATION WITH ½"x12" @ 4'-0" o.c. ANCHOR BOLTS WITH 3"x3"x¾" SQUARE WASHERS AND HEX NUTS. REFER TO TYPICAL FOUNDATION DETAILS FOR ANCHOR BOLT PLACEMENT.

- FOR NAILING NOT SHOWN ON PLANS USE THE FASTENING SCHEDULE IN THE TYPICAL FRAMING DETAILS OR THE INTERNATIONAL BUILDING CODE NAILING SCHEDULE (2018 I.B.C. TABLE 2304.10.1).

- WHERE WOOD FRAMING IS IN CONTACT WITH CONCRETE FOUNDATION, USE PRESSURE TREATED WOOD PRODUCTS.

- USE GALVANIZED OR STAINLESS STEEL FASTENERS WHEN NAILING INTO PRESSURE TREATED MATERIALS.

- ALL FRAMING NAILS TO HAVE A MINIMUM SHANK DIAMETER AS SPECIFIED IN THE MINIMUM FASTENING SCHEDULE IN THE TYPICAL FRAMING DETAILS. ALL SHEATHING NAILS TO HAVE A MINIMUM SHANK DIAMETER OF 0.131"Ø. FLOOR SHEATHING FASTENERS TO ALSO BE RING SHANKED.

ENGINEERED WOOD PRODUCTS:

- LAMINATED VENEER LUMBER (LVL) SHALL HAVE A MINIMUM MODULUS OF ELASTICITY OF 2.0E+6psi AND MARKED ACCORDINGLY. SUBSTITUTION OF A LOWER GRADE WILL REQUIRE A REVIEW OF ALL AFFECTED BUILDING ELEMENTS AND POSSIBLE REDESIGN.

- ALL LAMINATED VENEER LUMBER (LVL) TO BE SUPPLIED AT THE NOMINAL SIZE INDICATED IN THE PLANS OR BUILT UP ON SITE WITH 1½" WIDE BY FULL HEIGHT MEMBERS. CONNECT BUILT UP PLIES WITH 16dX0.164"Ø NAILS. EACH ROW OF NAILS TO BE SPACED @ 2½"o.c. AND ROWS SPACED AT MAXIMUM OF 12"o.c.

- GLUED LAMINATED SOFTWOOD TIMBER (GLULAM) SHALL BE 24F-V4 DF/DF IN ACCORDANCE WITH 2018, UNLESS OTHERWISE NOTED, AND HAVE A MODULUS OF ELASTICITY OF 1.8E+6psi AND MARKED ACCORDINGLY. AT MULTI-SPAN BEAM CONDITIONS AND CANTILEVERS, GLUED LAMINATED TIMBER (GLULAM) SHALL BE 24F-V8 DF/DF AND HAVE A MODULUS OF ELASTICITY OF 1.8E+6psi AND MARKED ACCORDINGLY.

- ALL GLUED LAMINATED TIMBER (GLULAM) TO BE SUPPLIED AT THE NOMINAL SIZE INDICATED IN PLANS.

- ALL WOOD I-JOIST FRAMING TO BE TRUS JOIST TJI BY "WEYERHAEUSER", OR APPROVED EQUAL, AND SUPPLIED AT THE NOMINAL DEPTH AND SERIES AS INDICATED IN PLANS AND MARKED ACCORDINGLY. INSTALL PER MANUFACTURER'S SPECIFICATIONS. SEE SHEET S1.3 FOR I-JOIST NOTCHING DETAIL. SUBSTITUTION OF A LESSER GRADE I-JOIST WILL REQUIRE A REVIEW OF ALL AFFECTED ELEMENTS AND POSSIBLE REDESIGN.

STRUCTURAL CONNECTIONS:

- ANCHOR BOLTS TO BE INSTALLED @ 4'-0" o.c. UNLESS OTHERWISE NOTED ON PLANS AND ONE INSTALLED WITHIN 12" EACH DIRECTION FROM FOUNDATION CORNERS. USE ½"x8x12" "J" TYPE ANCHOR BOLTS IN EXTERIOR STEM WALLS WITH 3"x3"x½" SQUARE WASHERS AND STANDARD HEX NUTS.

- SHEAR WALL HOLDOWNS ARE TO BE LOCATED ON THE CENTERLINE OF THE WALL FRAMING OF THE SHEAR WALLS. FOR ACTUAL CONNECTION DETAILS, REFER TO THE HOLDOWN SCHEDULE FOR CALLOUTS.

- HANGERS/STRAPS/TIES TO BE "SIMPSON STRONGTIE" OR APPROVED EQUIVALENT AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS. REFER TO PLANS, SECTIONS AND DETAILS FOR CALLOUTS.

- STRUCTURAL KNIFE PLATES TO BE CUT INTO WOOD WITH A MAXIMUM OF ⅜" GREATER THICKNESS AND 1" GREATER WIDTH THAN THE KNIFE PLATE DIMENSIONS. CONNECT KNIFE PLATE AND WOOD MEMBERS WITH A MINIMUM OF 2 EACH ⅜"Ø THROUGH BOLTS, REFER TO DETAILS FOR ACTUAL SIZE AND QUANTITY OF BOLTS.

STRUCTURAL STEEL SPECIFICATIONS:

1. MATERIALS

- STRUCTURAL STEEL SHAPES, PLATES AND BARS

- M, S, C, AND L SHAPES ASTM A36
- W SHAPES ASTM A992
- HP SHAPES ASTM A572, GRADE 50

- PLATES AND BARS ASTM A36

1.3. STRUCTURAL STEEL TUBING

- RECTANGULAR SHAPES ASTM A 500, GRADE B, MIN. YIELD STRESS= 46ksi
- CIRCULAR SHAPES ASTM A 500, GRADE B, MIN. YIELD STRESS= 42ksi
- STEEL PIPE ASTM A53, TYPE-E, GRADE B, WEIGHT CLASS STANDARD.

1.4. BOLTS AND HARDWARE

- HIGH STRENGTH BOLTS - ASTM A325
- CONVENTIONAL BOLTS - ASTM A307
- WASHERS - ASTM A36

- WELDING ELECTRODES: COMPLY WITH AWS REQUIREMENTS

FIRE BLOCKING:

CONTRACTOR TO SUPPLY FIRE BLOCKING AS PER INTERNATIONAL BUILDING AND RESIDENTIAL CODES FOR VERTICAL AND HORIZONTAL STUD AND SOFFIT CAVITIES AND CHIMNEYS.

EXCAVATION AND GRADING:

- CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND SHALL PROMPTLY NOTIFY THE ENGINEER OF ANY VARIATIONS OR DISCREPANCIES.

- STRUCTURAL MEMBERS SHALL BE ADEQUATELY SHORED AND BRACED DURING CONSTRUCTION.

- ENGINEER SHALL BE CONTACTED PRIOR TO CONSTRUCTION TO PROVIDE CONSTRUCTION OBSERVATION WHEN ENGINEER'S CERTIFICATION IS REQUIRED FOR THE COMPLETED STRUCTURE.

- ALL EXCAVATION ACTIVITIES SHALL COMPLY WITH PERMIT REQUIREMENTS ISSUED FOR THE PROJECT. CONTRACTOR SHALL REVIEW AND BE RESPONSIBLE FOR PERMIT COMPLIANCE.

- TOPSOIL, VEGETATION AND UNSTABLE OR FROZEN SOIL SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE STRUCTURE OR EMBANKMENT.

SPECIAL INSPECTIONS:

IN ACCORDANCE WITH THE SPECIAL INSPECTIONS SECTION 1704 OF CHAPTER 17 OF THE 2018 INTERNATIONAL BUILDING CODE, THE FOLLOWING LIST OF SPECIAL INSPECTIONS ARE REQUIRED DURING THE CONSTRUCTION OF THE PROJECT:

NO SPECIAL INSPECTIONS ARE REQUIRED FOR THIS PROJECT.

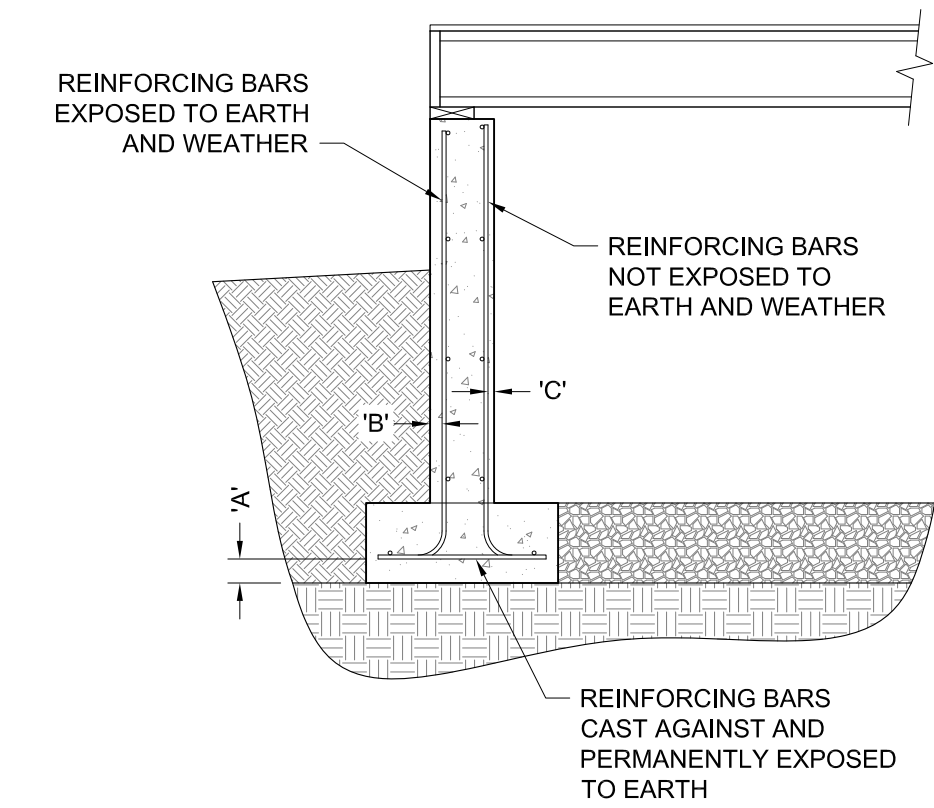
GENERAL CONTRACTOR IS REQUIRED TO COORDINATE SPECIAL INSPECTIONS WITH DESIGN ENGINEER PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION NOTES:

THESE STRUCTURAL DRAWINGS ILLUSTRATE THE COMPLETED STRUCTURE WITH ELEMENTS IN THEIR FINAL POSITION, PROPERLY SUPPORTED AND BRACED. THESE CONSTRUCTION DOCUMENTS CONTAIN TYPICAL AND REPRESENTATIVE DETAILS TO ASSIST THE CONTRACTOR. DETAILS SHOWN APPLY AT ALL SIMILAR CONDITIONS UNLESS OTHERWISE NOTED, (U.N.O.). ALTHOUGH DUE DILIGENCE HAS BEEN APPLIED TO MAKE THE DRAWINGS AS COMPLETE AS POSSIBLE, NOT EVERY DETAIL IS ILLUSTRATED, NOR IS EVERY EXCEPTIONAL CONDITION ADDRESSED. ALL PROPRIETARY CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS. ALL WORK SHALL BE IN COMPLIANCE WITH THE 2018 IBC OR IRC AND LOCAL CODES, COVENANTS, ORDINANCES AND BUILDING PERMIT.

THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL WORK, INCLUDING LAYOUT AND DIMENSION VERIFICATION, MATERIAL CONDITION, SHOP DRAWING REVIEW, AND THE WORK OF SUBCONTRACTORS. ANY DISCREPANCIES OR OMISSIONS DISCOVERED DURING THE COURSE OF THE WORK SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT AND ENGINEER. UNLESS OTHERWISE SPECIFICALLY INDICATED, THE DRAWINGS DO NOT DESCRIBE METHODS OF CONSTRUCTION.

WHERE PERIODIC OR CONTINUOUS INSPECTION IS REQUIRED BY THESE DOCUMENTS, GOVERNING BUILDING CODES, OR LOCAL ORDINANCES, THE OWNER SHALL EMPLOY AN INDEPENDENT INSPECTOR CERTIFIED IN THE PARTICULAR AREA OF THE REQUIRED INSPECTION. THE INSPECTOR SHALL BE RESPONSIBLE TO, AND REPORT TO, THE ARCHITECT AND BUILDING OFFICIAL.



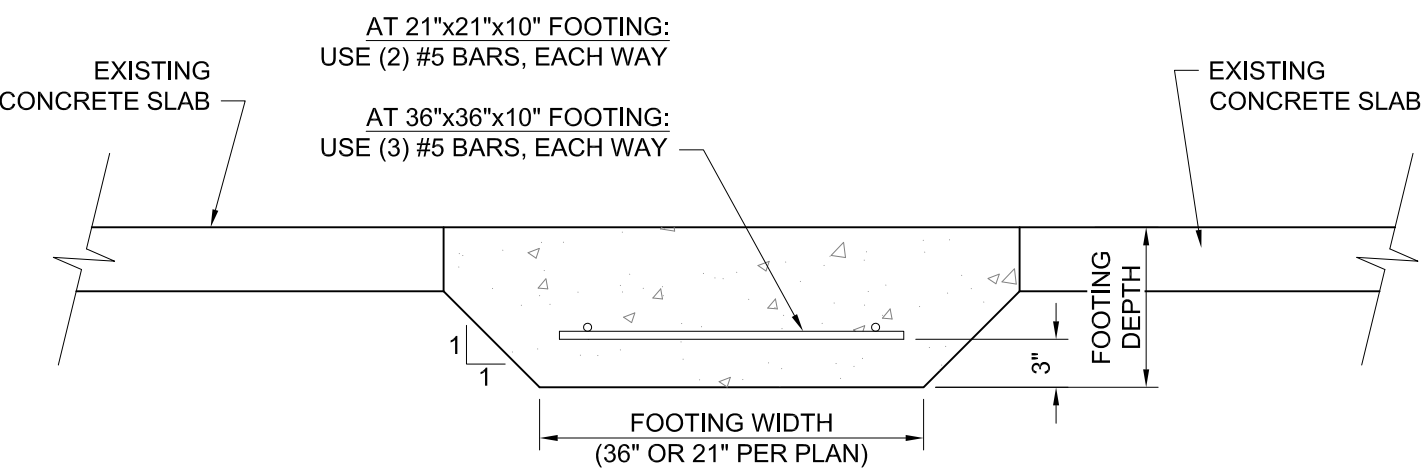
MINIMUM REINFORCING BAR COVER DISTANCES		
LOCATION	COVER DISTANCE	NOTES
'A'	3" MINIMUM	FOR ALL REINFORCING BAR SIZES
'B'	2" MINIMUM	FOR #6 BAR THROUGH #18 BAR
'B'	1½" MINIMUM	FOR #5 BAR AND SMALLER
'C'	1½" MINIMUM	FOR #14 AND #18 BARS
'C'	¾" MINIMUM	FOR #11 BARS AND SMALLER
BEAMS AND COLUMNS	1½" MINIMUM	FOR PRIMARY REINFORCEMENT, TIES, STIRRUPS, AND SPIRALS

NOTE:
USE THE ABOVE MINIMUM COVER DISTANCES WHEN THE ACTUAL LOCATIONS ARE NOT SPECIFIED IN THE STRUCTURAL NOTES, SCHEDULES, OR STRUCTURAL DETAILS.

MINIMUM REINFORCING BAR COVER DISTANCES

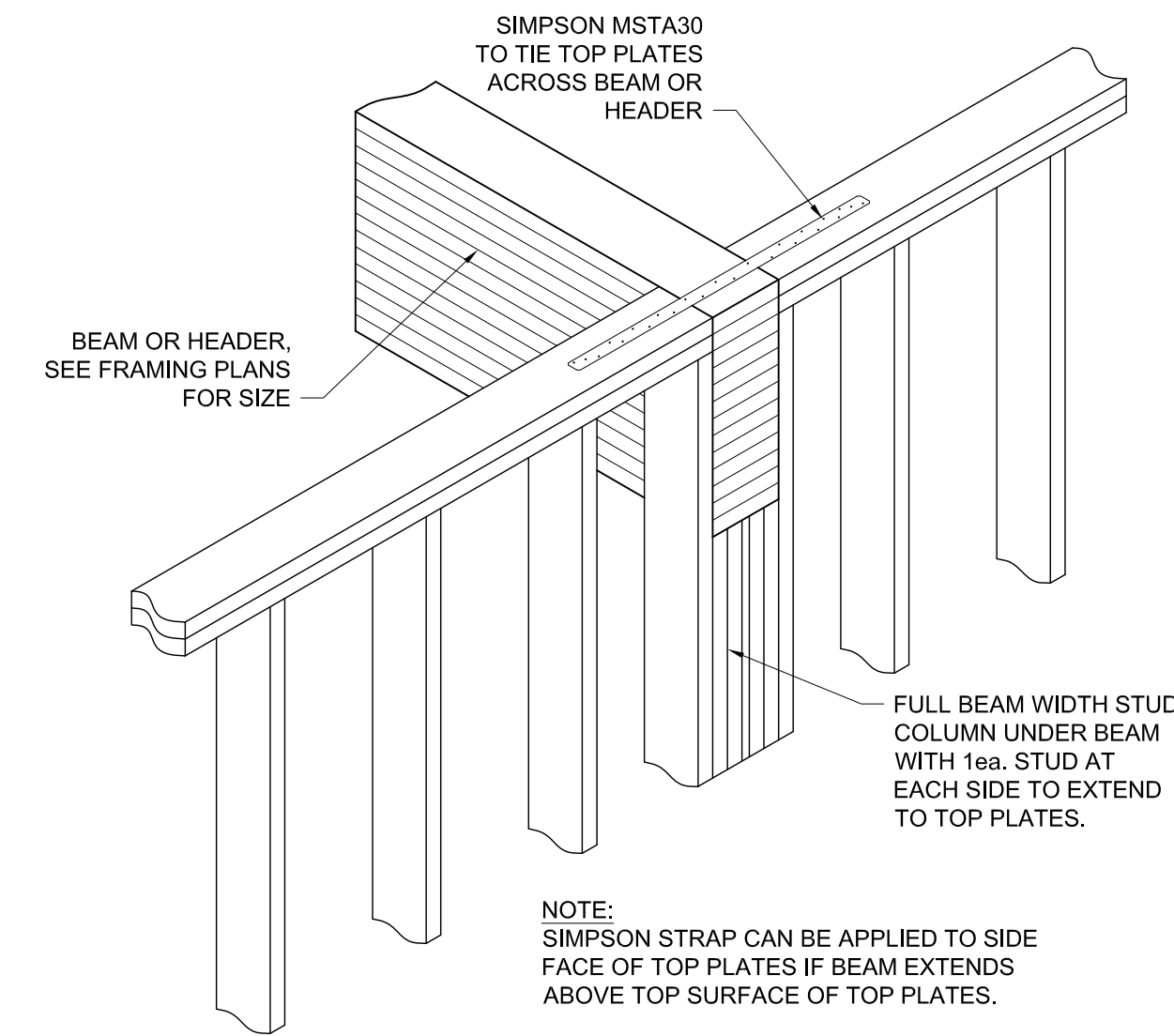
SCALE: ½"=1'-0"

PER ACI 318-14, CHAPTER 20, SECTION 20.6.1.3.1



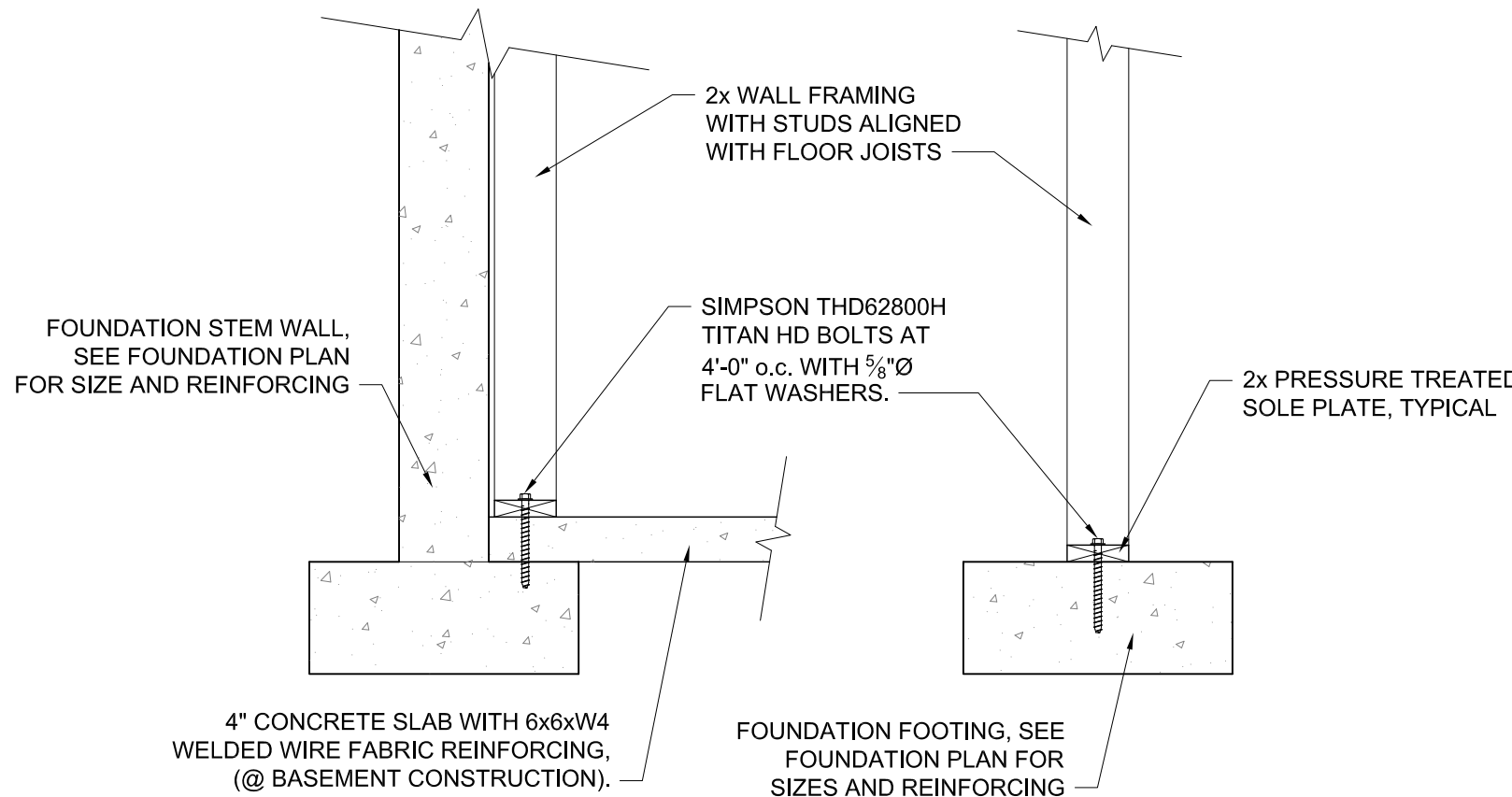
FOOTING DETAIL

SCALE: 1"=1'-0"



TYPICAL BEAM SUPPORT DETAIL

SCALE: ¾"=1'-0"



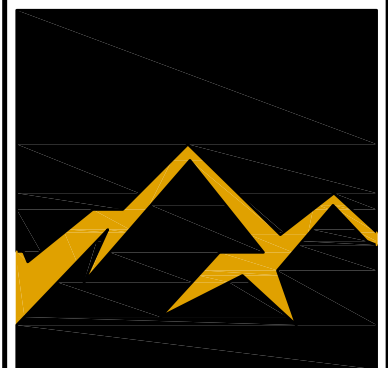
WALL CONNECTION DETAIL

SCALE: ¾"=1'-0"

@ FOOTINGS AND SLABS

Sheet Index

Sheet Number	Sheet Title
S1.0	STRUCTURAL NOTES AND TYPICAL DETAILS
S2.0	MAIN LEVEL FRAMING PLAN



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PROJECT TITLE:
FIRST REPUBLIC BANK
565 W. BROADWAY
JACKSON, WY

SHEET TITLE:
STRUCTURAL NOTES AND
TYPICAL DETAILS

DRAFTED BY:	MDL
REVIEWED BY:	JM
PLAN VERSION	DATE
FOR PERMIT	01/14/2020

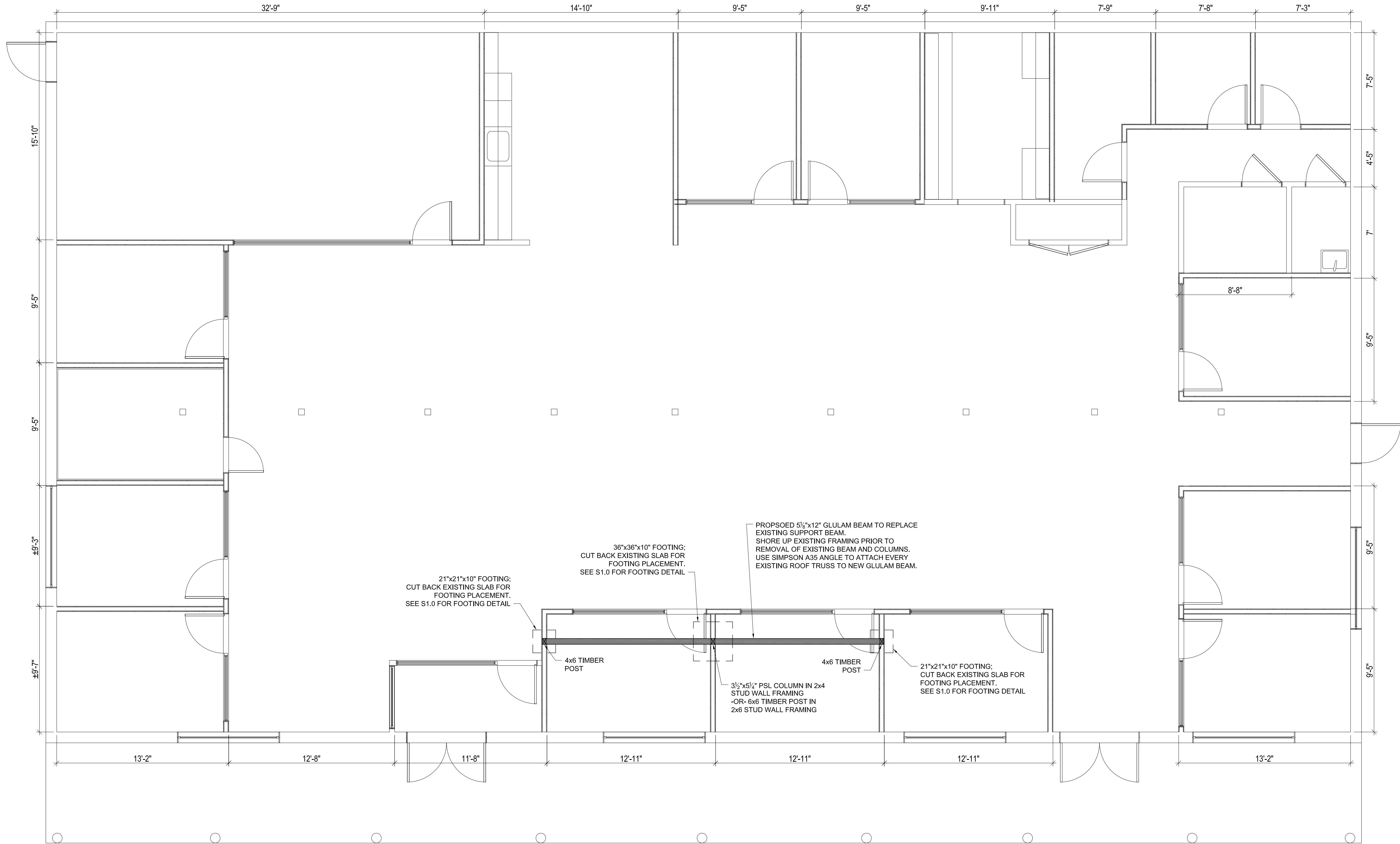
PROJECT NUMBER
20002

SHEET

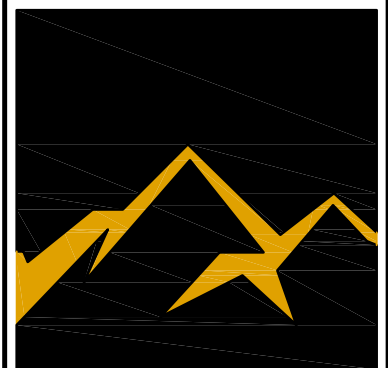
S1.0

ISSUED FOR PERMIT

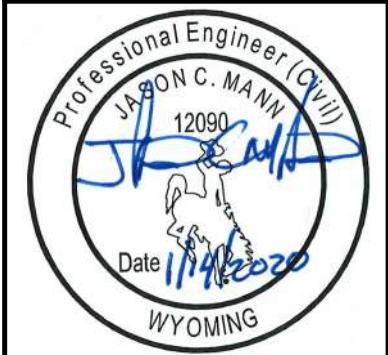
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MAIN LEVEL FRAMING PLAN
SCALE: 1/4"=1'-0"



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FOR PERMIT	01/14/2020

PROJECT NUMBER	20002
SHEET	S2.0

ISSUED FOR PERMIT

MECHANICAL LEGEND AND ABBREVIATIONS

ABBREVIATIONS - MECHANICAL	
ABV	ABOVE
ACC	AIR COOLED CONDENSER
ACD	AUTOMATIC CONTROL DAMPER
AD	ACCESS DOOR
AL	ACOUSTICAL LINING
ARCH	ARCHITECTURAL
BD	BALANCING DAMPER
BDD	BACK DRAFT DAMPER
BMS	BUILDING MANAGEMENT SYSTEM
BHP	BRAKE HORSE POWER
BTU	BRITISH THERMAL UNIT
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CO	CLEAN OUT
COMP	COMPRESSOR
CU	CONDENSING UNIT
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EUH	ELECTRIC UNIT HEATER
EWB	ENTERING WET BULB
°F	DEGREES FAHRENHEIT
F	FILTER
FBO	FURNISHED BY OTHERS
FC	FLEXIBLE CONNECTION (DUCT OR PIPE)
FCU	FAN COIL UNIT
FLA	FULL LOAD AMPS
FT	FEET
FTR	FIN TUBE RADIATOR
HC	HEATING COIL
HP	HORSE POWER
HR	HOURLY
HRU	HEAT RECOVERY UNIT
ID	INSIDE DIMENSION
KW	KILOWATT
KWH	KILOWATT HOURS
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	LINEAR DIFFUSER
LWS	LOUVER WITH WIRE SCREEN
MAT	MIXED AIR TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MFG	MANUFACTURER
MFS	MAXIMUM FUSE SIZE
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
NFA	NET FREE AREA
NIC	NOT IN THIS CONTRACT
NK	NECK
NTS	NOT TO SCALE
OAI	OUTSIDE AIR INTAKE
OD	OUTSIDE DIMENSION
PD	PRESSURE DROP
PHX	PLATE HEAT EXCHANGER
PSI	POUNDS PER SQUARE INCH (GAUGE)
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
RA	RETURN AIR
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SF	SUPPLY FAN
SENS	SENSIBLE
SM	SHEET METAL
SP	STATIC PRESSURE
SQFT	SQUARE FEET
TF	TRANSFER FAN

ABBREVIATIONS - MECHANICAL	
TRD	TRANSFER DUCT
TRG	TRANSFER GRILLE
TX	TOILET EXHAUST
TYP	TYPICAL
VAR	VARIABLE
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
W/	WITH
WB	WET BULB
WG	WATER GAUGE
WO-SIZE	WALL OPENING - [SIZE]
(300)	CUBIC FEET OR AIR PER MINUTE OR GALLONS PER MINUTE

PIPING LEGEND	
	COMBINED REFRIGERANT LIQUID/SUCTION PIPING
	ARROW INDICATES DIRECTION OF FLOW
	PITCH PIPE DOWN IN DIRECTION OF ARROW
	CONDENSATE DRAIN LINE
	UNION
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	BOTTOM PIPE CONNECTION
	TOP PIPE CONNECTION
	SLOPED CHANGE IN PIPE ELEVATION
	SHUT-OFF VALVE
	REFRIGERANT EXPANSION VALVE
	SIGHT GLASS
	VALVE IN VERTICAL

DUCTWORK LEGEND	
	DUCT SPLIT WITH SPLIT SIZE
	RADIUS ELBOW
	ELBOW WITH TURNING VANES
	RECTANGULAR BRANCH TAKEOFF WITH BALANCING DAMPER
	RECTANGULAR SUPPLY DUCT UP
	RECTANGULAR SUPPLY DUCT DOWN

DUCTWORK LEGEND (CONTINUED)	
	RECTANGULAR RETURN OR EXHAUST DUCT UP
	RECTANGULAR RETURN OR EXHAUST DUCT DOWN
	ROUND DUCT, UP
	ROUND DUCT, DOWN
	SLOPING RISE IN DUCTWORK
	DUCT SIZE (CLEAR INSIDE DIMENSION) FIRST FIGURE INDICATES PLAN SIZE
	ROUND DUCT DIAMETER SIZE (CLEAR INSIDE DIMENSION)
	DUCT LINING (DUCT SIZE NOTED INDICATES INSIDE DIMENSIONS)
	RECTANGULAR OR SQUARE TO ROUND OR OVAL TRANSITION
	FLEXIBLE CONNECTION
	DUCT END/CAP
	FLEXIBLE DUCT
	DUCT COIL WITH ACCESS DOOR
	VOLUME DAMPER IN DUCT
	CEILING DIFFUSER
	RETURN/EXHAUST REGISTER OR GRILLE
	RETURN/EXHAUST REGISTER OR GRILLE WITH FLEXIBLE DUCT CONNECTION
	LINEAR DIFFUSER WITH PLENUM
	SUPPLY REGISTER WITH AIR OUTLET DEVICE DESIGNATION
	RETURN OR EXHAUST REGISTER OR GRILLE WITH AIR INLET DEVICE DESIGNATION

MISCELLANEOUS	
	DIAMETER
	UNDERCUT DOOR
	SECTION DESIGNATION
	SECTION NUMBER DRAWING NUMBER
	DETAIL DESIGNATION
	DETAIL NUMBER DRAWING NUMBER
	EQUIPMENT DESIGNATION
	EQUIPMENT TYPE EQUIPMENT FLOOR AND NUMBER
	TERMINAL DESIGNATION
	THE NUMBER ON THE FLOOR FLOOR OR LEVEL
	AIR OUTLET/INLET DEVICE DESIGNATION
	TYPE NECK OR FACE SIZE CFM
	LINEAR DIFFUSER DEVICE DESIGNATION
	TYPE LENGTH & SLOT SIZE PLENUM INLET SIZE CFM
	KEYNOTE
	DRAWING REVISION DESIGNATION WITH NUMBERS

MECHANICAL SHEET LIST	
SHEET NUMBER	SHEET NAME
M001	MECHANICAL LEGENDS AND ABBREVIATIONS
M002	GENERAL NOTES
M003	MECHANICAL SCHEDULES
M004	MECHANICAL SPECIFICATIONS
M005	MECHANICAL SPECIFICATIONS
M006	MECHANICAL SPECIFICATIONS
M007	MECHANICAL SPECIFICATIONS
M008	MECHANICAL SPECIFICATIONS
M009	MECHANICAL SPECIFICATIONS
M201A	LEVEL 1 - MECHANICAL DUCT PLAN
M201B	LEVEL 1 - MECHANICAL PIPING PLAN
M203	ROOF - MECHANICAL PLAN
M501	MECHANICAL DETAILS
M502	VRF SYSTEM DIAGRAM



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REVISIONS

MECHANICAL
LEGENDS AND
ABBREVIATIONS

M001

CONTROLS LEGEND	
	TOTALIZING BTU METER
	EMERGENCY BREAK GLASS SWITCH FOR EQUIPMENT SHUT-DOWN
	FLOW MEASURING STATION
	FLOW SWITCH
	CARBON MONOXIDE SENSOR WITH ZONE DESIGNATION
	CARBON DIOXIDE SENSOR WITH ZONE DESIGNATION
	TEMPERATURE SENSOR/THERMOSTAT WITH ZONE OR EQUIPMENT DESIGNATION
	HUMIDISTAT/HUMIDITY SENSOR WITH HUMIDIFIER DESIGNATION
	COMBINATION TEMPERATURE/HUMIDITY SENSOR
	DUCT SMOKE DETECTOR SUPPLIED BY ELECTRICAL TRADE, INSTALLED BY MECHANICAL TRADE
	STATIC PRESSURE SENSOR WITH DESIGNATION
	REFRIGERANT SENSOR WITH DESIGNATION
	DDC DEVICE
	LOCAL CONTROL DEVICE WITH DDC MONITORING
	PACKAGED UNIT CONTROLLED DEVICE
	TWO POSITION ACTUATOR
	SUMMARY ALARM
	ANALOG INPUT
	AMPERAGE TRANSMITTER
	ANALOG OUTPUT
	AUXILARY INSTRUMENT OR CONTACT
	CONDUCTIVITY SENSOR
	CONTROL RELAY
	CURRENT SENSING RELAY
	CURRENT SENSOR/TRANSMITTER
	DIGITAL INPUT
	DIGITAL OUTPUT
	DIFFERENTIAL PRESSURE SWITCH
	DIFFERENTIAL PRESSURE SENSOR/TRANSMITTER
	ENABLE/DISABLE
	FREEZE PROTECTION THERMOSTAT

CONTROLS LEGEND	
	POWER (KWH)
	HUMIDITY SENSOR/TRANSMITTER (DUCT)
	LEVEL SENSOR/TRANSMITTER
	MODULATING ACTUATOR
	OCCUPANCY SENSOR/SWITCH
	OCCUPANT OVERRIDE
	PRESSURE SWITCH
	PRESSURE SENSOR/TRANSMITTER
	REVOLUTIONS PER MINUTE TRANSMITTER
	REFRIGERANT REVERSING VALVE
	SMOKE DETECTOR
	SPEED COMMAND
	SET POINT RESET
	START/STOP
	ZONE TEMPERATURE SENSOR/TRANSMITTER

- GENERAL NOTES:
- THE FOLLOWING NOTES APPLY TO ALL MECHANICAL DRAWINGS. ADDITIONAL NOTES MAY BE INDICATED ON INDIVIDUAL DRAWINGS.
 - DRAWINGS INDICATE CONNECTIONS FOR EQUIPMENT TO BE FURNISHED BY THE OWNER OR AS THE WORK OF THE TRADES. VERIFY LOCATION OF EQUIPMENT, ROUGH-IN LOCATIONS, AND TYPE OF CONNECTIONS PRIOR TO PREPARATION OF SHOP DRAWINGS SUBMITTALS, AND PRIOR TO INSTALLATION OF SERVICE CONNECTIONS. DO NOT INTERFERE WITH ACCESS FOR MAINTENANCE AND REMOVAL OR REPLACEMENT OF EQUIPMENT.
 - COORDINATE THE PHASING AND INSTALLATION OF NEW WORK WITH THE WORK OF ALL OTHER TRADES. BEAR THE EXPENSE FOR ANY ADDITIONAL WORK WHICH MAY BE CAUSED BY IMPROPER SEQUENCING OF CONSTRUCTION ACTIVITIES.
 - REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATIONS OF DEVICES IN FINISHED AREAS AND AT HEIGHTS INDICATED ON ARCHITECTURAL ELEVATIONS. LOCATE MECHANICAL DEVICES (E.G. TEMPERATURE SENSORS, PANELS AND SWITCHES), SO THAT THEY DO NOT CONFLICT WITH GENERAL CONSTRUCTION (E.G. WAINSCOT, DOOR HARDWARE), ELECTRICAL DEVICES (E.G. LIGHT SWITCHES, SPEAKERS, OUTLETS), AND THE WORK OF OTHER TRADES.
 - REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR GENERAL CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, EQUIPMENT HOUSEKEEPING PADS, PENETRATION DETAILS, FLASHING AND SEALING DETAILS, AND OTHER ELEMENTS OF GENERAL CONTRACTOR. COORDINATE THE SIZE AND LOCATION OF EQUIPMENT HOUSEKEEPING PADS WITH APPROVED EQUIPMENT SO THAT HOUSEKEEPING PADS ARE NOMINALLY 4" HIGH UNLESS INDICATED OTHERWISE, AND EXTEND 6" MINIMUM IN ALL DIRECTIONS FROM THE HORIZONTAL LIMITS OF THE EQUIPMENT WHICH THY SUPPORT.
 - REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF CEILING MOUNTED ITEMS. INSTALL CEILING MOUNTED ITEMS IN THE CENTER OF CEILING TILES, IN THE CENTER OF ROOMS, OR WHERE INDICATED ON ARCHITECTURAL DRAWINGS. WHERE LOCATION OF ITEMS ARE NOT INDICATED ON ARCHITECTURAL DRAWINGS, OBTAIN DIRECTIONS FROM ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.
 - COORDINATE EQUIPMENT POWER CONNECTION AND ELECTRICAL CHARACTERISTICS WITH ELECTRICAL DRAWINGS AND CONNECTION REQUIREMENTS. COORDINATE VARIATION IN ELECTRICAL CHARACTERISTICS FROM SCHEDULE VALUES. CHANGES TO ELECTRICAL CHARACTERISTICS (E.G. VOLTAGE, AMPS, HORSEPOWER ETC.) SHALL BE SUBJECT TO APPROVAL. BEAR THE TOTAL EXPENSE FOR REQUIRED REVISIONS TO THE ELECTRICAL SCOPE OF WORK CAUSED BY VARIATION FROM THE SCHEDULED REQUIREMENTS.
 - EQUIPMENT SORT CIRCUIT RATINGS (SCCR) SHALL BE NOT LESS THAN THE INTERRUPTING RATING OF THE BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICE SUPPLYING POWER TO THE EQUIPMENT. REFER TO SCHEDULES FOR BRANCH CIRCUIT OVERCURRENT DEVICE INTERRUPTING RATINGS.
 - COORDINATE THE LOCATION OF WORK TO PROVIDE CLEARANCES OVER LIGHTING FIXTURES AND OTHER CEILING MOUNTED DEVICES AS REQUIRED TO ALLOW FOR REMOVAL AND MAINTENANCE ACCESS.
 - DO NOT RESTRICT ACCESS TO ELECTRICAL CABLE TRAYS. AT A MINIMUM, ALLOW 18" CLEAR ON ONE SIDE OF CABLE TRAYS UP TO AN ELEVATION OF 6" ABOVE THE TOP OF THE CABLE TRAY. MAINTAIN 12" MINIMUM CLEARANCE OVER TOP OF CABLE TRAYS EXCEPT WHERE DUCT, PIPING, OR CONDUIT CROSS PERPENDICULAR TO CABLE TRAY, THIS CLEARANCE MAY BE REDUCED TO 6" OVER A DISTANCE OF NO MORE THAN 36" ALONG THE CABLE TRAY. PROVIDE NO LESS THAN 36" BETWEEN AREAS OF REDUCED CLEARANCE AND MAINTAIN INDICATED ACCESS ON THE SAME SIDE OF THE CABLE TRAY EXCEPT WHERE OTHERWISE APPROVED. DO NOT CONNECT OTHER TRADE ITEMS TO CABLE TRAY, CABLE TRACY SUPPORTS RO CABLE TRAY SEISMIC RESTRAINTS.
 - PROVIDE SUPPORT AND SEISMIC RESTRAINTS FOR PIPES, AND EQUIPMENT AS SPECIFIED, AS REQUIRED, AND AS SHOWN ON THE DRAWINGS. IF REQUIRED FOR INSTALLATION OF PIPES, DUCTS, AND EQUIPMENT, DESIGN AND PROVIDE ADDITIONAL STRUCTURAL MEMBERS BETWEEN COLUMN, JOISTS, AND STRUCTURAL FRAME TO MEET SUPPORT AND SEISMIC RESTRAINT REACTIONS (FORCES, MOMENTS, DEFLECTIONS). STRUCTURAL MEMBERS AND ANCHORAGES SHALL BE DESIGNED BY A PROCESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED. REFER TO STRUCTURAL DRAWINGS FOR DESIGN CRITERIA. SUBMIT STRUCTURAL MEMBER SHOP DRAWINGS AND CALCULATIONS FOR REVIEW. STRUCTURAL MEMBERS, BOLTS, AND WELDS SHALL BE IN ACCORDANCE WITH HE REQUIREMENTS SHOWN ON THE STRUCTURAL DRAWINGS AND INDICATED IN THE SPECIFICATIONS. NO WELDING, BOLTING, OR OTHER MEANS OF ATTACHMENTS TO THE STRUCTURAL MEMBERS SHALL BE MADE ON PORTIONS OF STRUCTURAL MEMBERS AT OR NEAR CONNECTIONS BETWEEN STRUCTURAL MEMBERS ON ANY ELEMENTS DESIGNATED IN THE SEISMIC LOAD RESISTING SYSTEMS UNLESS APPROVED BY THE STRUCTURAL ENGINEER. SUPPORTS ALL NOT INDUCE TORSIONAL LOAD INTO SUPPORTING STRUCTURAL FRAMING.
 - DO NOT CORE DRILL OR DRILL THROUGH BEAMS, COLUMNS OR SHEAR WALL UNLESS INDICATED ON STRUCTURAL DRAWINGS OR AS APPROVED BY THE STRUCTURAL ENGINEER.
 - PROVIDE PIPE SLEEVES AND PENETRATION SEALS AS REQUIRED FOR THE INSTALLATION OF PIPING SYSTEMS. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
 - COORDINATE THE LAYOUT OF EQUIPMENT, DUCTWORK, PIPING, AND APPURTENANCE SO THAT IT FITS INTO THE SPACE ALLOTTED. PROVIDE SERVICE ACCESS AND CLEARANCE AS INDICATED ON DRAWINGS, AS REQUIRED BY CODES, AND AS RECOMMENDED BY THE MANUFACTURER FOR THE INSTALLATION, REMOVAL, ENTRY, SERVICING, AND MAINTENANCE OF EQUIPMENT. PRIOR TO INSTALLATION, COORDINATE LAYOUT OF EQUIPMENT, DUCTWORK, PIPING, AND APPURTENANCES WITH ALL OTHER TRADES TO AVOID BLOCKING SERVICE OR REPLACEMENT ACCESS FOR NEW AND EXISTING EQUIPMENT AND EQUIPMENT INSTALLED BY OTHERS.
 - DRAWINGS ARE DIAGRAMMATIC AND SHOW APPROXIMATE LOCATIONS OF EQUIPMENT, DUCTWORK, PIPING, AND APPURTENANCES. DRAWINGS DO NOT SHOW REQUIRED TRANSITIONS, OFFSETS, FITTING, AND DEVICES. REFER TO DETAILS, DIAGRAMS, AND SPECIFICATIONS FOR REQUIRED SYSTEM APPURTENANCES, CONTROL DEVICES, ETC. INSTALL DEVICES IN ACCORDANCE WITH DEVICE MANUFACTURER RECOMMENDATIONS. CAREFULLY INVESTIGATE ELEMENTS OF CONSTRUCTION THAT COULD AFFECT THE WORK TO BE PERFORMED AND ARRANGE NEW WORK ACCORDINGLY. PREPARE COORDINATION DRAWINGS FOR NEW WORK, WHICH ARE COORDINATED WITH THE APPROVED AND INSTALLED WORK OF OTHER TRADES. PROVIDE REQUIRED OFFSETS, FITTING, TRANSITIONS, SUPPORTS AND OTHER APPURTENANCES AS REQUIRED. BEAR THE TOTAL EXPENSE OF RE-WORK THAT IS CAUSED BY FAILURE TO COORDINATE.
 - PROVIDE MAXIMUM HEADROOM AND CLEARANCE BELOW DUCTWORK, PIPING AND EQUIPMENT AND ASSOCIATED SUPPORTS AND RESTRAINTS. UNLESS OTHERWISE INDICATED, INSTALL TIGHT TO STRUCTURAL SYSTEMS ABOVE. WHERE WALL MOUNTED, INSTALL AS CLOSE TO WALL AS POSSIBLE. PROVIDE ADDITIONAL FITTINGS AND OFFSETS AS REQUIRED.
 - REFER TO EQUIPMENT SCHEDULE FOR DESIGN CAPACITIES. SCHEDULED VALUES SHALL BE CONSIDERED DESIGN CAPACITIES. PROVIDE EQUIPMENT WHICH MEET OR EXCEEDS THE SCHEDULED VALUES. MARK THE CONTRACT DRAWING EQUIPMENT SCHEDULES TO INDICATE THE MANUFACTURER, MODEL AND CAPACITY OF THE ACTUAL APPROVED EQUIPMENT PROVIDED AND SUBMIT THIS INFORMATION WITH RECORD DRAWINGS AS PAR OF PROJECT CLOSEOUT.
 - TO ENHANCE THE CLARITY OF PLAN DRAWINGS, AND WHERE NOT NECESSARY TO DESCRIBE THE REQUIRED SIZE, INDIVIDUAL SEGMENTS OF DUCT AND PIPE BETWEEN CONNECTIONS MAY RE SHOWN WITHOUT A SIZE INDICATED. WHERE SIZE IS NOT SHOWN ON PLANS, THAT SEGMENT SHALL BE THE SAME SIZE AS THE NEXT UPSTREAM SEGMENT WITH A SIZE INDICATED.
 - WHERE NOT INDICATED ON PLANS, REFER TO EQUIPMENT SCHEDULES AND DETAILS FOR INLET AND OUT DUCT AND/ OR PIPE SIZE. WHERE INDICATED ON PLANS, PLAN SIZES SHALL TAKE PRECEDENCE.
 - DUCTWORK SERVING INDIVIDUAL DIFFUSERS AND GRILLES IS GENERALLY NOT SIZED. WHERE NOT INDICATED ON PLAN DRAWINGS, REFER TO SCHEDULES AND DETAILS FOR NECK AND BRANCH DUCT SIZES BASED ON INDICATED AIRFLOW RATE ON NECK SIZE.
 - INSTALL DRAINS AT ALL LOW POINTS IN PIPING, INCLUDING ANY TRAPPED PORTIONS OF PIPING. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS IN CLOSED LOOP (MECHANICAL) PIPING SYSTEM. IN GENERAL, THESE DEVICES ARE NOT INDICATED ON DRAWINGS. WHERE AUTOMATIC AIR VENTS ARE INDICATED ON DRAWINGS, EXTEND AUTOMATIC AIR VENT (AAV) DISCHARGE TO NEAREST FLOOR DRAIN USING INDIRECT DRAIN PIPING OF SAME SIZE AS AAV DISCHARGE. INDICATED THE ACTUAL LOCATION ON FIELD-LOCATION DRAINS, VENTS AND DRAIN PIPING ON THE RECORD DRAWINGS.

- PROVIDE A MANUAL VOLUME DAMPER FOR:
 - EACH SUPPLY, RETURN, AND EXHAUST OPENING
 - IN ALL BRANCH DUCTS WHERE THREE OR MORE OPENING ARE ASSOCIATED WITH BRANCH, AND ELSEWHERE AS NOTED ON DRAWINGS OR IN SPECIFICATIONS LOCATE VOLUME DAMPERS AS FAR AS POSSIBLE FROM OPENINGS. FOR THE PURPOSE OF THIS REQUIREMENT , TERMINAL UNIT PRIMARY AIR DAMPERS ARE CONSIDERED A VOLUME DAMPERS. VOLUME DAMPERS ARE NOT REQUIRED FOR CEILING RETURN GRILLES THAT TRANSFER AIR TO A RETURN AIR PLENUM UNLESS OTHERWISE NOTED.
- PROVIDE CONICAL TAPS FOR 90 DEGREE ROUND DUCT BRANCHES FROM RECTANGULAR SUPPLY DUCTWORK. DO NOT USE STRAIGHT TEE FITTINGS UNLESS SPECIFICALLY INDICATED ON DRAWINGS.
- DUCTWORK STATIC PRESSURE AND SEAL CLASS, BASED ON SMACNA HDCS:

DUCT SYSTEM	STATIC PRESSURE	SEAL CLASS
A. SUPPLY DUCTWORK UPSTREAM OF AIR HANDLING UNITS	PLUS 4	A
B. RETURN DUCTWORK UPSTREAM OF AIR HANDLING UNITS	MINUS 4	A
C. UPSTREAM OF AIR TERMINAL UNITS AND FAN COIL UNITS	PLUS 4	A
D. DONWSTREAM OF AIR TERMINAL UNITS AND FAN COIL UNITS	PLUS 2	B
E. UPSTREAM OF EXHAUST FANS	PLUS 2	B
F. DOWNSTREAM OF EXHAUST FANS	MINUS 2	B
G. OUTSIDE AIR INTAKE DUCTWORK	MINUS 4	A
H. TRANSFER DUCTWORK	MINUS 2	B
I. EXHAUST DUCTWORK UPSTREAM OF HEAT RECOVERY UNITS	MINUS 4	A
J. EXHAUST DUCTWORK DOWNSTREAM OF HEAT RECOVERY UNITS	PLUS 4	A
K. SUPPLY DUCTWORK UPSTREAM OF HEAT PUMP UNIT	PLUS 4	A
L. RETURN DUCTWORK UPSTREAM OF HEAT PUMP UNIT	MINUS 4	A
M. SUPPLY DUCTWORK DOWNSTREAM OF EVAPORATIVE ECONOMIZER UNITS	PLUS 4	A
N. RETURN DUCTWORK DOWNSTREAM OF EVAPORATIVE ECONOMIZER UNITS	MINUS 4	A
O. SUPPLY DUCTWORK DOWNSTREAM OF MAKEUP AIR FILTRATION UNITS	PLUS 4	A
P. RETURN DUCTWORK DOWNSTREAM OF MAKEUP AIR FILTRATION UNITS	MINUS 4	A
- PROVIDE DUCT LINING FOR DUCTWORK AND PLENUMS AS SPECIFIED, WHERE INDICATED ON DRAWINGS AND AS INDICATED BELOW. DUCT SIZES INDICATED ON DRAWINGS ARE NET INSIDE DIMENSIONS REPRESENTING THE MINIMUM DUCT FREE AREA. THICKNESS OF DUCT LINING SHALL BE AS SPECIFIED UNLESS A GREATER THICKNESS IS INDICATED ON DRAWINGS. FOR CLARITY, DUCT LINING MAY NOT BE SHOWN IN ALL REQUIRED LOCATIONS ON DRAWINGS. PROVIDE DUCT LINING FOR THE FOLLOWING:
 - RECTANGULAR SUPPLY AIR DUCTWORK FROM HEAT RECOVERY UNITS TO TERMINAL UNITS AND AS INDICATED ON DRAWINGS.
 - RECTANGULAR SUPPLY AIR DUCTWORK FROM TERMINAL UNITS TO SUPPLY GRILLES/DIFFUSER AND CHILLED BEAMS, AND AS INDICATED ON DRAWINGS.
 - MIXED AIR AND EXHAUST AIR PLENUMS.
 - PLENUMS UPSTREAM OF RETURN/EXHAUST FANS.
 - TOILET EXHAUST DUCTWORK FROM EACH EXHAUST GRILLE TO A POINT 10' DOWNSTREAM OF GRILLE.
 - ROUND SUPPLY AIR DUCTWORK.
 - ROUND RETURN AIR DUCTWORK.
 - ALL AIR TRANSFER DUCTS.



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GENERAL NOTES

M002

CONDENSING UNIT																
DESIGNATION	LOCATION/ SERVICE	MANUF. MODEL NUMBER	NOMINAL TONNAGE	COOLING CAPACITY		HEATING CAPACITY		REFRIGERANT CHARGE	EFFICIENCY		ELECTRICAL DATA			DIMENSIONS (WxHxD)	WEIGHT (LBS)	NOTES
				MBH	AMBIENT DESIGN (°F DB)	MBH	AMBIENT DESIGN (°F DB/WB)	FACTORY CHARGE (lbs.)	EER	IEER	VOLTAGE/ PHASE	MCA	MOP			
CU-1	ROOF	DAIKIN RELQ192TATJA	10	105	85	76	-30	25.8	13.7	23.4	208/3	83.4	90	48.9" x 66.7" x 30.2"	794	
CU-2	ROOF	DAIKIN RXTQ60TAVJU	5	52	85	39	-30	7.9	9.8	9.8	208/1	29.1	35	35.4 x 53.0 x 12.6	225	
NOTES: A. PROVIDE CRANK CASE HEATER. B. PROVIDE LOW AMBIENT KIT C. PROVIDE SNOW HOOD. D. PROVIDE PAN HEATER. E. CU MODULES MOUNTED ON STEEL FRAME. SEE STRUCTURAL DRAWINGS FOR DETAILS.																

BRANCH SELECTOR					
DESIGNATION	MANUF. MODEL NUMBER	ELECTRICAL		WEIGHT (LBS)	NOTES
		MCA (A)	VOLTAGE / PHASE		
BS-1-1	DAIKIN- BS8Q54TVJ	0.8	208 / 1	72.8	
BS-1-2	DAIKIN- BS8Q54TVJ	0.8	208/ 1	72.8	
NOTES: A. PROVIDE DIAMONDBACK BV SERIES ISOLATION VALVES FOR EACH REFRIGERANT CIRCUIT TO ALLOW FOR MAINTENANCE ON EACH INDIVIDUAL FANCOIL.					

ELECTRIC UNIT HEATER SCHEDULE								
DESIGNATION	LOCATION	MANUFACTURER	LENGTH (INCH)	CAPACITY (MBH)	W	VOLTAGE/PHASE	MCA	NOTES
UH-A	BATHROOMS	KING KCV1209	71	2.9	840	120/1	7	
UH-B	OFFICES	KING KCV1212	94	3.8	1125	120/1	9.4	
GENERAL NOTES: A. PROVIDE WITH INTEGRAL THERMOSTAT								

ELECTRIC HEATING COIL												
DESIGNATION	LOCATION / SERVICE	MANUF. MODEL NUMBER	CFM	EAT ("F)	LAT ("F)	DUCT SIZE W x H (INCHES)	CAPACITY (KW)	VOLTAGE/ PHASE	FLA	MCA	MOPD	NOTES
EDH-1	106-CONFERENCE ROOM	RENEWAIRE EK-2109002FCCHR--21-1SD-N	281	70	92	24x12	2	208/1	9.62	12.02	15	
EDH-2	120-VESTIBULE 2	RENEWAIRE EK-279004SCCHR--21-2SD-N	530	70	94	28x12	4	208/1	19.23	24.04	25	
EDH-3	124-OPEN OFFICE	RENEWAIRE EK-279005FCCHR--21-2SD-N	600	70	96	28x12	5	208/1	24.04	30.05	35	
EDH-4	DOAS-1-1	RENEWAIRE EK-1810007FCCHR--21-4SE-N	850	42	68	18x10	7	208/1	33.65	42.06	45	
NOTES:												

AIR OUTLETS AND INLETS				
DESIGNATION	MANUF. MODEL NUMBER	TYPE OF SERVICE	FACE DIMENSIONS	NOTES
CD-A	TITUS OMNI	SUPPLY	24x24	SEE PLANS FOR NECK SIZES
CD-B	TITUS TJD	SUPPLY	24x24	SEE PLANS FOR NECK SIZES
EG-A	TITUS 50F	RETURN/EXHAUST	24x24	SEE PLANS FOR NECK SIZES
LD-A	TITUS FL-20	SUPPLY/RETURN	36x2	SEE PLANS FOR NECK SIZES
NOTES:				

FAN COIL SCHEDULE (VRF COOLING + HEATING)																	
DESIGNATION	LOCATION / SERVICE	ASSOCIATED CONDENSING UNIT	MODEL NUMBER	TYPE	CFM	ESP (IN. WG.)	COOLING			HEATING		ELECTRICAL			DIMENSIONS (WxHxD)	OPER. WEIGHT (LBS)	NOTES
							CAPACITY		TONS	CAPACITY (MBH)	LAT (°F)	VOLTAGE/ PHASE	MCA	MOP			
							TOTAL (MBH)	SENSIBLE (MBH)									
FCU-1-1	102- OFFICE 1	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-2	103- OFFICE 2	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-3	105- OFFICE 3	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-4	106- CONFERENCE RM.	CU-1	DAIKIN-FXZQ07TAVJU	CEILING CONCEALED DUCTED	280	0.6	6.8	4.3	0.6	8.9	90	208/1	0.8	15.00	21.7 x 9.7 x 31.5	55.0	
FCU-1-5	107- PANTRY	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-6	108- OFFICE 4	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-7	109- OFFICE 5	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-8	110- WORK/COPY	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-9	117- OFFICE 6	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-10	104- MDF	CU-2	DAIKIN-FXSQ48TAVJU	CEILING CONCEALED DUCTED	1300	0.6	44.1	26.0	4.0	NA	NA	208/1	2.8	15.00	55.1 x 9.7 x 31.5	104.0	1
FCU-1-11	119- OFFICE 7	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-12	120- OFFICE 8	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-13	121- OFFICE 9	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-14	122- OFFICE 10	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-15	123- OFFICE 11	CU-1	DAIKIN-FXZQ05TAVJU	CEILING MOUNTED DUCTLESS	300	N/A	5.1	3.4	0.5	6.8	90	208/1	0.3	15.00	22.6 x 10.2 x 22.6	35.3	
FCU-1-16	124- OPEN OFFICE	CU-1	DAIKIN-FXSQ18TAVJU	CEILING CONCEALED DUCTED	600	0.6	16.3	10.0	1.5	20.8	90	208/1	1.6	15.00	39.4 x 9.7 x 31.5	77.0	
FCU-1-17	121- OPEN OFFICE	CU-1	DAIKIN-FXSQ15TAVJU	CEILING CONCEALED DUCTED	530	0.6	13.6	8.3	1.3	17.7	90	208/1	1.4	15.00	27.6 x 9.7 x 31.5	60.0	
NOTES: A) PROVIDE CONDENSATE PUMP WITH SEPARATE 120/1 ELECTRICAL CONNECTION. ASSUME LITTLE GIANT VCMA-20																	
NUMBERED NOTES: 1) COOLING ONLY																	

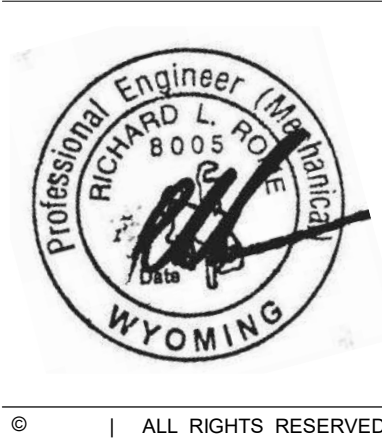
DEDICATED OUTSIDE AIR SYSTEM																													
DESIGNATION	LOCATION/SERVICE	MANUF. MODEL NUMBER	SUPPLY FAN					EXHAUST FAN					HEAT EXCHANGER							AIR FILTER			dB	ELECTRICAL DATA			WEIGHT (LBS)	NOTES	
			CFM	NUMBER OF FANS	EXT SP IN. WG	MOTOR HP (EACH)	VFD	CFM	NUMBER OF FANS	EXT SP IN. WG	MOTOR HP (EACH)	VFD	SUMMER				WINTER			PD IN WG. (INITIAL)	PD IN WG. (FINAL)	MERV RATING	ARI 270 (LWA)	VOLTAGE / PHASE	MCA (AMPS)	FLA			
													EAT (°F)	LAT (°F)	EFFICIENCY (SENSIBLE)	CAPACITY (MBH)	EAT (°F)	LAT (°F)	EFFICIENCY (SENSIBLE)										CAPACITY (MBH)
DOAS-1-1	MECHANICAL ROOM	RENEWAIRE HE1.5JINV-S34SS-DANT-L	850	1	1.5	1.11	N	850	1	1.5	1.14	N	81	76.9	69%	13.0	30	57	69%	11.0	0.3	0.8	13		208/3	16.3	6.6	500	
NOTES:																													

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MECHANICAL
SCHEDULES

M003

HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

SECTION 23 05 00 HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS		
23 05 01 – HVAC GENERAL PROVISIONS		
A.	The General, Supplementary Conditions and any architectural specifications are a part of the requirements for the work under this Division of the Specification.	
B.	Provide labor and materials required to install, test and place into operation the heating, ventilating, and air conditioning, as called for in the Contract Documents, and according to town of Jackson and State of Wyoming codes and regulations.	
C.	Provide labor, materials, and accessories required to provide complete operating mechanical systems as described or which may be reasonably implied as essential for a complete operating system.	
D.	Drawings, specifications, codes, and standards are minimum requirements. Where requirements differ, apply the more stringent.	
E.	Should any change in drawings or specifications be required to comply with governing regulations, notify the Architect prior to submitting bid.	
F.	Execute work in strict accordance with the best practices of the trades in a thorough, substantial, skillful and well-executed manner by competent workers. Provide a competent, experienced full-time Superintendent who is authorized to make decisions on behalf of the Contractor.	
G.	Applicable equipment and materials to be listed by Underwriters' Laboratories and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by authorities having jurisdiction. The Energy using products shall be certified for use in State of Wyoming and meet State energy efficiency standards.	
H.	Submit shop drawings, manufacturer's data, samples, and test reports (three copies minimum). Contractor shall allow five working days minimum review from the time it is received by the Engineer.	
I.	The Contract Documents show the general arrangement of equipment, ductwork, piping, and accessories. Follow these drawings as closely as the actual construction and the work of other trades will permit. Provide offsets, fittings, and accessories which may be required but not shown on the Drawings. Investigate the site and review drawings of other trades to determine conditions affecting the work and provide such work and accessories as may be required to accommodate such conditions.	
J.	Provide firestopping around all pipes, conduits, ducts, etc. which pass through rated walls, partitions, and floors in strict accordance with the manufacturer's published approval listing and rating.	
K.	Before commencing work, examine adjoining work on which this work is in any way dependent and report conditions which prevent performance of the work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.	
L.	Definitions:	
	1. "PROVIDE" means to "Furnish" and "Install".	

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

4.	Include revisions required to adapt alternatives in such proposals, including revisions by other trades. No increase in the contract price will be considered to accommodate the use of alternative equipment.	
5.	Wherever quality standards (such as serviceability, energy efficiency, longevity, or durability) and operating results (such as noise levels, quantity delivered, or pressure obtained) are specified or scheduled, or when the manufacturer and size of equipment, for which such operating results are published or determinable, is specified, the substitution being proposed must conform substantially to the quality and quantities specified or implied. The substitution must fit into available space conditions and must function properly in coordination with the rest of the system.	
6.	Proposed changes and substitutions of systems, equipment, and manufacturers shall be submitted and include the following information with the proposal:	
	a. A description of the difference between the existing contract requirements and that proposed, the comparative features of each, and the effect of the change on the end result performance. Include the impact of all changes on other contractors and acknowledge the inclusion of additional costs to other trades.	
	b. Schematic drawings and details to supplement the description.	
	c. A list of the contract requirements that must be revised if the change is accepted, including any specification revisions.	
	d. Complete list of materials and equipment proposed for use in the change.	
	e. Include a description and estimate of costs the Owner may incur in implementing the change, such as additional space requirements, permits, architectural and aesthetic impact, design costs, tests, permits evaluation, operating and support costs.	
	f. A projection of any effects the proposed change would have on collateral costs to the Owner.	
	g. A statement of the time by which a contract modification accepting the change must be issued, noting any effect on the contract completion time or the delivery schedule.	
	h. A statement indicating the reduction to the contract price if the Owner accepts the change. Be responsible for appropriate modifications to all trades.	
BB.	Record Drawings:	
	1. The Contractor shall maintain on a daily basis at the project site a complete set of Record Drawings. The Record Drawings shall initially consist of a set of bond paper prints or AutoCAD files of the Contractor's Coordination Drawings. The prints shall be marked or AutoCAD files electronically updated to show the precise location of all buried or concealed work and equipment, including embedded piping and valves, and all changes and deviations in the mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite written instructions from the Architect or Engineer. The updated Coordination Drawings shall be used to produce the final Record Drawings that shall be delivered to the Owner in AutoCAD electronic format media upon project completion.	
	2. Upon completion of the work, the Contractor and subcontractors shall certify all Record Drawings on the front lower right hand corner adjacent to the above marking with a rubber stamp impression or an AutoCAD image similar to the following:	

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

2.	"INSTALL" means to join, unite, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner, complete and ready for regular operation.	
3.	"FURNISH" means to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application.	
4.	"AS DIRECTED" means as directed by the Architect or the Architect's Representative.	
5.	"CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings.	
6.	"SUBMIT" means submit to the Architect for review.	
M.	Evaluate existing conditions which may affect methods or cost of performing the work, based on examination of the site or other information. Failure to examine the Drawings, this document or other information does not relieve the Contractor of responsibility for satisfactory completion of the work.	
N.	Provide two (2) copies of operating instructions and maintenance manuals for all equipment and materials furnished under this Division upon two (2) weeks after completion of project.	
O.	Maintain on a daily basis at the project site a complete set of Record Drawings, reflecting an accurate dimensional record of all deviations between work shown on Drawings and that actually installed.	
P.	Coordinate, with building management, the requirements for after-hours work needed for tenant tie-ins to base building systems.	
Q.	Locate all equipment needing service in accessible locations and on one side of the unit when possible. Coordinate with general contractors to provide access panels in inaccessible ceilings. Minor deviations from drawings can be made in order to provide better accessibility.	
R.	All HVAC systems shall be in accordance with Town of Jackson and State of Wyoming regulations and constructed in accordance with the best general practice.	
S.	Contractor shall allow for testing and rebalancing of all existing to be reused equipment as well as new.	
T.	Coordinate all work with existing structure, piping, and conduits.	
U.	Obtain and pay for all required fees, permits, and inspections.	
V.	Obtain written permission of Owner before cutting or patching of structural systems.	
W.	Guarantee work for one (1) year from date of filing Notice of Completion.	
X.	Remove all abandoned mechanical equipment and associated ductwork, piping, etc., unless otherwise specified by Owner.	
Y.	Pressure test each system of piping and ductwork as specified.	
Z.	Submittals and Reviews:	

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<div>RECORD DRAWING CERTIFIED CORRECT (¹/₁₆-inch high letters) (Printed Name of General Contractor) (¹/₁₆-inch high letters) Date: (Printed Name of Subcontractor) (¹/₁₆-inch high letters) Date:</div>		
3.	Prior to final acceptance of the work of this Division, the Contractor shall submit properly certified Record Drawings to the Architect and Engineer for review and shall make changes, corrections, or additions as the Architect and/or Engineer may require to the Record Drawings. Submitted Record Drawings shall be on electronic media in AutoCAD 2018 or later format and one set of full-size prints. After the Architect's and Engineer's review, and any required Contractor Revisions, the Record Drawings shall be delivered to the Owner on electronic media in AutoCAD 2018 or later format. The Architect and Engineer do not assume any responsibility for the accuracy or completeness of the Record Drawings.	
23 05 13 – ELECTRIC MOTORS FOR HVAC EQUIPMENT		
A.	Acceptable Manufacturers:	
	1. Constant Speed Applications: Toshiba Model E.Q.P., Magnetek E-Plus III, Baldor Super E, Reliance XE Premium, General Electric Energy Saver, Marathon Series E	
	2. Variable Speed Applications: U.S. Electrical Motors "Inverter Grade" □, Baldor "Inverter Drive" □, or approved equal	
	3. Inverter Duty Motors: U.S. Electrical Motors "Inverter Grade" □, Baldor "Inverter Drive" □, or approved equal	
B.	One-half horsepower and larger motors shall be rated 460 Volts Alternating Current (VAC) and suitable for operation on a 480 VAC (±5%), 3-phase, 60 Hz nominal electricity supply systemFan coil unit and fan powered terminal unit motors shall be rated 208 VAC, single-phase, 60 Hz, and shall be provided with integral thermal overload protection.	
C.	One-third horsepower and smaller motors shall be rated 120 VAC, single-phase, 60 Hz, and shall be provided with integral thermal overload protection.	
D.	Motors shall be generally constant speed, squirrel-cage type, open drip-proof, or totally enclosed fan cooled (TEFC) design. Single phase motors shall be high efficiency capacitor start, induction run, or split phase type as approved for the service.	
E.	Variable Speed Applications:	

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1.	Submittals: Prior to construction submit for approval the following materials and equipment. Submittal should be submitted separately by numbered specification section and should include equipment cut sheets, dimensions, capacities, wiring diagram and electrical loads, special installation details, etc.	
	a. Electric Motors for HVAC Equipment	
	b. Variable Frequency Drives	
	c. Meters, Gauges, and Thermometers	
	d. Hangers and Supports	
	e. Vibration Isolation and Seismic Restraints	
	f. Systems Identification	
	g. Testing, Adjusting, and Balancing	
	h. Thermal Insulation	
	i. Pumps	
	j. Air Cleaning Devices	
	k. Building Controls	
	l. Sequence of operations	
	m. Refrigerant Piping	
	n. HVAC Ducts and Casings	
	o. Dampers	
	p. Acoustics	
	q. Fans	
	r. Air Outlets and Inlets	
	s. Variable Refrigerant and Flow Systems	
	t. Other miscellaneous equipment as specified and or scheduled on drawings.	
2.	Electronic Submittals:	
	a. Electronic submittals where acceptable to the Architect will be submitted in PDF format through a project file sharing website.	
	b. Identify and incorporate information in each electronic submittal file as follows:	
	(1) Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.	
	(2) Name file with submittal number or other unique identifier, including revision identifier.	
	(3) File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., UCSF-230923.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., UCSF-230923.01.A).	
	(4) Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.	
	c. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Architect, containing the following information:	
	(1) Project name	
	(2) Date	
	(3) Name and address of Architect and Engineer	
	(4) Name of Owner	
	(5) Name of Contractor	

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1.	Motors used with variable frequency drives shall be designed specifically for use on AC inverter power and adjustable speed applications.	
2.	Performance data for adjustable speed operation shall be stamped on a steel data plate and permanently attached to the motor frame.	
23 05 14 – VARIABLE FREQUENCY DRIVES		
A.	Acceptable Manufacturers:	
	1. Variable Frequency Drives: Toshiba, ABB, Graham/Danfoss	
B.	AC Variable Frequency Drive:	
	1. Provide completely assembled VFD, factory-tested by the manufacturer. The VFD shall operate from a line overvoltage of 30 percent over nominal. The undervoltage trip level shall be 35 percent under the nominal voltage as a minimum.	
	2. The alternating current variable speed drive system shall include the microprocessor based variable frequency controller, the required signal logic, and control. The electrical drive equipment specified including the variable frequency controller and its associated microprocessor control system shall be of the same manufacturer. Coordinate with driven equipment supplier to ensure compatibility between drive and AC Motors.	
	3. All equipment shall comply with the applicable requirements of the latest standards of ANSI, IEEE, and NEMA. The electrical equipment, as well as the design, construction, and installation thereof, shall comply with all the applicable provisions of the National Electrical Code and be ETL-SEMKO or UL approved.	
	4. The variable frequency drive shall be mounted in a NEMA 1 enclosure for drives inside the building. The control circuitry shall be isolated from the power circuitry.	
	5. The speed controller shall respond to a speed adjusting potentiometer from the VFD sequence panel when in the manual mode or shall respond to a millilamp or voltage electrical signal when operating in the automatic mode.	
	6. The cabinet shall require front access only. The unit shall be suitable for operation in ambient air at 0 degrees C to 40 degrees C and up to 95 percent RH at rated load and switching frequency.	
	7. The variable frequency controller shall convert 230 or 480 volt (plus or minus 30 percent) 3 phase, 60 hertz (plus or minus 3 percent) utility supplied or standby generator supplied power to variable frequency, variable voltage three-phase AC power for induction motor speed control. The controller shall be selected to have sufficient capacity to provide stepless speed control of the specified horsepower motors throughout a continuous speed range under a variable torque load not exceeding the motor full-load rating.	
C.	Installation:	
	1. The Contractor shall install the drive and power wiring shall be completed in accordance with the recommendations of the manufacturer as outlined in the installation manual.	
	2. Coordinate with equipment supplier to ensure compatibility between variable frequency drive and the motor supplied with the equipment.	
	3. Division 26 shall mount and wire the drives in locations as shown on the Drawings.	
	4. Maintain code required electrical clearance around all VFD cabinets.	

23 05 29 – HANGERS AND SUPPORTS

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(6)	Name of firm or entity that prepared submittal	
(7)	Names of subcontractor, manufacturer, and supplier	
(8)	Category and type of submittal	
(9)	Specification Section number and title	
(10)	Drawing number and detail references, as appropriate	
(11)	Related physical samples submitted directly	
(12)	Indication of full or partial submittal	
(13)	Transmittal number [numbered consecutively]	
(14)	Submittal and transmittal distribution record	
(15)	Remarks	
d.	Metadata: Include the following information as keywords in the electronic submittal file metadata:	
	(1) Project name	
	(2) Number and title of appropriate Specification Section.	
	(3) Manufacturer name	
	(4) Product name	
3.	Prepare and submit detailed shop drawings for ductwork, piping work and other distribution services in minimum 1/4 inch to 1 foot scale, including elevations and locations and sizes of openings in floor decks, walls and roofs.	
4.	HVAC design drawings shall not be submitted as sheet metal shop drawings.	
5.	The work described in shop drawing and product data submittals shall be carefully checked by all trades for clearances (including those required for code compliance, maintenance, and servicing), field conditions, maintenance of architectural conditions, and proper coordination with other trades on the job. Each submitted shop drawing to include a certification that related field conditions and requirements have been checked by all Contractors and Subcontractors and that conflicts do not exist.	
6.	No part of the work shall be ordered, procured, started in the shop or in the field until the shop drawings and samples for that portion of the work have been submitted, reviewed and returned with either "No Exceptions Noted" or "Exceptions Noted" marked on the submission.	
7.	Review of submittals is for general compliance with the design concept and Contract Documents. Comments or absence of comments does not relieve the Contractor from compliance with the Contract Documents. The Contractor remains solely responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of construction, for performing the work in a safe manner, and for coordinating the work with that of other trades.	
AA. ALTERNATIVE EQUIPMENT AND MATERIALS		
1.	Contract Documents are based on materials specified and on equipment manufacturers indicated. Acceptance of alternative equipment manufacturers does not relieve Contractor of the responsibility to provide equipment and materials that meet the quality and performance as stated or implied in the Contract Documents.	
2.	Equipment manufacturers listed in individual sections are acceptable for this project, subject to requirements of Contract Documents.	
3.	Submit proposals to supply alternate materials or equipment, in writing, with sufficient lead time for review prior to the date equipment must be ordered to maintain project schedule. Reimburse Owner for costs associated with the review of the proposed alternative whether alternative is accepted or rejected.	

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A.	Acceptable Manufacturers:	
	1. Pipe Hangers: Anvil, Fee & Mason, Elcen, Tube-Turn, F&S, Pipe Shields, B-Line Kindorf, Michigan Hanger, Power Strut, Unistrut, or approved equal. Anvil figure numbers are listed below; equivalent material by specified manufacturers is acceptable	
	2. Sleeves: Pipe Shields, Insul, RK Industries	
	3. Pipe Wrap Tape: Polycen, Nassua, 3M	
	4. Firestop: Nelson, Dow, 3M, Hilti	
	5. Mechanical Sleeve Seals: Pipeline Seal and Insulator, Thunderline Linkseal, Calpico Pipe Linx, Metralflex Metraseal	
B.	Sleeves:	
	1. Construct sleeves for pipes passing through walls (other than foundation walls), floors, partitions, hung or furred ceilings, etc., of minimum 18 gauge galvanized steel, flanged on each side of wall, partition, hung or furred ceiling, etc.	
	2. Provide standard weight galvanized steel pipe sleeves with welded anchor flanges at foundation walls and reinforced concrete or masonry walls.	
	3. Provide 20 gauge galvanized sheet metal sleeves, the full depth of floor or wall, for round ductwork passing through masonry or concrete and/or steel cellular floor construction. Rectangular ductwork shall be provided with framed openings through floor and wall construction.	
	4. Provide cast iron or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.	
	5. Stack Sleeve Fittings: Provide manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing and underdeck clamping ring with setscrews.	
	6. Provide mechanical sleeve seals at exterior wall and tank wall penetrations. Seal shall be of the modular sealing element unit type, designed for field assembly, to fill annular space between pipe and sleeve.	
	7. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.	
	8. Pressure Plates: Plastic. Include two for each sealing element.	
	9. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.	
C.	Penetration Firestop:	
	1. Fire-Rated Construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, and sound or vibration absorption, and at other construction gaps.	
	2. Smoke Barrier Construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound or vibration absorption, and at other construction gaps.	
	3. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free. Mortar systems must be Warnock Hersey approved.	

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4. Withstand the passage of cold smoke either as an inherent property of the system or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.
5. All firestopping products must be from a single manufacturer.
6. Through-penetration smokestopping at smoke partitions. Any system complying with the requirements for through-penetration firestopping in fire-rated construction, as specified, is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded in a non-fire rated smoke barrier.
7. Seal all pipe and duct penetrations through fire-rated construction with factory-built devices or with manufactured fill, void, or cavity materials "Classified" by Underwriters Laboratories Inc. for use as a Through-Penetration Firestop. All firestop devices and systems shall be approved for such use by the Authority Having Jurisdiction. The firesafing system used shall maintain the fire-resistance rating of the building component that is penetrated.
8. All materials shall be non-hardening and non-toxic. The firesafing system used shall accommodate expansion and contraction of the floating mechanical piping systems without damaging the firestop or reducing its effectiveness as a smoke barrier or water seal.

D. Hangers and Supports:

1. Support horizontal piping in accordance with the following schedule:

Pipe Size (Inches)	Maximum Hanger Spacing (Feet)	Rod Size (Inches)
1 and smaller	6	¾
1¼ to 2	9	¾
2½ to 3	10	¾
4 to 5	12	¾

2. Do not hang piping from other piping. Support of hangers by means of vertical expansion bolts is not permitted.
3. Hangers for insulated piping shall support the pipe without piercing the insulation.
4. Use hangers which are vertically adjustable 1½-inch minimum after piping is erected. Install hangers so that ½-inch minimum clearance is maintained between finished covering of pipe and adjacent work.

23 05 48 – VIBRATION AND SEISMIC CONTROLS

A. Acceptable Manufacturers:

1. Vibration Isolation: Mason Industries (MI), Vibration Mountings & Control (VMC), Vibration Eliminator (VEC), Vibrex Vibration Control Systems (VVC)
2. Piping and Duct Seismic Bracing: Kin-Line, Super Strut, Mason Industries

B. Isolate mechanical equipment from the building structure by means of vibration isolators as specified or as recommended by equipment manufacturer. Isolator model numbers referred to in the Specification are by Mason Industries.

- C. Piping and ductwork to be isolated must pass freely through walls and floors without rigid connections. Maintain ¾-inch to 1¼-inch concentric clearance around outside surfaces of piping or ductwork at penetration points. Pack this clearance space tightly with fiberglass, and caulk airtight after installation of piping or ductwork, or provide resilient firestopping as required. Provide supports 6 to 8 inches from walls or partitions on both

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23 05 53 – SYSTEMS IDENTIFICATION FOR HVAC

- A. Identify all equipment with identical letters and/or numbers as used on Drawings. Where space is available use full name of equipment. Attach nameplates in a permanent manner in a location that will be clearly visible after installation is complete.
- B. Identify piping systems with color coded bands, sharply contrasting with background. Locate bands near strategic points, such as valves, items of equipment, changes in direction, wall penetrations, capped stub out for future connection and every 40 feet of straight runs. If necessary, paint a strip background of black or white to obtain contrast.
- C. Mechanical equipment shall be identified by means of nameplates permanently screw-fastened to the equipment. Nameplates shall be black surface, white core laminated bakelite with engraved letters. Plates shall be a minimum of 3-inch long by 1-inch wide with white letters 3/8-inch high.
- D. Terminal equipment installed in ceiling spaces such as variable volume terminals, fan coil units, heat pumps, etc., shall have identifying number stenciled on bottom of unit so that it is visible from below.
- E. For valves, smoke and combination fire/smoke dampers and automatic control dampers, use metal tags 2 inch minimum diameter, fabricated of 19 gauge polished brass, stainless steel or aluminum.
1. Attach tags with jack chain "S"-hook or split ring of same materials.
2. Provide engraved/stamped tags with black ink-filled ¼ inch high letters and ½ inch high numbers.
3. Provide minimum 5/32 inch hole for fastener.

23 05 93 – TESTING, ADJUSTING, AND BALANCING

A. General Procedure:

1. Balance to maximum measured flow deviation from specified values of 10% at terminal device and 5% at equipment or mean sound level deviation of 15 decibels.
2. Permanently mark settings on valves, splitters, dampers and other adjustment devices.
3. Test and balancing contractor shall be AABC certified.
4. Test and balance agency shall include an extended warranty of 90 days, after completion each phase of the test and balance work, during which time the Engineer may request readjustment of the system to comply with comfort, sound conditions or relative space pressure requirements.
5. Testing and balancing agency, as part of its contract, shall act as authorized inspection agency responsible to Consulting Engineer and Owner, and shall during the test and balance list all items that are installed incorrectly, require correction, or have not been installed in accordance with Contract Drawings and/or Specifications, pertaining to the air distribution, cooling and heating systems.
6. Test and balancing contractor shall work with Building Controls Contractor as needed to obtain test data and balance the system.
7. Acceptance:
- a. Mechanical systems shall not be considered ready for final inspection until balancing results acceptable to the Architect are obtained.
- b. If it is found that the specified airflows cannot be achieved on portions of

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- sides of penetrations.
- D. Do not make rigid connections between equipment and building structure that degrades or short circuits the vibration isolation system specified herein.
- E. Provide flexible connectors to all other connections to vibration isolated equipment such as condensate drains, and other piping as allowed by codes and/or local authorities.
- F. Loop electrical circuit connections to isolated equipment to allow free motion. Include at least one slack 90° bend.
- G. Install isolators with the isolator hanger box attached to, or hung as close as possible to, the structure. Provide outrigger supports where required for clearance to equipment and to maintain minimum clearance of equipment to structure above.
- H. Suspend isolators from substantial structural members, not from slab unless specifically permitted. Attachments to fireproof structural members shall be re-fireproofed as required.
- I. Align hanger rods to clear the hanger box. Replace bent rods.
- J. Suspend horizontal pipe 2 inches and smaller by means of Type E isolator with a minimum 0.25 inch deflection. Support pipe larger than 2 inches by isolator Type C1 with a minimum 1½-inch static deflection.
- K. Provide seismic restraints for equipment piping and ductwork as required by ASCE Standard 7-05 and 2006 International Building Code with local amendments.
- L. Provide seismic restraint calculations stamped by a Wyoming State licensed structural or civil engineer, confirming compliance with ASCE 7-05 and the building code.
- M. Isolator and Restraint Specification:

1. Type "C1" pre-compressed spring hanger rod isolators shall incorporate the following:
- a. Spring element seated on a steel washer in series with a deflected neoprene element as specified.
- b. Steel retainer box encasing the spring and neoprene washer. Ensure no metal-to-metal contact.
- c. Minimum ½-inch clearance between retainer box and spring hanger rod. Provide neoprene grommet.
- d. Where operating weight differs from installed weight provide built-in adjustable limit stops to prevent equipment rising when weight is removed. Stops shall not be in contact during normal operation. Maximum 30" allowable rod misalignment from centerline axis.
- e. Type PC30N.....MI
Type PCSR.....VEC
Type HXA-PC.....VVC
Type HRSA-PR.....VMC
2. Type D elastomer inherently restrained isolators shall incorporate the following:
- a. Bolt holes for bolting to equipment base.
- b. Bottom steel plates for bolting to sub-base as required.

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- the system, the actual conditions shall be reported to the Architect for consideration of corrective action before continuing the balance procedure.
- c. If measured flow at final inspection shows deviation of 10 percent or more or mean sound-level deviation of 10 decibels or more from the certified report listings for more than 10 percent of selected areas, the Report shall be rejected.
- d. If Report is rejected, systems shall be rebalanced and a new certified report submitted.
- B. Balancing Report and Drawings:
1. Submit a draft copy of reports prior to final acceptance of project. Provide 4 copies of final report for inclusion in Operating and Maintenance Manuals.
2. Provide reports in durable soft cover, 3-ring along with binder manuals, complete with table of contents, indexing tabs and cover identification at front and side.
3. Submit a sepia made from the latest available revised set of mechanical shop drawings with all air inlet and outlets identified and tagged. Submit copies upon completion of the balancing contract with the test report.
4. Submit with report, fan and pump curves with operating conditions plotted. Submit grille and diffuser shop drawings and diffusion factors.

C. Air System Procedure:

1. Execute air systems balancing for each air system in accordance with AABC specifications and as described herein.
2. Make tests with supply, return and exhaust systems operating and doors, windows, closed, or in their normal operation condition.
3. Test and adjust fan speed to design requirements.
4. Test and record motor full load amps. Record each installed motor manufacturer.
5. Transverse main supply air ducts, using a pilot tube and manometer. Calibrate the manometer to read two significant figures in velocity pressure ranges. Take a minimum 16 readings per traverse. The intent of this operation is to measure by traverse the total air quality supplied by the fan and to verify the distribution of air to the floor and/or zones. A main duct is defined as any of the following:
- a. Typical floor duct loop.
- b. A duct serving four (4) or more outlets.
- c. A duct serving a hydronic coil
- d. A zone duct from a VAV terminal unit.
- e. A duct emanating from a fan discharge or plenum and terminating at one or more outlets.
- f. Measure and record RA opening size at the main RA shaft. Using trapeze measure the total volume of RA from that floor. Inspect operation of backdraft damper, return air damper (RAD) and pneumatic actuator.
6. Submit data in support of fan capacity deliveries by the following four methods. For return, relief and exhaust fans, methods 1 and 4 are sufficient.
- a. By summation of the air quantity readings at inlets or outlets.
- b. By duct traverses of main supply ducts.
- c. By rotating vane traverse across the filter or coil bank.
- d. By plotting revolutions per minute and static pressure readings on the fan curve. Air density corrections must be indicated.

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- c. Molded unit type neoprene element as specified.
- Type BR.....MI
Type 368 S/368 TD.....VEC
Type FUD-EQ.....VVC
- Type RDC.....VMC
- Type E elastomer hanger rod isolators shall incorporate the following:
- Molded unit type neoprene element as specified.
- Steel retainer box encasing neoprene mounting.
- Clearance between mounting hanger rod and steel retainer box. Provide neoprene grommet.
- Type HD.....MI
Type CD.....VEC
Type HSS-VLS.....VVC
Type HR.....VMC
3. Type "E" elastomer hanger rod isolators shall incorporate the following:
- a. Molded unit type neoprene element as specified.
- b. Steel retainer box encasing neoprene mounting.
- c. Clearance between mounting hanger rod and steel retainer box. Provide neoprene grommet.
- Type HD.....MI
Type CD.....VEC
Type HSS-VLS.....VVC
Type HR.....VMC
4. Type "F" pad type elastomer mountings shall incorporate the following:
- a. 5/16 inch minimum thickness neoprene elements as specified. Verify thickness will not degrade or derate the isolator performance.
- b. Sized for 50 pounds per square inch maximum loading. Provide suitable bearing plate to distribute load.
- c. Ribbed or waffled design.
- d. ½-inch deflection per pad thickness.
- e. 16 gauge galvanized steel plate between multiple layers of pad thickness.
- Type MWSW.....MI
Type EVAPG-EQ.....VVC
Type MAXI-FLEX.....VMC
5. Type "G" pad type elastomer mountings shall incorporate the following:
- a. Neoprene impregnated canvas duck material.
- b. Maximum loading 1,000 pounds per square inch. Provide suitable bearing plate to distribute load.
- c. Minimum thickness, 2 inch.
- Type HL.....MI
Type Fabri-Flex.....VMC
6. Seismic Restraint, Type I: All directional seismic snubbers shall consist of interlocking steel members restrained by molded neoprene bushing compounded to bridge bearing specifications. Bushing shall be replaceable and a minimum of ¼ inch thick. Rated loadings shall not exceed 1,000 psi. Snubbers shall be

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7. Test and record required and measured system static pressures; filter differential, coil differential and fan total static pressure.
8. Adjust main supply and return ducts to proper design flow rates.
9. Inspect and confirm all fire dampers are open, all smoke dampers and fire/smoke dampers are in their correct position, all duct access doors are closed and fire damper fusible links are accessible.
10. Adjust zones to proper design, supply and return flow rates.
11. Test and adjust each air inlet and air outlet and transfer duct to within 10% of design requirements.
12. Identify each air inlet, air outlet, transfer duct and transfer wall opening as to location and area on as-built drawing.
13. Identify and list size, type and manufacturer of diffusers, grilles, registers and testing equipment. Use manufacturer's rating on equipment to make required calculations.
14. In readings and tests of diffusers, grilles and registers, report the required face and neck velocity, test face and neck velocity, and required air pressure drop and flow rate. Test after adjustments.
15. Adjust diffusers, grilles, and registers to minimize drafts, dumping, and to prevent "short circuiting" between supply and return outlets.
16. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
17. Record installed fan drive assemblies; fan sheaves, motor sheaves, belts, and motors.
18. Check zone temperature set points. Ensure zone sensor is operating properly and responds to changing room temperatures.

D. Balancing Data:

1. Air Handling Equipment Installation Data:
- a. Manufacturer, model and size
- b. Arrangement, discharge and class
- c. Motor type, horsepower, speed, voltage, phase, cycles and full load amperes
- d. Location and final identification
2. Air Handling Equipment Design Data:
- a. Total air flow rate
- b. Static pressure
- c. Motor horsepower, speed, voltage and amperes
- d. Fan speed and brake horsepower
- e. Hydronic coil inlet and outlet dry bulb temperatures
- f. Initial filter air pressure drop
3. Air Handling Equipment Record Data:
- a. Total air flow rate
- b. Static pressure
- c. Fan speed and brake horsepower
- d. Motor operating amperes
- e. Inlet and outlet, dry bulb temperatures
- f. Filter air pressure drop
4. Duct Air Quantities: Mains, Branches, Outside Air, and Exhausts (Maximum and Minimum):

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- manufactured with an air gap between hard and resilient material of not less than ¼ inch or more than ¼ inch. Snubbers shall be installed with factory set clearances. The capacity of the seismic snubber at ¾-inch deflection shall be equal or greater than the load assigned to the mounting grouping controlled by the snubber multiplied by the applicable "G" force. Submittals shall include the load deflection curves up to ½ inch deflection in the X-, Y- and Z-planes.
- Type Z-1225-1.....MI
7. Seismic Restraint, Type II: Cable type with approved end fastening devices (minimum of two per end) to equipment and structure. Cable to comply with Federal Specification MIL-W-83420, Military Grade, 7 inch x 19 inch galvanized steel.
- Type SCBH.....MI
- N. Flexible Piping Connectors
1. Neoprene Type FC-1:
- a. Manufactured of kevlar-nylon tire cord and neoprene molded and cured with hydraulic presses.
- b. Straight connectors shall have two spheres.
- c. Elbow shall have single sphere forming the corner of joint.
- d. Rated 150 pounds per square inch at 220°F.
- e. Size 6-inch and larger and all flexible piping connectors at pumps, and chillers shall employ control cables with end fittings isolated from anchor plates by means of ½-inch bridge bearing neoprene washer bushings.
- Type Safelex SFDEJ, SFDCR.....MI
2. Flexible Stainless Hose, Type FC-2:
- a. Braided flexible metal hose.
- b. 2-inch pipe size and smaller with male nipple fittings.
- c. 2½-inch and larger pipe size with fixed steel flanges.
- d. Suitable for operating pressure and temperature with 4:1 minimum safety factor.
- e. Length as specified on Drawings.
- Type BSS.....MI
Type MFP.....VMC
- O. Isolator and Restraint Schedule:

Equipment	Deflection (Inches)	Isolator Type	Restraint Type
Roof-mounted fans ½ hp or greater	1.0	"B"	—
Roof-mounted fans less than ½ hp	0.15	"G"	—
Wall-mounted fans	0.15	"G"	—
Suspended fans	1.0	"C1" or "C2"	II
Fan coil units	0.35	"E"	II
Split-system or VRF air-cooled condensers	2	"B"	—

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- a. Duct sizes
- b. Number of pressure readings
- c. Sum of velocity measurements
- d. Average velocity
- e. Duct recorded air flow rate
- f. Duct design air flow rates
5. Air Inlets and Outlets:
- a. Inlet/outlet identification location and designation
- b. Manufacturer's catalogue identification and type
- c. Application factors
- d. Design and recorded velocities
- e. Design and recorded air flow rates
- f. Deflector vane or diffuser cone settings

23 07 00 – THERMAL INSULATION FOR HVAC

E. Acceptable Manufacturers:

1. Fiberglass: Johns Manville; Knauf; Owens Corning
2. Elastomeric: Armacell; Aeroflex
3. Mastics, Adhesives and Sealers: Ductmate; Foster; IC; Childers
4. Jackets:
- a. Metal: Childers; RPR Products
- b. PVC: Ceel-Co; PIC Plastics
- c. Other: Venture Tape; Polyguard, Foster Vapor Fas 62-05
5. Pre-Molded Fittings, Valves, Strainers and Equipment Insulation: Insul-Therm International; Extol of Ohio, Inc.; or approved equal
6. Fire Barrier Duct Wrap: 3M Duct Wrap 615+; Unifrax FyreWrap®; or approved equal

F. Pipe Insulation:

1. Materials:
- a. Glass Fiber: ASTM C547; rigid-molded, noncombustible.
- (1) "K" Value: 0.23 at 75°F.
- (2) Maximum Service Temperature: 850°F.
- (3) Fan speed and brake horsepower
- embossed and reinforced with glass fiber yarn and bonded to aluminum foil, secure with self-sealing longitudinal laps and butt strips.
- b. Elastomeric Foam: ASTM C534; flexible, cellular elastomeric, molded or sheet.
- (1) "K" Value: 0.27 at 75°F.
- (2) Maximum Service Temperature of 220°F.
- c. Field-Applied Jackets:
- (1) Aluminum Jacket (AL): 0.016 inch thick sheet, stippled finish, with longitudinal slip joints and 2 inch laps, die-shaped fitting

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- (2) covers with factory-attached protective liner.
Vapor Barrier Jacket (VBJ): Five ply, non-bituminous, embossed, aluminum foil/polymer laminated film with permeance rating of 0.0 as tested in accordance with ASTM F1249. Venture Clad Plus (1579CW) by Venture Tape, Polyguard Zero-Perm (indoors only), Foster Vapor Fas 62-05 or approved equal.
- (3) All Service Jacket (ASJ): Double adhesive closure with longitudinal seam . Owens-Corning SSL II-ASJ or approved equal.

G. Pipe Insulation Schedule:

Service	Temperature Range (°F)	Material	Run-outs*	Insulation Thickness (In Inches) for Pipe Sizes (In Inches)				
				1 and less	1½ to 2	2½ to 4	5 to 6	8 and up
Refrigerant	All	Elastomer c foam, glass fiber	1	1	1½	1½	1½	1½
Condensate drains (i.e. bodies and piping) above hung ceilings	All	Glass fiber	½	½	½	-	-	-

* Runouts are up to 2-inch piping directly connected to a fan coil, heat pump, unit heater or terminal unit and not exceeding 12 feet in length.

H. Fittings, Valves and Flanges:

- Use factory pre-molded fittings of the same materials and thickness as the adjacent pipe insulation. Such fittings shall be applied to all 90's, 45's, Tees, flanges, and valves.
- Where pre-molded insulation fittings are not manufactured, insulate fittings, flanges, strainers and valves with mitered segments of the same density as the adjoining pipe covering. Vaporseal for cold (below dew point) applications using vapor barrier mastic with open weave glass or polyester mesh lay in while wet. Provide a final coat of vapor barrier mastic. Overlap glass mesh and outer coat adjacent covering by a minimum of 2 inches. Vapor barrier mastic shall be IC 501, Childers CP-34 or Foster 30-65. Permeance of mastic shall be 0.03 perms or less at 45 mils as tested by ASTM E96. Reinforcing mesh shall be Foster Mast a Fab, Childers Chil Glas #10 or approved equal.
- Provide insulation for the removable covers and flanges of pipe strainers on cold services with built-up sections of glass fiber pipe covering, arranged to facilitate servicing of the strainer. Complete applications with vaporseals as specified above. Vapor barriers shall be sealed and continuous through guides, hangers, walls, sleeves, etc. Adhesives and coatings shall be as noted herein.

I. Jacketing Schedule:

Service	Location	Jacket Type
Refrigerant piping	Interior locations	ASJ or painted finish
	Exterior locations	AL or VBJ
Condensate	All locations	ASJ or painted finish

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- d. Acceptable Manufacturers: Brandt, Setra, Air Monitor.
3. Watt Transducer:
- a. The assembly shall consist of the hardware necessary to generate a pulsed signal indicating the total power being measured by the kilowatt-hour meter provided by others.
- b. If existing meter cannot be modified to provide a pulsed output, provide a watt transducer.
- c. Watt transducer shall consist of current and voltage transducers and 4 to 20 milliamp transmitter. The assembly shall have output open and short circuit protection. Total accuracy of plus or minus 2% of span.
- d. Acceptable Manufacturers: Scientific Columbus, Ohio Semitronics.
4. Differential Pressure Switch – Air:
- a. Shall be diaphragm operated and actuate a SPDT snap-acting switch. Operating point shall be adjustable. Range shall suit application.
- b. High and low sensing ports shall be ½-inch nominal pipe thread connected to angle type tips designated to sense pressure.
- c. Switches used for fan shutdown shall be manual reset type.
5. Damper End Switch:
- a. Shall be oil-tight, roller type, single pole double throw snap-acting switch. Mechanism to provide ample overtravel to prevent stress on damper and control equipment.
- b. Acceptable Manufacturers: Furnas Electric, Allen Bradley, Telemechanique.
- D. Automatic Dampers:
1. Provide automatic dampers as indicated on Contract Drawings.
2. Dampers shall be low leakage type, with published leakage data certified under the AMCA Certified. Leakage through a 48-inch by 48-inch damper at 4 inches water gauge pressure difference shall be less than 6.2 cubic feet per minute per square foot of damper.
- E. Electric Damper Operators:
1. Damper actuator shall stroke by rotating motion of a silently operating, reversible, overload protected synchronous motor. Crank arm shall be actuated directly with no intermediate linkage.
2. Provide one actuator for 16 square feet of damper area or as recommended by the manufacturer, whichever is the more stringent. Provide additional actuators to meet the damper leakage requirement. Damper actuator shall stroke from fully open to close or vice versa in less than 2 minutes. If damper is an integral part of a smoke control system the actuator shall stroke from fully open to fully closed in less than 15 seconds.
3. Modulating actuator shall be the push-pull type. Two position damper shall have spring return.
- F. Installation of Wiring:
1. Provide wiring for control devices, monitoring devices, instrumentation, and interlocks as required for a complete system. Coordinate with Division 21, 22, 23, 26 and 27 specifications for devices requiring wiring under this Section.

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J. Ductwork Insulation:

1. Materials:

- a. Flexible Glass Fiber: ASTM C553, flexible blanket.

- (1) 'K' Value: 0.27 at 75°F installed.
(2) Density: 0.75 pounds per cubic foot.
(3) Vapor Barrier Jacket: Aluminum foil reinforced with fiber glass yarn and laminated to fire-resistant kraft, secured with UL listed pressure sensitive tape and outward clinched expanded staples and vapor barrier mastic as needed. Maximum vapor barrier perm rating shall not exceed 0.02 perm.

- b. Rigid Glass Fiber: ASTM C612; rigid board.

- (1) 'K' Value: 0.23 at 75°F.
(2) Density: 6.0 pounds per cubic foot.
(3) Vapor Barrier Jacket: Aluminum foil reinforced with fiber glass yarn and laminated to fire-resistant kraft, secured with UL listed pressure sensitive tape and outward clinched staples and vapor barrier mastic as needed.

K. Ductwork Insulation Schedule:

Service	Material	Thickness (Inches)
Exhaust ducts within 10 feet of exterior openings	Flexible glass fiber	1.5
Supply ducts in conditioned spaces (cooling and heating systems)	Flexible glass fiber	1½ (minimum R value of 4.2)
Supply and return ducts in unconditioned spaces	Rigid glass fiber	2 (minimum R Value of 8.0)
Supply plenums (cooling and heating systems)	Rigid glass fiber	2 (min. R value of 8.0)
Outside air intake ducts	Rigid glass fiber	2

- L. Wherever external duct insulation is specified and internal acoustic treatment of equivalent insulating effect is also required (by Drawings or Specifications) for the same location, the external insulation may be omitted.

23 09 00 – BUILDING CONTROLS

A. General:

2. All controls work shall include wiring and complete testing.

- a. A dedicated data communications network including electric isolation from processors and protection from electrical interference.
- b. Standalone Direct Digital Control (DDC) controller and field panels, including sensors, and control devices.
- c. Complete electrical installation including wiring, raceways and power wiring, except as noted.
- d. Software required to effect a complete and operational control system as specified herein.

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2. Run all wiring in compliance with the requirements of the electrical specifications (Division 26) and in accordance with authorities and codes having jurisdiction. Provide separate conduit for control wiring under this Section.
3. Control wiring, power or signal shall be run in metallic conduit, except signal from room temperature sensor to terminal unit where ceiling space is accessible.
4. Provide all BMS wiring, including power wiring to DDCs and BMS equipment. All power wiring for control system shall be from an emergency power panel.

23 09 93 – SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

- A. Supply and install necessary software, programming, sensing, controlling and controlled devices, piping, wiring and commissioning of automatic control systems, so as to provide a complete control system, meet requirements of control sequences specified.

B. General:

1. Contractor shall provide customized control strategies and control sequences and be able to define appropriate control loop algorithms and choose the optimum loop parameters for loop control. All control loops shall be tuned to stabilize within ±1% of setpoint within 5 minutes of setpoint change or startup.
2. Safety devices shall be hardware interlocked with "hand" and "automatic" positions in series with motor controller holding circuit.
3. Smoke control, fire and life safety sequences shall override other automatic control sequences including hardwired safety devices.
4. Reset schedules and setpoints shown in sequences are for initial programming and start up, during system commissioning the reset schedules and setpoints shall be fine-tuned to obtain desired comfort, energy and life safety system results.
5. The output of the reset schedules should be limited between maximum and minimum values. The intent of the reset schedules indicated is that the range of the output be limited between the minimum and maximum values indicated in the reset schedules.
6. All functions which use analog points to switch equipment on and off (e.g., fans, pumps) must be programmed with dead bands, and if necessary, time delays to prevent short cycling of equipment.

C. DOAS:

D. VRF:

E. Exhaust Fans:

1. Start Stop Control:
- a. Supply fans shall be started automatically from the BMS
2. Occupied Operation:
- a. The fan shall be on and the exhaust air damper shall be open.
3. Unoccupied:
- a. The fan shall be off, the exhaust air damper shall be closed.
4. Warm Up/Cool Down:

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- e. Complete operating and maintenance manuals and field training of operators and maintenance personnel.
- f. System commissioning and acceptance tests.
- g. Review of fire alarm shop drawing for acceptance by BMS contractor to ensure proper coordination of scope of work, wiring and operating sequences.
- h. Pneumatic supply system including: air compressor tanks, filters and piping. Provide necessary control air piping for steam PRV stations, closed expansion tanks and VAV boxes.
- i. Miscellaneous control wiring including, but not limited to:
- (1) Wiring of water cooled AC unit's thermostats
(2) Interlock wiring
(3) Lighting Control Relay's low voltage control wiring
(4) Power wiring from designated Division 16 outlets to BMS components that require power.
- j. Provide a dynamic graphics package for each floor. Include architectural floor plan, equipment and sensor locations and unit designations.

B. Direct Digital Controller:

1. Direct Digital Controller (DDC) to be a completely self-contained, field programmable, real time microprocessor based controller.
2. DDC application programs to be resident in the DDC. Once down-loaded, a DDC shall not require further communication with the CPU except for data base changes, operator commands, and requests from the CPU for DDC data.
3. The DDC shall be expandable by adding input/output logic cards that operate through the processor of the DDC. The processor in the DDC shall be able to manage input/output logic cards mounted remotely from DDC, thereby expanding its control loop and energy management point capacity.
- Input/Output Logic Cards:
- a. Analog input (AI) – accept industry standard 4 to 20 milliamp, 0 to 5 volt, 0 to 10 volt, 3 to 15 pounds per square inch and thermistor analog signals. Minimum of eight points per DDC.
- b. Analog output (AO) – provide industry standard 3 to 15 pounds per square inch, 4 to 20 milliamp, 0 to 5 volt and 0 to 10 volt analog output signals. Minimum of eight points per DDC.
- c. Digital input (DI) – accept, non-powered, binary contact closure signals. Provide pulse counting capability of at least ten (10) closures per second. Minimum of eight (8) points per DDC.
- d. Digital output (DO) – maintained or momentary electrical relay with suitable rated isolated contacts for start/stop and mode change of devices as scheduled. Minimum of eight points per DDC.
5. Provide current and voltage limiting devices at communications network cable connection.
6. Power supplies with transient Power Line Surge Protection.
7. Supply a minimum of 72 hours of battery backup for the random access memory and real time clock. Provide automatic restart and battery recharging upon restoration of power.
8. Provide pedestal base floor mounted or wall mounted steel cabinet with full front hinged door, locking handle with master key and non-glare baked enamel finish. Each DDC shall contain a plastic encased control diagram showing associated controls.

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- a. During the Warm Up period, the fan shall be off and the exhaust air damper shall be closed. During Cool Down period, the plant shall operate as described in the occupied mode except that the exhaust air damper and the fan shall be off when the outside temperature is above 75°F.

F. Wall Heaters

G. Input/Output Summary Sheets:

1. The following pages provide a list of input/output points. The Contractor shall provide necessary hardware and software including sensors and wiring.

23 21 13 – HYDRONIC PIPING

A. Pipe Services Schedule:

Service	Material	Type	Weight
Equipment drains and overflows, condensate drains	Steel	Galvanized	Schedule 40
	Copper	Type L	Hard
Refrigerant	Copper	Type L	Hard, capped and nitrogen filled
Refer to specific Mechanical Division sections for services not listed above, e.g. domestic water – refer to Section 22 11 00 "Domestic Water Systems".			
* Maximum 230 degrees F for mechanical couplings on piping 10-inch and larger.			

B. Schedule of Piping Fittings for HVAC Systems:

Service	Size	Material	Type	Weight
Fan coil or terminal unit hot and chilled water runouts, coil condensate drains	All	Wrought copper	Solder	Standard
Refrigerant	All	Wrought copper	Silver solder, copper-phosphorus alloy	Standard

C. Piping Installation:

1. Make piping connections to coils, humidifier distribution manifolds and equipment arranged that the equipment can be serviced or removed without dismantling the piping.
2. Install piping concealed above as high as possible above ceilings or in walls unless otherwise indicated.
3. Connect refrigerant piping to bottom of mains where space allows.
4. All cut and threaded pipe shall have the cutting burrs and sharp edges reamed out.
5. In erecting pipe, friction wrenches and risers shall be used exclusively, and any pipe, cut, dented or otherwise damaged shall be replaced.
6. All ferrous to non-ferrous pipe connections shall be made with accepted dielectric pipe or flange union isolating joints to prevent any electrolytic action between dissimilar metals.

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

9. Capabilities:

- a. Stand-Alone Capability: If PC or communications network malfunctions, each DDC shall continue to control, monitor and have the ability to be accessed and programmed via a handheld operator's terminal.
- b. Degraded Mode: If, by failure of a sensor or system component which causes information critical to a DDCs program to be lost, default values or subroutines will automatically be used to approximate critical information to ensure continued control.
- c. Networking: Each DDC shall be capable of sharing point information with other DDCs on the same data network.
- d. Real time operating system capable of time of day scheduling and other time based functions.
- e. Each DDC shall be provided with the ability to prevent unauthorized access to its software program. This shall be accomplished by a password or cabinet lock. In the locked or unauthorized position, the operating characteristics of the DDC cannot be changed, although inputs, outputs and set point values can be displayed. In the unlocked or authorized position, the ability to change the DDC program shall be unhindered.
- f. Alarm processing to include: Change of state, flow proof, high and low analog limits, and setpoint deviation. Provide at least two levels of alarm priority.
- g. The DDC programming language shall be designed for Building Automation and Control applications and shall be capable of performing the following control algorithms:
- (1) Floating; Proportional (P) direct and reverse acting; Proportional plus Integral (PI); Proportional Integral plus Derivative (PID); Anti-integral wind up; Cascade; Programmed interlock logic; Deadband switching and control; Incremental control.

C. Sensors and Switches:

1. Temperature Sensors:

- a. Temperature sensor assemblies shall consist of a 100 or 1,000 OHM platinum RTD sensor and a solid state, 2-wire, 4 to 20 milliamp transmitter protected in a housing suitable for the environment in which it is installed.
- b. Space temperature sensors shall be enclosed in a locking type cover plate with no external temperature indication or adjustment of setpoint. Sensor setpoint adjustment shall require use of the plug-in jack provided in the coverplate or other access to the control network. Finish and final locations of space temperature sensors shall be approved by the Architect.

2. Pressure Transmitter Assembly – Air Streams:

- a. The assembly shall consist of a pressure sensor and a solid-state, 2-wire, 4 to 20 milliamp transmitter contained in a housing suitable for duct mounting.
- b. The assembly shall be factory calibrated and field installed to an accuracy of plus or minus 0.05 inches water gauge over a range of 0 to 4 inches water gauge.
- c. Probe: 8-inch pitot tube, brass.

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7. All copper tubing shall be cut and reamed to remove all burrs. Outside and inside of the fittings and outside of the tubing at each end shall be well cleaned with steel wool before soldering to remove all traces of oxidation regardless of how clean the surfaces of the pipe and fittings may appear.
8. Provide unions at connections to each piece of equipment for easy dismantling and at such other points to facilitate installation. Unions shall be of same strength, and manufacture used in the respective piping systems and shall be of the ground joint type.
9. Nipples: Any piece of pipe 8 inches in length and less shall be considered a nipple. All nipples with unthreaded portion 1½-inch and less shall be extra heavy. All other nipples to be of weight corresponding to fitting connected. Only shoulder nipples shall be used; close nipples will not be acceptable.
10. All fittings unions and connections at pumps, tanks or other major equipment 3 inches and over in size shall be assembled with flanged joints and approved gaskets.

D. Pressure Tests:

1. Less than 100 pounds per square inch operating pressure:
- a. Test hydrostatically to 150 pounds per square inch.
2. Over 100 psi operating pressure:
- a. Test hydrostatically to 1½ times operating pressure.
- b. Never exceed ANSI B16.1 test pressure basis.
- c. Review building working pressure diagram for pressure rating of fitness and equipment.

23 21 23 – PUMPS

A. Acceptable Manufacturers:

1. Cooling Coil Condensate Pumps: Little Giant VCMA-20 Series, March, Beckett CB, Hartell KTP20

B. Cooling Coil Condensate Pumps:

1. Provide a fully automatic condensate removal pump with ½ gallon capacity integral leakproof tank. Pump capacity shall be 20 gallons per hour with a 15 foot lift.
2. The pump shall be a vertical-type with stainless steel motor shaft, rust proof, high-impact ABS tank and motor cover, 3 drain inlet connections.
3. Provide a removable ¾ inch barbed check valve.
4. Provide a safety switch and relay rated at 5 amperes/48 volts to shut down the associated HVAC unit or wired to a tank high level alarm.
5. Pump shall be rated for high-efficiency gas furnace applications that produce an acidic condensate.
6. The 120 volt single phase motor shall be thermally protected motor and UL Listed for hardwire connection.

23 23 00 – REFRIGERANT PIPING

A. Refrigerant piping and fittings shall be as follows:

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Jackson Wyoming
307.733.9955



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1.

Copper Tube: ASTM B88 and ANSI BP-1 ARC with sealed ends.
2.

Fittings: ASME B16.22 wrought copper pressure type with long radius elbows.
3.

Joints: Brazed with AWS A5.8 BCuP silver/phosphorus/copper alloy.
4.

Filter/Drier: Pleated media cartridge type with solid core sieve and activated alumina.
5.

Strainer: Straight line or angle type with brass or steel shell with replaceable cartridge. Screen of stainless steel wire or monel reinforced with brass.
6.

Valves: Shutoff, check, solenoid and relief valves shall be selected for the pressure and flow required. Henry Technologies, Hansen Technologies, Flomatic Valves.
- B.

Installation:
1.

All piping shall be sized and specialties selected by the equipment manufacturer or his representative including any required double risers, traps, flexible connections, etc.
2.

Install pipe and specialties in accordance with the equipment manufacturer's recommendations.
3.

Connect piping to equipment using unions or flanges.
4.

Provide isolation valves and valved bypasses around replaceable cartridge filter/driers and other replaceable specialties.
5.

Route pipe in an orderly manner, parallel to building structure, maintaining gradient.
- C.

Testing:
1.

Pressure test to ASME B31.5.

23 31 00 – HVAC DUCTS AND CASINGS

- A.

Acceptable Manufacturers:
1.

Spiral Oval and Round Ducts: United McGill "Uni-form", Semco, Metco, Ductmate Industries "Spiralmate" and "Ovalmate"
2.

Duct Connection Systems: Ductmate Industries "Ductmate 35" and "Ductmate 45", Nexus, Ward
3.

Flexible Connections: Ventfabrics "Ventglas" and "Ventlon", Duro Dyne "Insulfab", Advance Elastomeric Systems, Ductmate Industries "PROflex"
4.

Flexible Ducts: Automatic Industries "Thermaflex M-KE", United McGill, Genflex "IL"
5.

Spring Fasteners: Dzus, Simmons "Quick-Lock"
6.

Duct Sealants: Minnesota Mining and Manufacturing , Benjamin Foster, Childers, Miracle Adhesive, United McGill, Hardcast, Ductmate Industries "PROSeal"
7.

Spin-in Fittings: Young Regulator, Modular Metals
8.

Flexible Duct Clamps: Aerquip Ideal, Tridon, Young Regulator
9.

Acoustical Panel Plenums: IAC, Rink, Vibro-Acoustics, United McGill
10.

Access Doors, Ducts: Ventfabrics, Duro Dyne, Ruskin. Use "Ventlok" No. 140 latches, Ductmate Industries, hinged type only
11.

Access Doors, Plenums: Ventfabrics, Duro Dyne, Elgen
12.

Duct Joint Tape: Hardcast
- B.

Published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this section where cited below:
1.

ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers Handbooks (Latest Editions).

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- (a)

Flame spread: 10.
- (b)

Smoke developed: 0.
- (3)

Similar to Hardcast®.
- c.

Spring Fasteners: Self-ejecting oval head stud and receptacle with screwdriver slot.
- d.

Slide-on Transverse Joint Connectors:
- (1)

Prefabricated slide-on transverse duct connectors and components shall be accepted. Ducts constructed using prefabricated systems shall refer to the manufacturer guidelines for sheet gauge, intermediate reinforcement size and spacing, and proper joint reinforcement. Ductmate Industries, Ward, Nexus, or approved equal.
- (2)

Formed-on flanges shall be constructed as T-25 A/B flanges, of which the construction guidelines are given in Figure 1-4 of the 1995 SMACNA HVAC Duct Construction Standards, Metal and Flexible, Second Edition. No other construction standards pertaining to formed-on flanges shall be accepted.
- (3)

Formed-on flanges shall include the use of corners, bolts, cleat and gasket.
- (4)

All components shall be metal unless other materials are required by code or specified.
3.

Flexible Connections:
- a.

Flexible Connections shall be used where ductwork connects to rotating, vibrating or noise producing machinery. Connectors shall be attached in such a manner to provide an airtight and waterproof seal.
- b.

With metal edges at each end:
- (1)

No. 24 USSG galvanized steel.
- c.

2 inch slack in fabric.
- d.

Install to allow minimum movement of 1 inch.
- e.

Length of fabric connections:
- (1)

Minimum: 4 inches.
- (2)

Maximum: 10 inches.
- f.

Materials:
- (1)

Indoor installations shall be a UL listed, fire retardant neoprene or vinyl coated woven fiberglass fabric. Minimum density 30 ounces per square yard and rated to 200°F.
- (2)

Outdoor installations shall be a UL listed ultra violet light resistant Hypalon coated woven fiberglass fabric. Minimum density 24 ounces per square yard and rated to 250°F.
- (3)

Flame spread rating: 25 maximum, smoke developed rating: 50 maximum
- (4)

Insulated connections:
- (a)

Two layers of fabric with 1-inch thick fiberglass, 1.5 pound density.
- (b)

Performance as previously specified in 3-f-(2).

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2.

SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.
- a.

HVAC Duct Construction Standards, Metal and Flexible, Second Edition, 2005.
- b.

Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems, Fourth Edition, 2002.
- c.

HVAC Systems Testing Adjusting and Balancing. 3rd Edition, 2002
- d.

Seismic Restraint Manual, Guidelines for Mechanical Systems, 1998
- e.

HVAC Air Duct Leakage Test Manual 1st Edition, 1985
- C.

Submittals
1.

Submit ductwork shop fabrication and shop construction standards prior to submittal of ductwork shop drawings.
2.

Ductwork shop fabrication and shop construction standards shall include all applicable shop details and product data. Include the following:
- a.

Duct reinforcement tables for all pressure classes, duct materials [galvanized steel, aluminum, stainless steel, black iron] and ductwork shapes [rectangular, round, spiral, flat oval] to be used on this project
- b.

Duct reinforcement tables shall include material gauges, transverse joint reinforcement type and standard shop joint spacing
- c.

Transfer duct construction detail
- d.

Acoustical lining, perforated metal liner, adhesive, nosing and fastening cuts and details
- e.

Installation details for [volume dampers] [single blade and multi-blade type] [remote- and cord-operated remote volume dampers] [control dampers] [fire dampers] [smoke dampers] [combination fire/smoke dampers] [backdraft dampers]
- f.

Duct access doors
- g.

Duct fitting construction details such as rectangular and radius elbows, turning vanes, offsets, branch connections, etc.
- h.

Duct support and attachment details
- i.

Flanged duct connection details for all systems and each manufacturer used on project. Minimum duct construction gauges shall be as per SMACNA duct reinforcement tables. Duct gauges may not be reduced based on alternative jointing manufacturer's recommendations
- j.

Ductwork sealant
- k.

Diffuser ductwork connection details
- l.

Duct penetrating full height partition details
- m.

Flexible connection details
- n.

Duct and plenum construction details
- o.

[Submit data on all adhesives, coatings, mastics and duct sealants or caulking to ensure that the LEED Credit EQ 4.1 is achieved].The VOC content of any adhesives or sealants must be less than the current VOC content limits of the South Coast Air Quality Management District (SCAQMD) Rule #1168, and all sealants used as fillers shall meet or exceed the requirements of the Bay Area Air Quality Management District (BAAQMD) Regulation 8, Rule 51.
3.

Product Data including manufacturer's installation instructions, application, materials of construction, gauges, descriptive literature, and maintenance data for:
- a.

Ductwork and fittings

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- (5)

Provide wire embedded uncoated glass fabric with sewn seams for air temperature over 150°F.
4.

Turning Vanes:
- a.

Galvanized steel ductwork: Galvanized steel or painted black steel, except as noted.
- b.

Other ductwork: Same material as ductwork.
- c.

Construction shall meet or exceed SMACNA "HVAC Duct Construction Standards".
- (1)

Use of single wall vanes with ¾ inch trailing edge shall be limited to maximum air velocity of 2,000 feet per minute and a maximum duct dimension of 18 inches.
- (2)

Double wall vanes shall be used in ducts where air velocity exceeds 2,000 feet per minute, or any duct with a dimension over 18 inches.
- (3)

Vane length: Provide separate equal-size sections for vane length greater than those previously indicated in Paragraph 1.03: Referenced Standards.
- (4)

Vane runners: SMACNA Type 1 or 2 acceptable.
- (5)

Tab spacing shall be as specified in Figure 2-3 of the SMACNA Manual, HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005. Rail systems with non-standard tab spacing shall not be accepted.
5.

Round duct take-off fittings:
- a.

Factory-fabricated spin-in fitting.
- b.

Die-formed galvanized steel.
- c.

Pressure ratings:
- (1)

Standard construction – up to ½-inch static pressure.
- d.

Balancing damper:
- (1)

Locking regulator.
- F.

Round and Oval Ductwork:
1.

General:
- a.

Factory-fabricated spiral lockseam duct, except as otherwise indicated.
- b.

Factory-fabricated longitudinal seam acceptable for ducts larger than standard factory sizes.
- c.

Factory-fabricated fittings:
- (1)

Same manufacturer as duct and as detailed.
- (2)

Same material and construction as duct in which installed.
- (3)

Tees: VAV box connection to duct loop:
- (a)

Conical saddle tap or conical tee fitting.
- (b)

Center-line take-off, unless otherwise indicated.
- (c)

Continuously welded seams.
- (4)

Elbows:
- (a)

Standing seams.

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- b.

Plenums
- c.

Fasteners and sealants
- d.

Access doors
4.

Shop Drawings:
- a.

¼ inch scale dimensioned duct layout drawings of all mechanical rooms, riser elevations, and floor plans, giving complete dimensions for location, elevation, and clearance, showing work of other Sections and Divisions wherever necessary to show coordination
- b.

Access door details
- c.

Flexible connection details
- d.

Duct and plenum construction details
- e.

Provide a separate set of dimensioned drawings or a partial set at enlarged scale showing all penetrations required for ductwork through structural members, floor and roof slabs, concrete walls and precast walls
- f.

Duct materials, reinforcement and construction schedules
- g.

Duct support and attachment details
5.

All sheet metal shop drawings shall be drawn in double line indicating actual dimensions of ductwork, fittings and equipment. Shop drawings submitted with ductwork drawn in single line shall be returned without review.
6.

Sheet metal shop drawing shall indicate, as a minimum, the following data:
- a.

Ductwork sizes and section breaks
- b.

Location of acoustical lining
- c.

Bottom of duct elevations for all ducts or other services in conflict with ductwork
- d.

Diffuser face size, neck size and air quantity
- e.

All volume dampers
- f.

All air conditioning units
- g.

All terminal units
- h.

Dimensioned drawings showing penetrations required for ductwork through structural members, floor and roof slabs, concrete walls and precast walls
- i.

Duct support and attachment details
7.

HVAC design drawings shall not be submitted as sheet metal shop drawings.
8.

Prior to mounting or hanging of mechanical equipment or ductwork, obtain approval from Architect for proposed method of mounting particularly in existing buildings. Submit weights and location of all mechanical equipment and ductwork to the Architect for approval well in advance of general construction work to allow sufficient time for any structural evaluation, critique and necessary redesign to accommodate the installation
- D.

Duct Classification:
1.

Duct classification is based on pressure classification as scheduled in Table 1-1 and as described in the 2005 SMACNA HVAC Duct Construction Standards (Metal and Flexible). Comply with NFPA 90A when ducts traverse through smoke zones. Comply with UBC/UMC when more stringent than NFPA 90A or SMACNA standards.
2.

Longitudinal Seams: Pittsburgh lock shall be used on all longitudinal seams; snap-lock or button punch seams are not acceptable. If SMACNA seal class A or B is specified, the longitudinal seam shall be sealed from the inside.
3.

Minimum operating pressure for each duct system:

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- (b)

Mitered elbows with continuously welded seams:
- (i)

2 gores – less than 35°
- (ii)

3 gores – 36°F through 71°
- (iii)

5 gores – over 71°
- (c)

Adjustable elbows allowed downstream of variable volume boxes, return/exhaust fans and fan coil units provided each joint is sealed.
- (5)

Also acceptable:
- (a)

Die-stamped radius elbows for ducts 8 inches or smaller.
- (b)

Mitered elbows as specified above for ducts larger than 8 inches.
- d.

Not acceptable:
- (1)

Corrugated or flexible metal duct.
- (2)

Pleated elbows.
- (3)

Acoustiflex.
2.

Single-Wall Ducts:
- a.

Materials of construction:
- (1)

Galvanized steel: supply and return, general and toilet exhaust ducts.
- b.

Metal gauges:
- (1)

Comply with SMACNA Standards.
- (2)

Comply with NFPA 90A when ducts transverse through smoke zones.
- c.

Similar to United McGill "Uni-Form".
- G.

Flexible Ducts:
1.

General:
- a.

Use only where indicated
- b.

UL 181, Class 1 air duct
- c.

Labeled for compliance with UMC
- d.

With polymeric liner
2.

Static Pressure Class Up to 1 inch w.g.:
- a.

Insulated Flexible Duct:
- (1)

Maximum working pressure 1.0 inches w.g.
- (2)

Nominal 1 inch insulation with vapor barrier.
- (3)

Maximum thermal conductivity 0.27 BTUH/sq. ft. °F/in at 75°F.
- (4)

Similar to Thermaflex M-KE.
- b.

Use downstream of VAV boxes or at distribution devices in a constant volume system.
- c.

Maximum length 6 feet.

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- a.

Scheduled external static pressure for each fan or HVAC unit, positive or negative.
- b.

Adjust upward to nearest pressure class tabulated in SMACNA HVAC Duct Construction Standards.
4.

Duct classification is applicable to all ductwork, including but not limited to the following:
- a.

Supply duct from ductloop to air terminals (+2" w.g.).
- b.

Supply ducts from air terminals to air outlets (+1" w.g.).
- c.

Constant volume supply air systems complete from fan discharge to air outlets (+1" w.g.).
- d.

Outside air supply systems (+1" w.g.).
- e.

Flexible ducts (+1" w.g.).
- f.

Relief, return and exhaust systems (-2" w.g.).
- E.

Materials:
1.

Sheet Metal:
- a.

Steel sheets:
- (1)

Cold rolled steel sheets, lock forming quality.
- (2)

Meeting ASTM A653 and A-653M.
- (3)

Black or galvanized as specified.
- (4)

Galvanizing: 0.9 ounces per square foot both sides .
- b.

Stainless steel sheets:
- (1)

ANSI Type 316 as specified.
- (2)

Ce concealed: Finish No. 2B or No. 3.
- (3)

Exposed: Finish No. 4.
2.

Miscellaneous Products:
- a.

Duct Sealants:
- (1)

Sealing compound: shall be flexible water based adhesive for use in all pressures. Sealant shall be UV-resistant, conform to ASTM E84, be UL 723 Listed and meet NFPA requirements for Class 1 ductwork.
- (2)

Gaskets:
- (a)

Continuous, reinforced, inert self-conforming type.
- (b)

¼-inch thick.
- (c)

Width: to match angle connection.
- (d)

Ductmate Industries Model 440, or equal.
- b.

Hard-setting joint tape:
- (1)

Two-part tape:
- (a)

Mineral impregnated woven fiber tape.
- (b)

Impregnated with activator/adhesive of polyvinyl acetate type.
- (2)

UL listed:

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3.

Factory installed collar.
4.

Flexible ductwork clamps:
- a.

Straps approved for use with flexible ductwork.
- b.

Stainless steel strap.
- c.

Adjustable screw type.
- d.

Similar to Ideal.
- H.

Access Doors:
1.

In accordance with SMACNA – Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005, except as noted.
2.

In ductwork:
- a.

Insulated or non-insulated, same as duct.
- b.

Hinged, except where sliding or removable type required. Latch, equal to Ventlok No. 100.
- c.

Size:
- (1)

20 inches x 14 inches.
- (2)

Ducts less than 16 inches: one dimension 20 inches; other dimension 2 inches less than duct width.
- (3)

Larger sizes where required for access.
- d.

Provide in following locations:
- (1)

Coils in ducts: entering and leaving side.
- (2)

Automatic dampers: linkage side.
- (3)

Balancing dampers and backdraft dampers
- (4)

Fire dampers, smoke dampers and combination fire smoke dampers.
- (5)

Duct-mounted smoke detectors, sprinkler heads, heat detectors.
- (6)

Inlet and outlet sides of each in-line centrifugal and axial fan.
- (7)

All controls, sensing, processing, transmitting and actuating devices
- e.

Make completely accessible. Provide permanent label on all access doors identifying the concealed components as specified above.
- I.

Ductwork Installation:
1.

General:
- a.

Duct dimensions indicated are net, inside, clear, dimensions:
- (1)

For internally lined ducts, add lining thickness to determine metal duct for dimensions.
- b.

At exposed duct penetrations of walls, floors and ceilings, provide sheet metal angle type escutcheons.
- c.

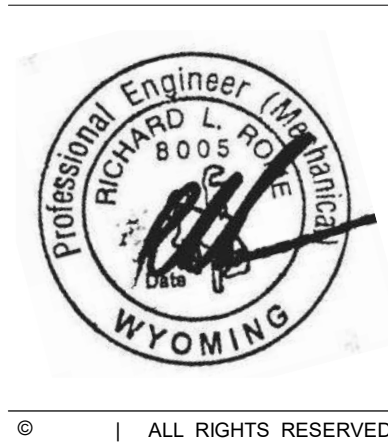
Transitions:
- (1)

Pitch sides of duct in "diverging" or "converging" airflow maximum of 15° including angle.
- d.

Duct openings:

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- (1) Provide openings where required to accommodate thermometers, smoke detectors, controllers, etc.
 - (a) Insert through airtight rubber grommets.
- (2) At fire dampers allow adequate length of duct to install access door.
- e. Flexible Duct Connections:
 - (1) Install at:
 - (a) At connections to fans, sound attenuators, fan coils, heat pumps, air conditioning units and all air handling equipment. As indicated on Drawings.
- f. Volume dampers:
 - (1) Install dampers where specified.
 - (2) Install damper in branch duct for every diffuser at accessible location most remote from diffuser.
2. Rectangular Duct Joints:
 - a. Standing seams, except where flush drive slip seam called for.
 - b. Use flush, drive-slip, for:
 - (1) Exposed ducts.
 - (2) Where required for clearance.
 - c. "Ductmate" system joints, may be used in lieu of standing seams. (**PLASTIC CLIPS ARE NOT ALLOWED**).
3. Joint Sealing:
 - a. Seal all transverse, longitudinal and spiral joints of all sheet metal ducts by one of following methods:
 - (1) Six ounce canvas strip, six inches wide.
 - (a) Adhere with lagging adhesive. Hardcast Two Part II Duct Sealing System: DT-5400 tape with RTA-50 sealant (**DUCT TAPE NOT ALLOWED**).
 - b. Seal punched holes and corner cracks (**DUCT TAPE NOT ALLOWED**).
 - c. After installation and testing reseal joints found to be leaking.
4. Round and Oval Ductwork:
 - a. Joints between ducts:
 - (1) Made with beaded sleeve joints.
 - (2) Duct sealer applied to male end.
 - (3) Mechanically fastened with sheet metal screws or pop rivets.
 - (4) Over joint and screw or rivet heads, apply coating of duct sealer.
 - (5) Seal and tape as specified for rectangular ductwork.
 - b. Joints, duct and fitting:

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5. Extend wire leads on fans driven by direct motor drive from the motor junction box in air tight rigid walled conduit, to a junction box mounted external to the fan casing.
6. On fans driven by belt drive provide standard "V-groove" type belts and sheaves suitable for the service intended. Fan sheaves are non-adjustable type with removable machined bushings. Provide adjustable pitch type with removable machined bushings. Provide adjustable pitch type motor sheaves with double locking feature, to 10% above and below the rated fan speed. Dynamically balance sheaves with over three grooves. Provide at least two belts and sheaves each capable of carrying the entire load with one belt broken.
7. Provide performed expanded metal or sheet metal belt guards, with grommated tachometer ports at the fan and motor shafts, for all exposed sheaves and belts. Belt guard shall comply with OSHA requirements and be easily removable.
8. Construct wheels/impellers exposed to normal atmospheres of cast aluminum or hot dip galvanized steel and finished with two layers of factory applied non-scaling paint.
9. Electrically ground all fans and drives to prevent accumulation of static charge. Indicate grounding method in fan submittals.
10. Provided threaded drain plugs at fan housing low points.
11. Fan wheels/impellers and housings shall be relieved of residual stresses produced in the forming process.
12. Provide housings with integral inlet and discharge flanges, complete with bolt holes for flexible or hard duct connections. Shop fabricate any companion flanges required for connections to sound attenuators. Companion flanges shall be rolled angles matched to both fan housing and sound attenuators.
- C. Centrifugal Fans:
 1. Provide backward inclined (BI), backward curved (BC), airfoil (AF), forward curved (FC) fan wheels, and single width single inlet (SWSI), or double width double inlet (DWDI), as specified or indicated on the Drawings, enclosed in a scroll shaped fan housing.
 2. Weld or securely rivet fan blades to the hub plate and rim.
 3. Fan housings are to be heavy gauge construction, continuously welded inside and outside. Housings shall be suitably braced to prevent vibration or pulsation. Fan housings shall have spun, aerodynamically designed spun inlet cones or inlet venturis for smooth air entry into the wheels. All fan wheels shall have tapered spun wheel cones or shrouds providing stable flow and high rigidity. Housing with lock seam construction or partial weld shall not be acceptable unless for smaller fan sizes (12-inch wheel diameters or less) where it is standard construction for models listed on Drawings.

23 33 00 – AIR OUTLETS AND INLETS

- A. Acceptable Manufacturers:
 1. Air Inlets and Outlets: Titus, Krueger, E.H. Price, Air Factors, Air Concepts.
 2. Accessories: Dampers, equalizing grids, turning vanes, extractors, plenums, hardware and frames shall be provided by the same manufacturers as the air inlets and air outlets provided.
- B. General:
 1. Refer to Architectural Drawings and Specifications for reflected ceiling plans, elevations, wall and ceiling types and construction. Air outlets and inlets in fire rated ceilings or walls must be all steel construction. Coordinate frame and

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- (1) Slip projecting collar of fittings into duct with a minimum insertion length of 2 inches.
- (2) Apply duct sealer. Seal and tape as specified for rectangular ductwork.
- c. Junctions between ducts:
 - (1) Branch take-off: 45 degrees or
 - (2) Branch take-off: conical 90 degrees
- d. Horizontal supports shall be one-piece clamp band strap, minimum one strap per section. Support fittings as required by SMACNA.
- e. Vertical supports shall be one of the following:
 - (1) Clamp bands with extended ends supported at each floor.
 - (2) Clamp bands with knees bracing.
- f. Use angle iron braces for duct reinforcing. Refer to the SMACNA HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005, figure numbers 1-9 through 1-12.
5. Flexible Duct:
 - a. Provide continuous, single pieces.
 - b. Maximum Length:
 - (1) Above 1 inch water gauge static pressure: 12 inches or as specified.
 - (2) Under 1 inch water gauge static pressure: 6 feet.
 - (3) Local codes or union rules take precedence and may reduce the maximum lengths specified.
 - c. End Connections:
 - (1) Connect to duct collars, terminal unit connections and round air outlets per manufacturer's instructions.
 - (2) Secure with strap clamps specified above.
 - d. Installation:
 - (1) Support per SMACNA.
 - (2) Flexible duct is not allowed in lengths greater than that specified. Bends, twists or sagging of flexible duct is not acceptable.
 - (3) Minimum inside bending radius shall be a minimum of two duct diameters. If minimum radius cannot be maintained, provide sheet metal plenum over air outlet and connect flexible duct to side of plenum. Paint interior flat black.
 - (4) Maximum – one 90 degree turn.
 - (5) Install as straight as possible.
 - e. Flexible duct is only allowed above lay-in type accessible ceilings only.

23 33 13 – DAMPERS

- A. Acceptable Manufacturers:
- B. Balancing Dampers – Single Blade:

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- border types to accommodate the wall or ceiling specified or shown on the Architectural Drawings.
2. All dampers provided shall be operable from the face of the Air Inlet or Air Outlet.
3. Outlet Types:
 - b. Square Ceiling Diffuser, Plaque Face:
 - (1) Provide architectural square panel ceiling diffusers, all-steel construction.
 - (2) Diffuser shall have an 22-gauge steel face panel that captures a secondary 22-gauge panel. The face panel shall be removable by means of four hanger brackets. The exposed surface of the face panel shall be smooth, flat, and free of visible fasteners.
 - (3) The backpan shall be one piece precision die-stamped and shall include an integrally drawn inlet. The diffuser backpan shall be constructed of 22-gauge steel.
 - (4) Sizes indicated on the Drawings are neck sizes.
 - (5) Baked white enamel finish.
 - (6) Type CD-A: 24-inch by 24-inch face size, Titus Model OMNI or approved equal.
 - (7) Type CD-B: 24-inch by 24-inch face size, Titus Model TJD or approved equal.
 - c. Exposed Duct Double Deflection Supply Register:
 - (1) Provide steel border register with rear vertical and front horizontal adjustable air foil type solid aluminum blades.
 - (2) Provide model AG-45 extractor and install register on a reverse knuckle joint in accordance with SMACNA Manual.
 - (3) Frames shall be 1.25 inches wide, 20 gauge steel with full penetration resistance welds and a steel reinforcement gasket at each corner. Grind welds smooth and countersink all screw holes.
 - (4) Aluminum blades shall be spaced on 0.75 inch centers and extend completely through the side frame on each side. Blades shall be individually adjustable without loosening or rattling and shall be securely held in place with permanently spring tensioned wire.
 - (5) Baked white enamel finish.
 - (6) Type SR-A: Titus Model 272 RL or approved equal.
 - d. Combination Plenum and Linear Slot:
 - (1) Continuous linear slot diffusers shall fully integrate with the ceiling system and be constructed of 1/8-inch minimum extruded aluminum with continuous bar volume and deflection control damper for each slot. Provide continuous 26-gauge steel plenums with 1/2-inch acoustical lining sized as per manufacturer's recommendation above diffusers with supply air connections as indicated on Drawings.
 - (2) The slot diffusers shall have pattern controllers supported with spacer channels in 24-inch (nominal) increments the entire length of the slot. The pattern controllers shall allow infinite adjustments to the air stream at 24-inch intervals relative to the direction of the air stream as well as extending or reducing the air throw as may be required to satisfy job conditions and to provide draft-free air distribution. The slot diffuser shall maintain

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1. Provide volume dampers as specified and/or shown on the Drawings for proper balancing and distribution of air, in the various branches of the ductwork for use in testing and balancing the system. Dampers shall be installed separate and independent from the damper specified to be set behind supply, return and exhaust air grilles. Provide single blade dampers in ducts 24 inches in width or less, or 12 inches in height or less. Provide multiple blade dampers for all other duct sizes. Coordinate with the air balancing contractor and provide additional dampers required for proper air balance.

23 33 19 – ACOUSTICS

- A. General:
 1. Noise levels, generated by equipment and ductwork, shall be attenuated to permit attainment of sound pressure levels in all 8 octave bands in occupied spaces that conform to the following Noise Criteria (NC) curves:
 - a. Lobbies, corridors, toilets, spaces within 10 feet of duct penetrations through shaft and equipment room walls and floors of equipment rooms: NC 40.
 - b. Conference Rooms:
 - (1) Small: NC 35
 - (2) Large: NC 30
 - c. Executive Offices: NC 30
 - d. Storage Spaces: NC 50
 - e. All other spaces: NC 35
- B. Acceptable Manufacturers:
 1. Sound Linings: Certainteed ToughGuard, Schuller, Owens-Corning Fiberglas
- C. Duct Lining:
 1. Fiber glass duct liner downstream of terminal units and fan coils shall be finished with a neoprene coated facing, stenciled NFPA 90.
 2. 1.5 in. w.g. pressure duct liner shall be finished with perforated 24-gauge galvanized sheet metal, 28% minimum open area or foil facing. Thickness:
 - a. In ductwork: minimum 1-inch, 1 1/2 pounds per cubic foot density matte-faced unless otherwise noted on Drawings or Specifications.
 - b. Linear Diffuser Supply Plenums: Minimum 1/2-inch, 1 1/2 pound density.
 4. Flamespread shall be maximum 25 fuel contributed and smoke developed shall be maximum 50.
 5. Where duct liner is applied, insulation is not required.
 6. Minimum sound-absorption coefficients (ASTM C423 Mounting Type A) for sound-absorbing duct lining material when tested while mounted per ASTM E795:

Lining Thickness (inches)	Noise Reduction Coefficient (NRC) Minimum
1/2-inch	0.45

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

- air flow across the ceiling and shall not "dump" even when airflow is reduced to 10% of design air quantities. Fixed or blade type pattern controllers are not acceptable.
- (3) Type LD-D Titus Model FL- 20 or approved equal
4. Inlet Types:
 - a. Eggcrate Return Grille:
 - (1) Provide eggcrate design with 1/2 inch by 1/2 inch by 1/2 inch aluminum grid with a minimum free area of 90 percent.
 - (2) Provide with [surface mount] [lay-in tile] extruded aluminum border, 1.25 inches wide, 0.05 inches thick with flush joints and countersunk screw holes.
 - (3) Face areas as shown on the Drawings.
 - (4) Baked enamel finish.
 - (5) Type EG-A: Titus Model 50F or approved equal.

23 40 00 – HVAC AIR-CLEANING DEVICES

- C. Acceptable Manufacturers:
 1. Flat Filters: Flanders/CSC, CAMFIL/Farr, American Air Filter (AAF)
 2. Bag Filters: CAMFIL/Farr, Viledon, American Air Filter, Flanders/CSC
 3. Filter Gauges: Dwyer, or approved equal
- D. TYPE "A" – PANEL FILTERS
 1. Provide 1-inch thick pleated, lofted, non-woven, reinforced fabric, supported and bonded to a welded wire grid, and enclosed in cardboard frame for all panel filters with a MERV 7 rating.
 2. In locations where "slide-in" side access type is required, install filters with adequate seals and blank-off provisions for preventing bypassing of air.
 3. Do not exceed 400 feet per minute filter bank face velocity or as scheduled on the Drawings for the maximum scheduled airflow.
 4. Frames shall be 16 gauge galvanized steel, complete with gaskets and spring type positive sealing fasteners.
 5. Initial resistance to airflow at 500 FPM shall not exceed 0.3 inches water gauge; with a 0.9 inches water gauge recommended final resistance.
- E. TYPE "B" – MEDIUM PERFORMANCE PANEL FILTERS
 1. Provide factory-assembled filter media with a MERV 8 rating. Provide filter media 1-inch thick with an effective filter media of at least 7 square feet per square foot of filter face area.
 2. Media retainer shall be of welded steel construction, designed to support multiple pleats of filter cartridge against the direction of airflow.
 3. Filters shall consist of permanent 16 gauge galvanized steel frame and factory-assembled replaceable filter cartridges, complete with installation accessories.
 4. Provide holding and sealer frames of 16 gauge galvanized steel, equipped with gaskets and four (4) spring type, positively sealing fasteners.
 5. Select the frame to maximize the filter area in the casing. Limit different filter sizes to three total for the project.
 6. Initial resistance to airflow at 500 FPM velocity shall not exceed 0.35 inches water gauge; with a 1.0 inch water gauge recommended final resistance.

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

- | Lining Thickness (inches) | Noise Reduction Coefficient (NRC) Minimum |
|---------------------------|---|
| 1-inch | 0.70 |
| 1.5-inch | 0.85 |
| 2-inch | 0.95 |
7. Dynamic Loss Coefficient: Maximum 1.2.
 8. K Factor: Maximum 0.23 Btu/inch-hour – degree Fahrenheit – square foot, R Value Minimum: 4.2 at 1" thickness.
 - D. Installation of Sound-Linings:
 1. Adhere with 6-inch wide strips of adhesive at 12-inch centers at all joints in lining.
 2. In addition, secure with weld pins and 2-inch diameter washers on maximum 16-inch centers and in compliance with SMACNA standards.
 3. Coat all edges with sealer.
 4. Provide continuous sheelmetal edge protection nosings at entering edges of lined duct sections and all joints.
 5. Dimensions of lined ductwork are clear inside dimensions after lining has been installed.
 6. Extent of Ductwork Sound-Linings:
 - a. Heating, Ventilating and Air-Conditioning Systems.
 - b. Ventilation Systems: As indicated on Drawings.
 - (1) VAV Boxes: First six (6) feet of ductwork at discharge side of boxes. There shall be no branch takeoffs within first four (4) feet.
 - c. Exhaust Systems: As indicated on Drawings.
 - d. Ductwork downstream of fan coil units, heat pumps, AC units or fan-powered terminal units: Minimum ten (10) feet. Branch takeoffs to diffusers are not allowed within five (5) feet from discharge outlet.
 7. All transfer ducts.
 8. All linear diffuser supply plenums.

23 34 00 – FANS

- A. Acceptable Manufacturers:
 1. Centrifugal Fans: Twin City, Chicago, Howden, Loren Cook, Greenheck
- B. General – All Fans:
 1. Provide fans that are quiet operating and non-overloading the entire range of operation.
 2. Statically and dynamically balance fan wheels/impellers at the factory and certify balance.
 3. Provide precision self-aligning bearings designed to prevent leakage of oil or grease. Provide cups, oil chambers, Zerk or Alemite lubrication fittings in accessible locations for ease of lubrication.
 4. Provide copper lubrication leads, for lubrication of internal motors and bearings, extending to a capped termination point external to the fan casing or air handling unit.

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

- F. TYPE "C" – HIGH PERFORMANCE FILTERS
 1. Provide filter media of high-density microfine glass fibers laminated to a non-woven synthetic backing to form a lofted filter blanket. Provide media with a MERV rating of 13.
 2. Provide permanent frame of a self-sealing type to facilitate installation and prevent air leakage between the frames. Provide a seal between the frames and the filter cartridge. The filter media shall be self-supporting against the force of the airflow throughout the operating range of 40 to 120 percent of nominal capacity.
 3. Filters shall consist of permanent 16 gauge galvanized steel frame and factory assembled replaceable filter cartridges, complete with installation accessories.
 4. Filters shall be rated UL Class 1.
 5. Initial resistance to airflow at 500 FPM shall not exceed 0.40 inches water gauge for MERV 13 with a 1.0 inch water gauge recommended final resistance.
- G. FILTERS HOUSINGS (SIDE ACCESS)
 1. Housing shall be factory-fabricated of 16 gauge galvanized steel, welded and properly braced. Provide pre-punched standing flanges to facilitate field installation.
 2. Housing or holding frame shall be of the same manufacturer as filter media or provided by the mechanical equipment manufacturer. Coordinate media size with filter rack design. Contractor-fabricated housings or filter racks shall not be accepted. Housing assembly shall be suitable for use in duct systems with [_____] inches of water gauge static pressure.
 3. Casing and tracks shall be constructed of galvanized or enameled steel or aluminum. Mounting tracks and access doors shall have gaskets to minimize air bypass around the filters.
 4. Provide two doors for access from both sides. Doors shall be hinged 16 gauge galvanized steel equipped with positive sealing, heavy-duty latches and sponge neoprene gaskets. Doors shall not be secured with nuts, bolts, wing nuts, or sheet metal screws.
 5. Standard filter sections provided by mechanical equipment manufacturers may be used for MERV 11, 13 and 14 filters.
 6. Insulate housings where adjacent duct or air system is insulated. Insulation shall be contained within a 2 inch thick, double wall steel panel and meet the requirements specified for adjacent duct or mechanical equipment.
 7. Furnish housings MERV 11 and above air filter system with a lever action sealing mechanism to secure media in tracks.
 8. Frames for filter system with MERV 11 and above shall have an integral pre-filter track for installation of Type A filter immediately upstream of the high efficiency media. Secure pre-filters by means of spring clips or a spring-loaded mechanism. Provide leak-proof gaskets between pre-filter media and holding frame.
 9. Universal holding frames shall be constructed with U-type bearing channels, polyester gasketing and positive sealing clips.
 10. Extrusions of anodized aluminum shall be provided with a replaceable woven pile seal for sealing between extrusion and holding frame.
- H. FILTER GAUGES
 1. Provide filters with direct reading gauges, 4 inch dial type, diaphragm actuated, in a metal case to monitor both primary and secondary filter banks. Dwyer Magnehelic Series 2000 or approved equal.

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HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

F. TYPE "C" – HIGH PERFORMANCE FILTERS

1. Provide filter media of high-density microfine glass fibers laminated to a non-woven synthetic backing to form a lofted filter blanket. Provide media with a MERV rating of 13.
2. Provide permanent frame of a self-sealing type to facilitate installation and prevent air leakage between the frames. Provide a seal between the frames and the filter cartridge. The filter media shall be self-supporting against the force of the airflow throughout the operating range of 40 to 120 percent of nominal capacity.
3. Filters shall consist of permanent 16 gauge galvanized steel frame and factory assembled replaceable filter cartridges, complete with installation accessories.
4. Filters shall be rated UL Class 1.
5. Initial resistance to airflow at 500 FPM shall not exceed 0.40 inches water gauge for MERV 13 with a 1.0 inch water gauge recommended final resistance.

G. FILTERS HOUSINGS (SIDE ACCESS)

1. Housing shall be factory-fabricated of 16 gauge galvanized steel, welded and properly braced. Provide pre-punched standing flanges to facilitate field installation.
2. Housing or holding frame shall be of the same manufacturer as filter media or provided by the mechanical equipment manufacturer. Coordinate media size with filter rack design. Contractor-fabricated housings or filter racks shall not be accepted. Housing assembly shall be suitable for use in duct systems with [_____] inches of water gauge static pressure.
3. Casing and tracks shall be constructed of galvanized or enameled steel or aluminum. Mounting tracks and access doors shall have gaskets to minimize air bypass around the filters.
4. Provide two doors for access from both sides. Doors shall be hinged 16 gauge galvanized steel equipped with positive sealing, heavy-duty latches and sponge neoprene gaskets. Doors shall not be secured with nuts, bolts, wing nuts, or sheet metal screws.
5. Standard filter sections provided by mechanical equipment manufacturers may be used for MERV 11, 13 and 14 filters.
6. Insulate housings where adjacent duct or air system is insulated. Insulation shall be contained within a 2 inch thick, double wall steel panel and meet the requirements specified for adjacent duct or mechanical equipment.
7. Furnish housings MERV 11 and above air filter system with a lever action sealing mechanism to secure media in tracks.
8. Frames for filter system with MERV 11 and above shall have an integral pre-filter track for installation of Type A filter immediately upstream of the high efficiency media. Secure pre-filters by means of spring clips or a spring-loaded mechanism. Provide leak-proof gaskets between pre-filter media and holding frame.
9. Universal holding frames shall be constructed with U-type bearing channels, polyester gasketing and positive sealing clips.
10. Extrusions of anodized aluminum shall be provided with a replaceable woven pile seal for sealing between extrusion and holding frame.

H. FILTER GAUGES

1. Provide filters with direct reading gauges, 4 inch dial type, diaphragm actuated, in a metal case to monitor both primary and secondary filter banks. Dwyer Magnehelic Series 2000 or approved equal.

MECHANICAL
SPECIFICATIONS





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999 3rd Avenue, Suite 3200
Seattle, WA 98104
(206) 342-9900
wsp.com

HEATING, VENTILATING AND AIR CONDITIONING TENANT SPECIFICATIONS

2. Provide filters with direct reading gauges, 4 inch dial type, diaphragm actuated, in a metal case with electrical control contacts to provide high-pressure alarm at the BMS. Dwyer Photohelic Series 3000 or approved equal.
3. Lettering shall be black figures on white background. Provide front recalibration adjustment.
4. Provide gauges with the following differential ranges in inches water gauge:

filter	range
MERV 8	0.0 to 1.0
MERV 11	0.0 to 2.0
MERV 13	0.0 to 2.0

5. Provide one gauge for each filter bank, suitable for flush- or surface-mounting. Include an air filter gauge accessory package consisting of mounting bracket, aluminum tubing, two static pressure tips, and vent valves for each gauge.

- I. Reinforce all filter banks and frames by welding the frames together or with galvanized angles or channels, in accordance with the filter manufacturer's recommendations. The maximum deflection at any point shall not exceed 0.25 inches with the filter bank operating at a final air pressure drop of 2.5 inches water gauge.

- J. Fully gasket each filter bank to prevent air bypass around the filter sections or between the filter modules. Caulk and seal between the plenum and the holding frame.

- K. Provide complete sets of Type 'A' filters for each piece of mechanical equipment to be used during the construction phase. The initial set shall be factory-installed and each subsequent construction set shall be installed at the direction of the Owner or Contractor, or when filters reach a maximum air pressure drop of 0.75 inches water gauge.

- L. Provide two (2) complete sets of the filters specified for each fan coil and air-handling unit. Install one set immediately prior to the air balance and testing required by Section 23 05 93 – Testing, Adjusting and Balancing for HVAC. The other set shall be delivered to the Owner at the time of initial occupancy of the project.

- M. Maintain necessary clearance for changing filters.

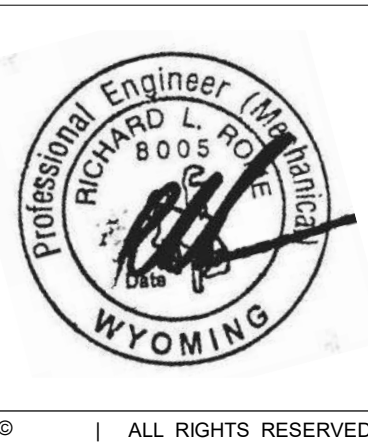
- N. Install filter gauge static pressure tips upstream and downstream of filters. Mount gauge on outside of filter housing or filter plenum in accessible location. Install tubing and gauge valves between gauge and sensor tips. Adjust and level each gauge

- O. Maximum air velocity through the filter media shall not exceed 100 feet per minute for pleated type filters or a maximum face velocity of 400 feet per minute through the filter bank at the maximum scheduled fan airflow.

- P. Install filter assemblies according to manufacturer's instructions and accepted trade practice. Focus particular attention on sealing against leakage between holding frame, housing, filter headers and filters.

- Q. Do not operate the equipment until specified filter media has been installed. Contractor shall be responsible for maintaining the cleanliness of air handling equipment and air distribution systems during construction through regular inspection and changing of filter media throughout the construction period.

END OF SECTION

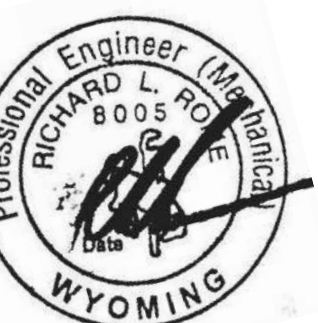
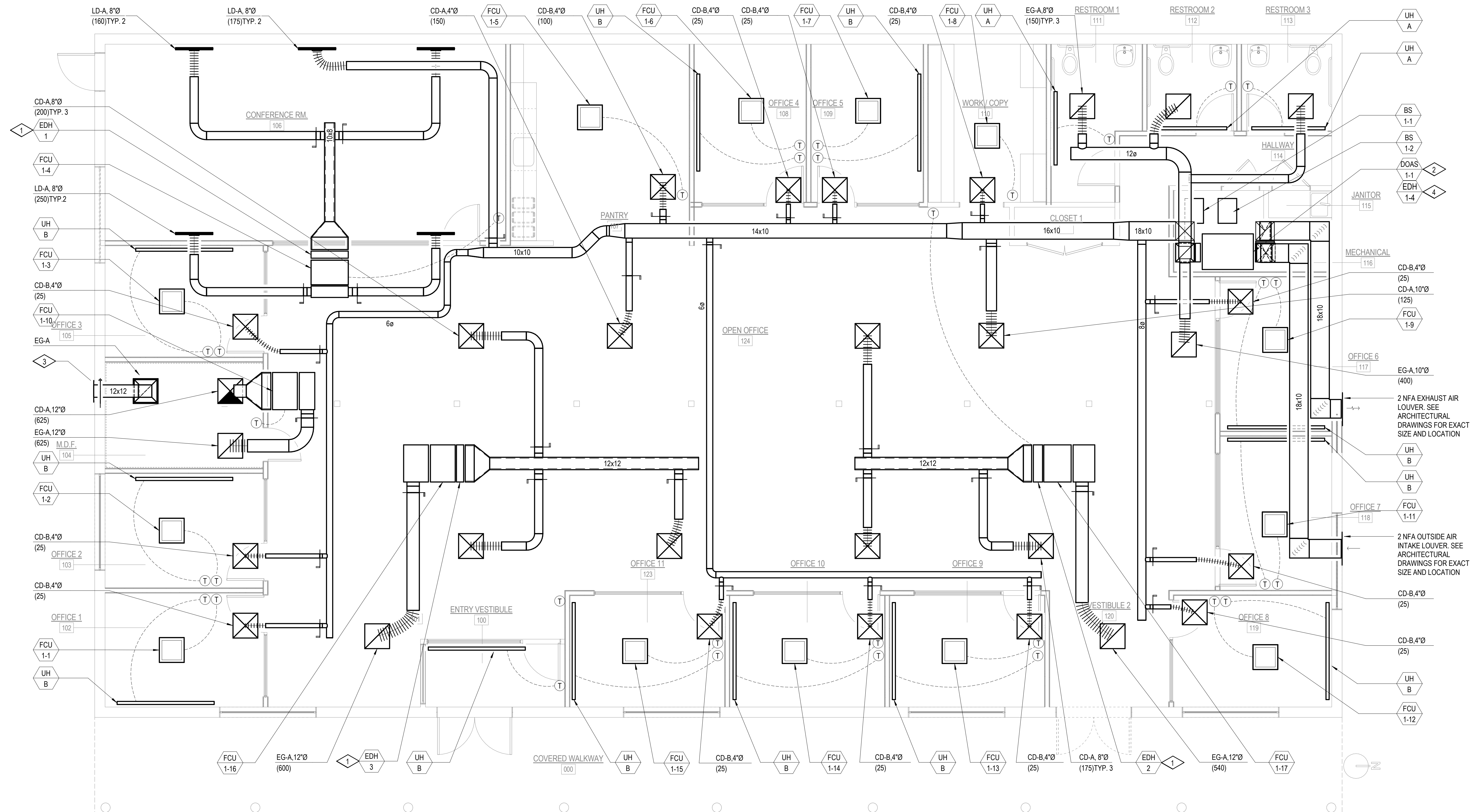


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MECHANICAL
SPECIFICATIONS

M009

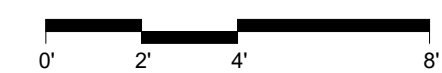


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1 LEVEL 1 - MECHANICAL DUCT PLAN

1/4" = 1'-0"

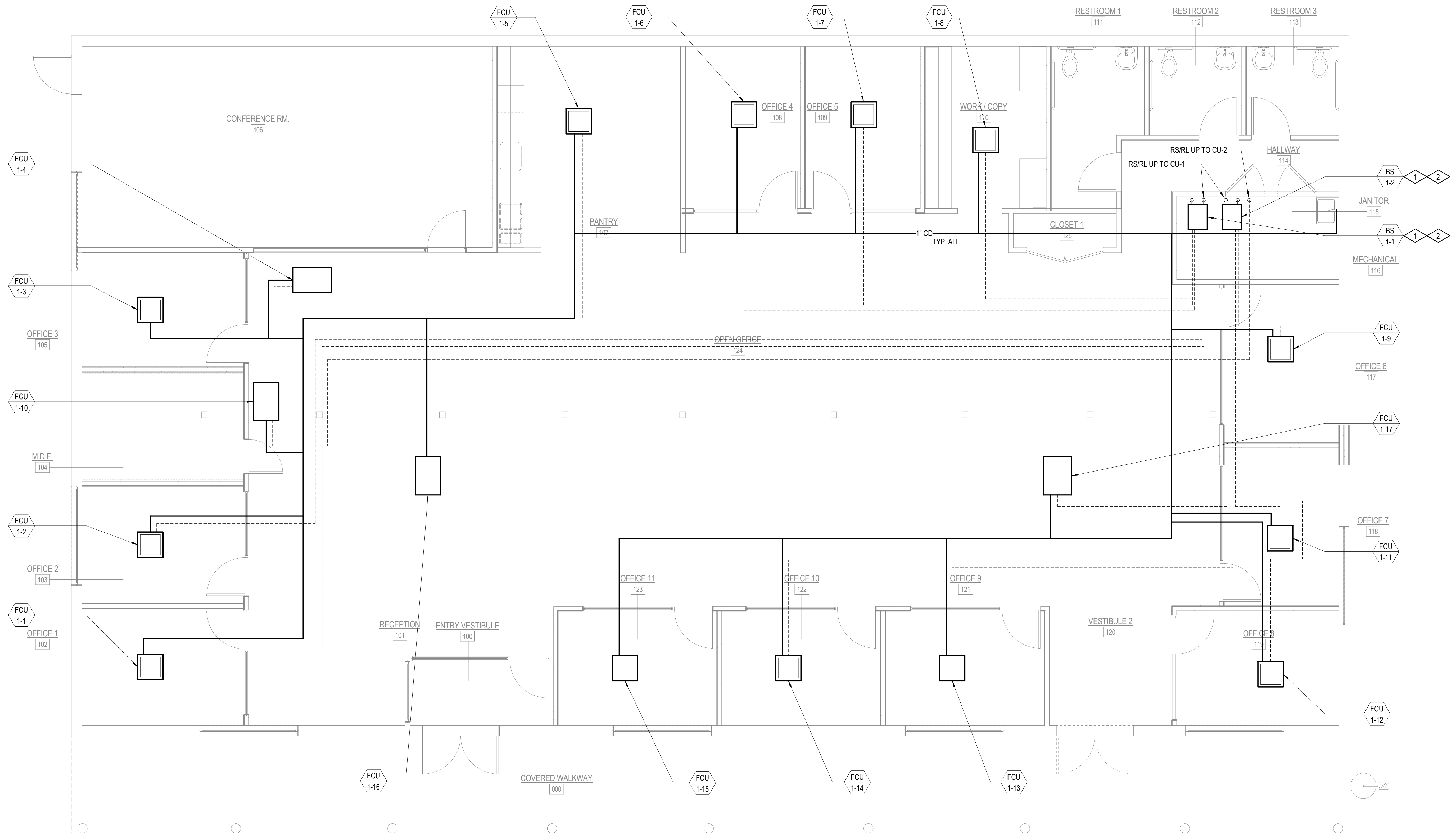
- | # | NUMBERED NOTES |
|---|--|
| 1 | MOUNT EDH DIRECTLY DOWNSTREAM OF FCU. |
| 2 | MOUNT DOAS ON 4-INCH HOUSE KEEPING PAD. |
| 3 | 12x12 LOUVER WITH INSULATED MOTORIZED BACKDRAFT DAMPER. |
| 4 | MOUNT EDH DIRECTLY DOWNSTREAM OF DOAS-1-1 ON SUPPLY DUCTWORK |



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LEVEL 1 - MECHANICAL DUCT PLAN

M201A



1 LEVEL 1 - MECHANICAL PIPING PLAN
1/4" = 1'-0"

- # NUMBERED NOTES
- 1 REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AND GUIDELINES FOR ROUTING AND SIZING OF RL/RS. DAIKIN IS BASIS OF DESIGN FOR THIS PROJECT. REFER TO M502 FOR PIPE SIZING OF DAIKIN SYSTEM.
- 2 MOUNT BS-1-1 AND BS-1-2 TIGHT TO CEILING.

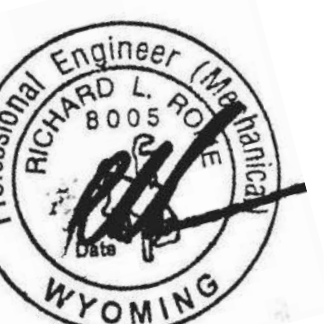
0' 2' 4' 8'



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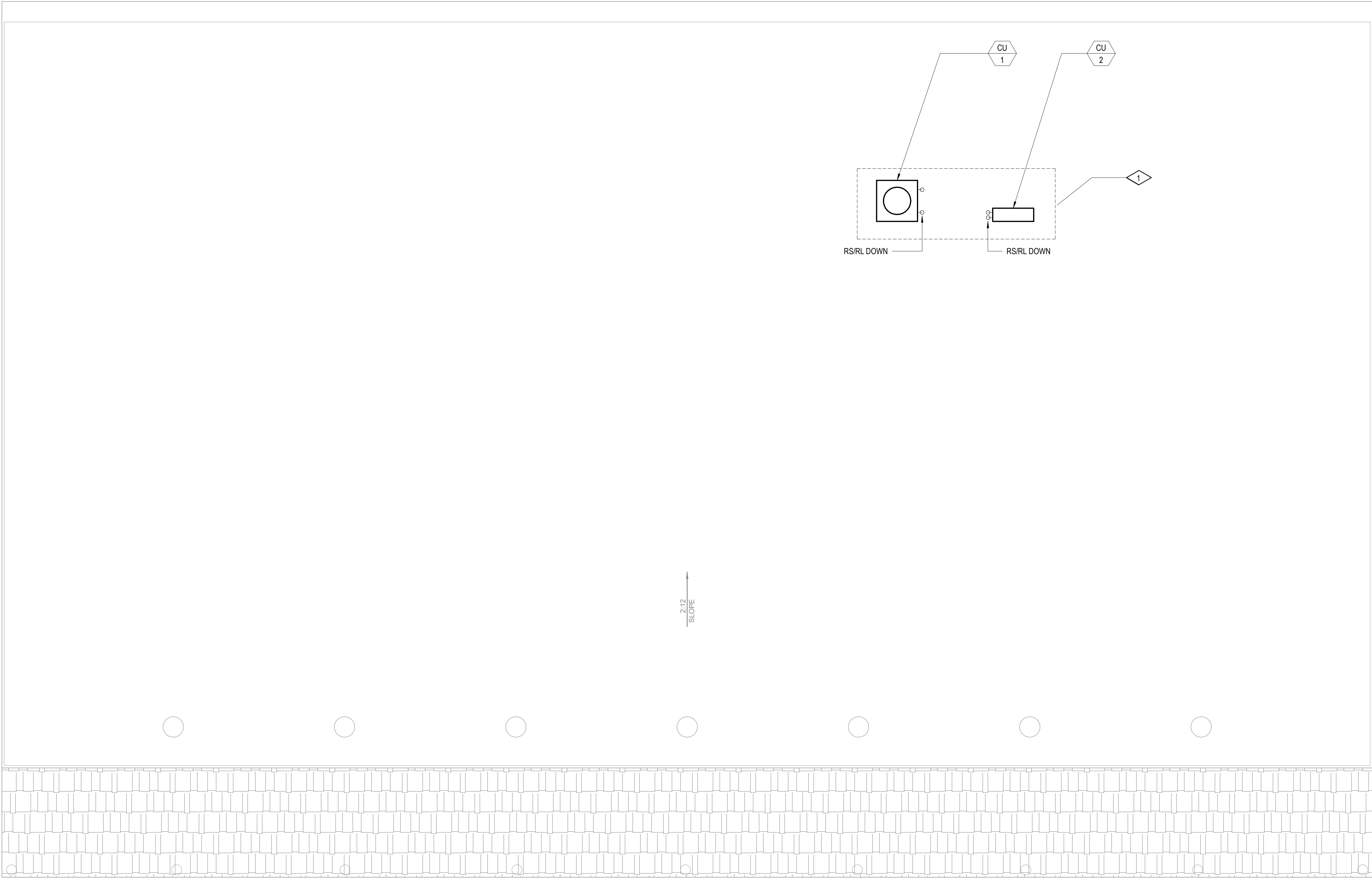


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LEVEL 1 - MECHANICAL
PIPING PLAN

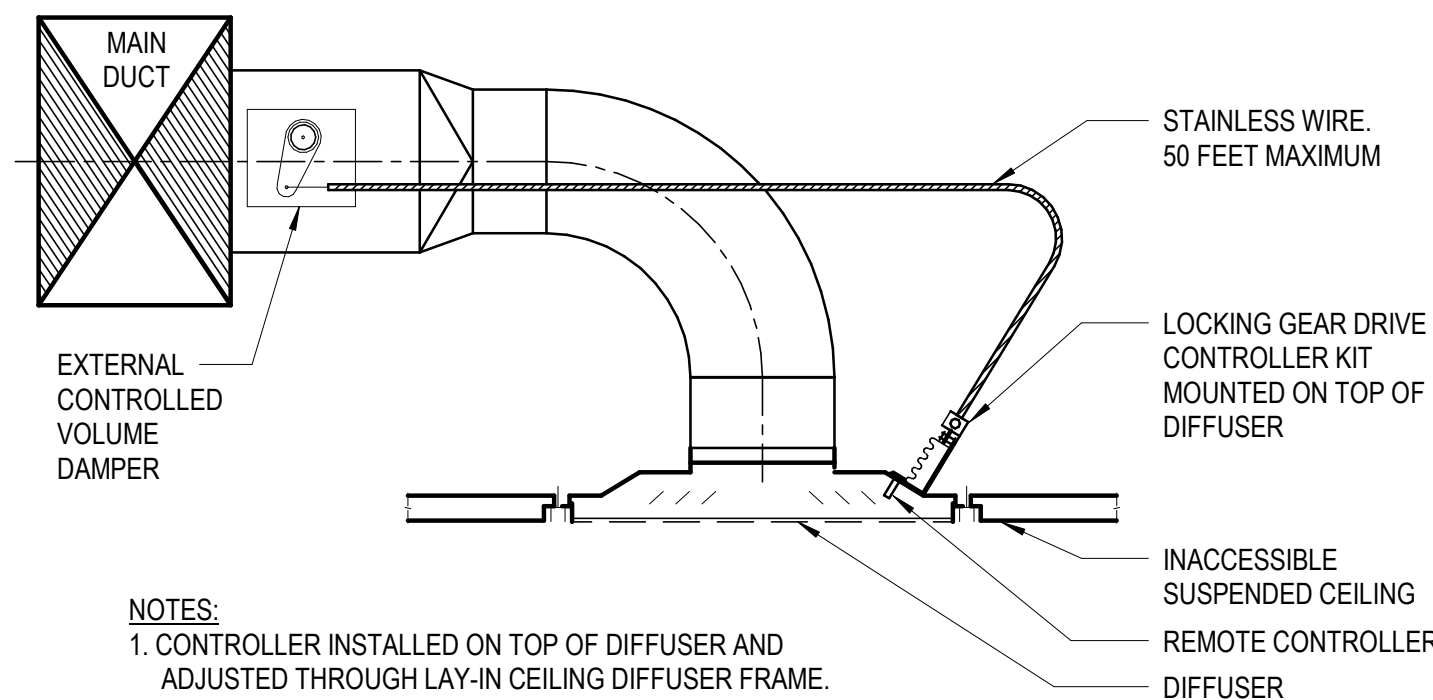
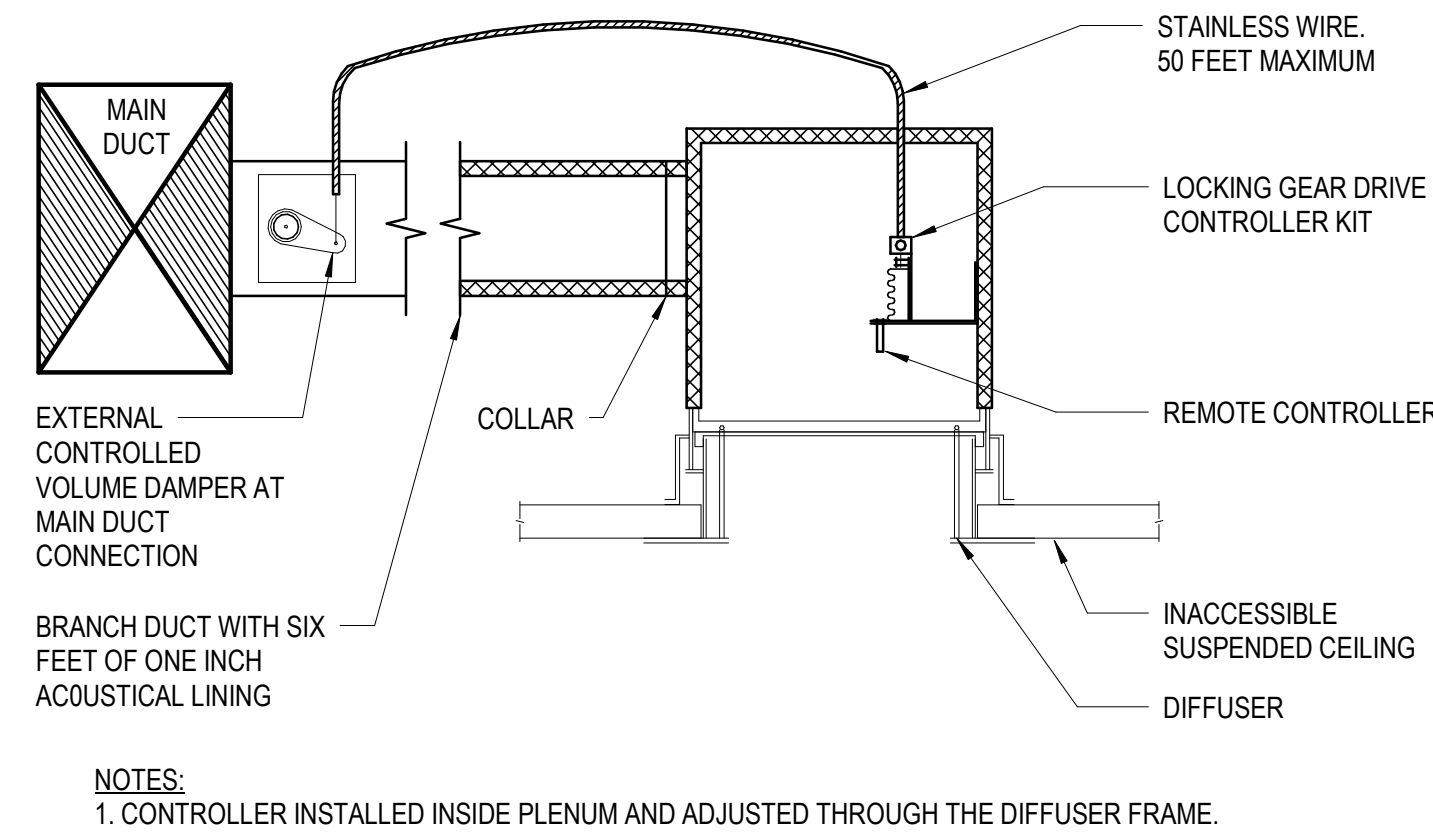
M201B



1 ROOF - MECHANICAL PLAN
1/4" = 1'-0"

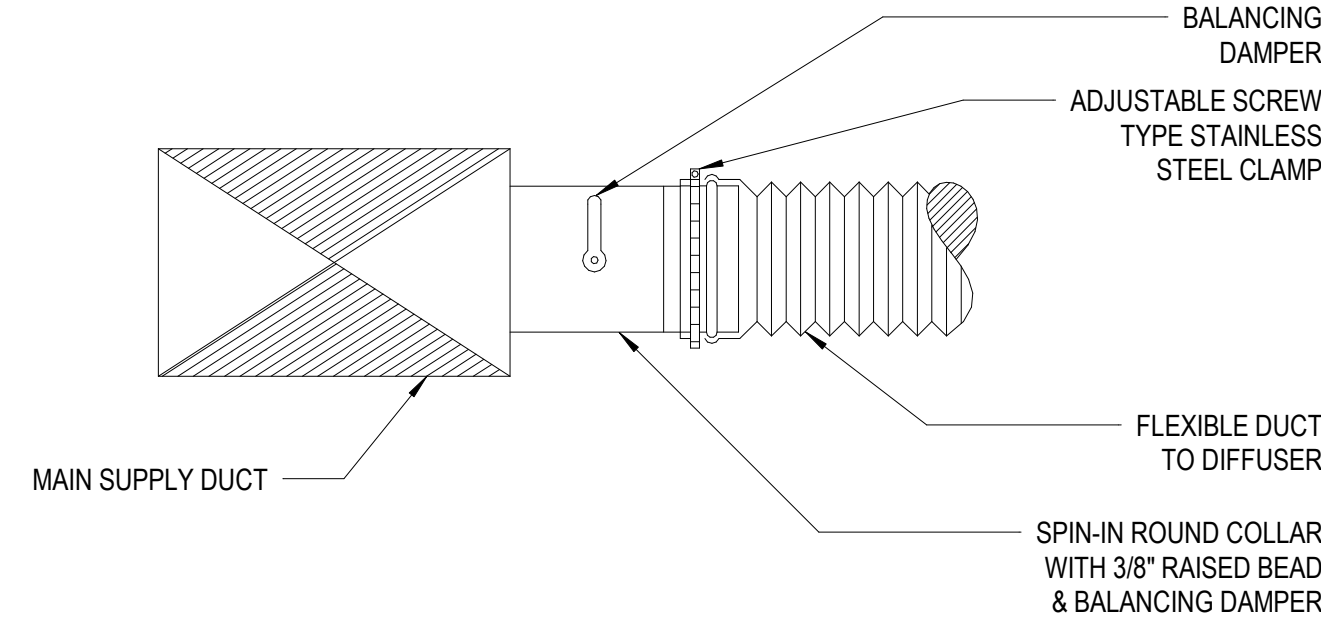
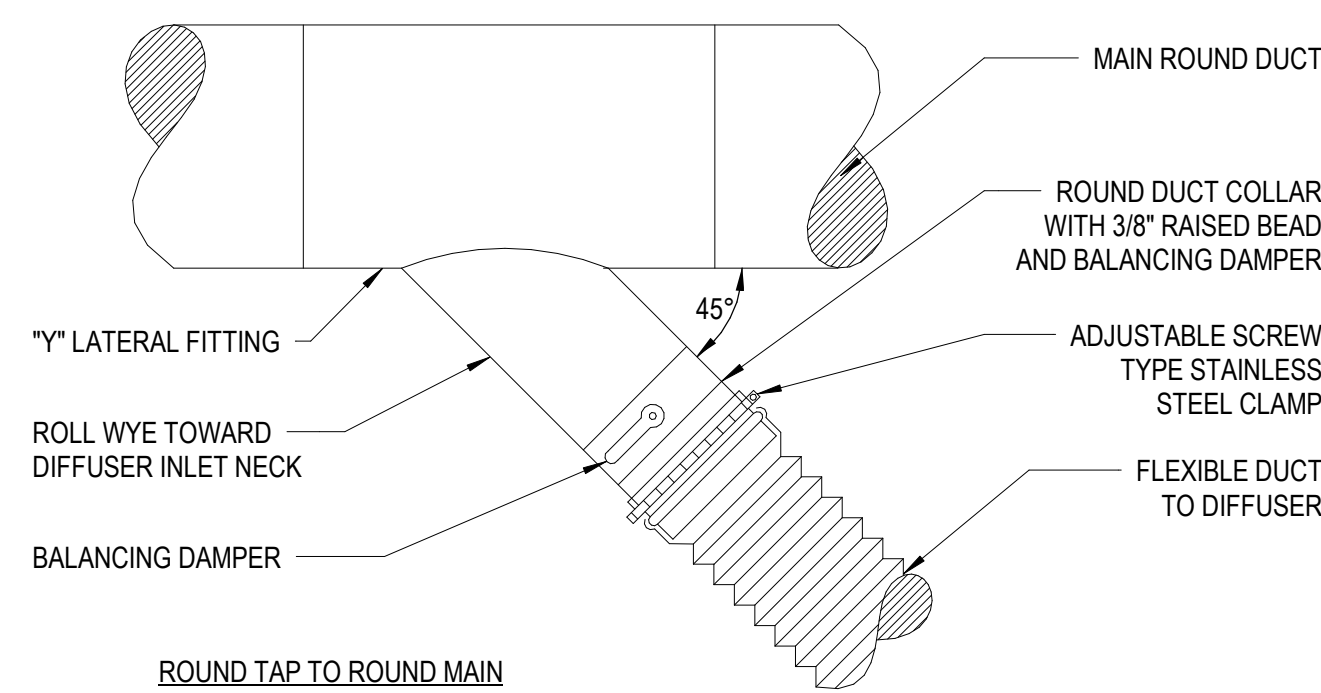
- <#> **NUMBERED NOTES**
- <1> CU-1 AND CU-2 TO BE MOUNTED TO 4'-0"x4'-0" GRATED STEEL PLATFORM





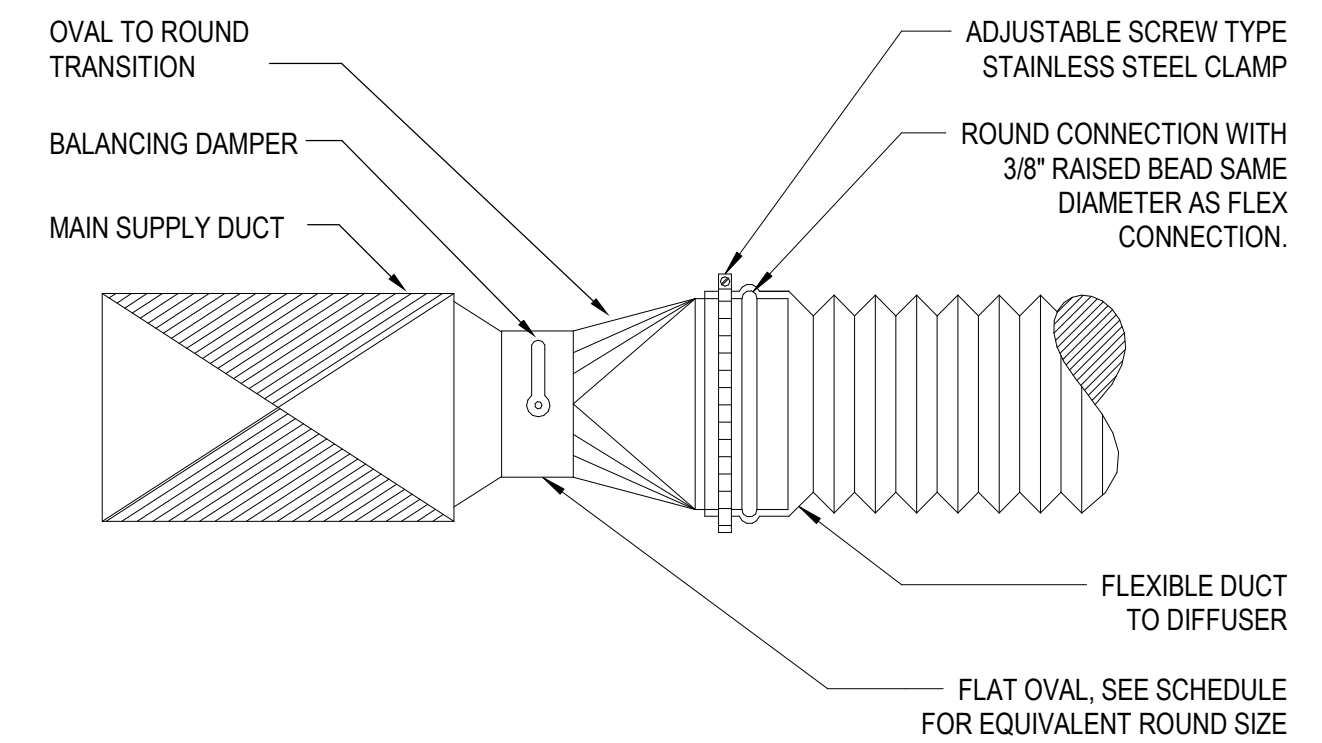
5 REMOTE CABLE DAMPER CONTROLLER

12" = 1'-0"



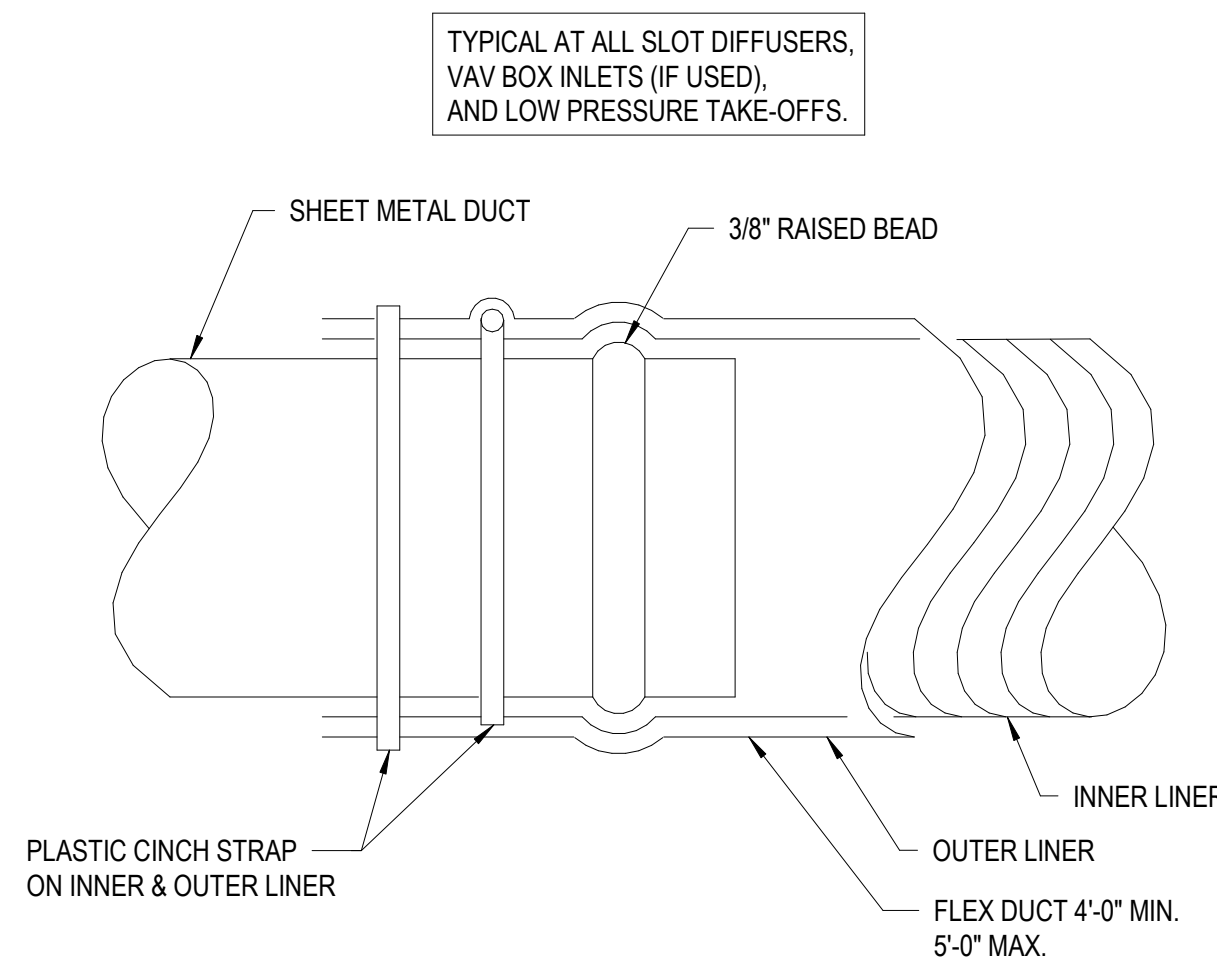
4 LOW PRESSURE BRANCH DUCT CONNECTIONS

12" = 1'-0"



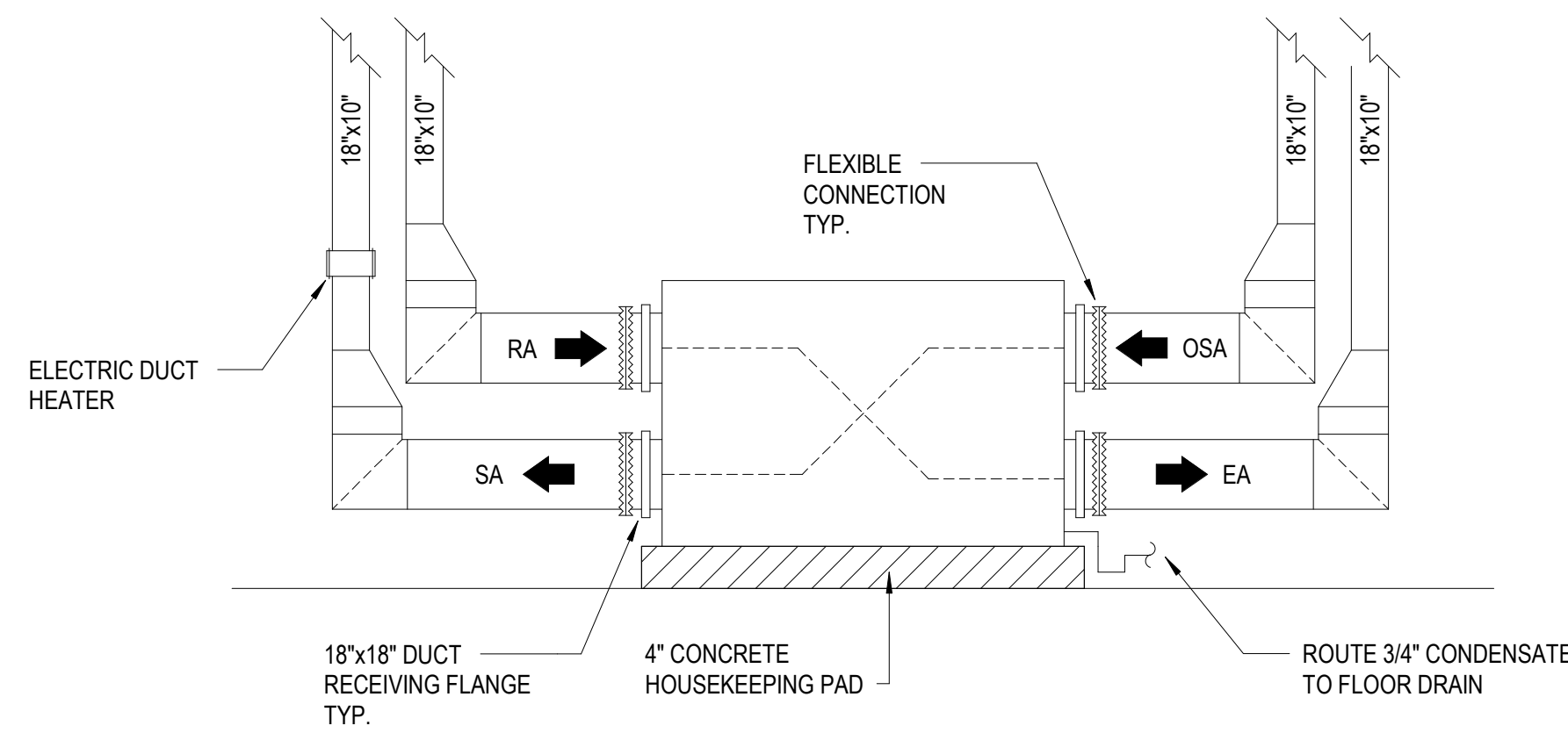
FLAT OVAL EQUIVALENT ROUND	
ROUND Ø	FLAT OVAL INCHES
6"	4x9
7"	5x10
8"	6x11
10"	6x11
12"	7x20
14"	8x22
16"	8x30

ROUND TAP TO RECTANGULAR MAIN
(TAP LARGER THAN MAIN)



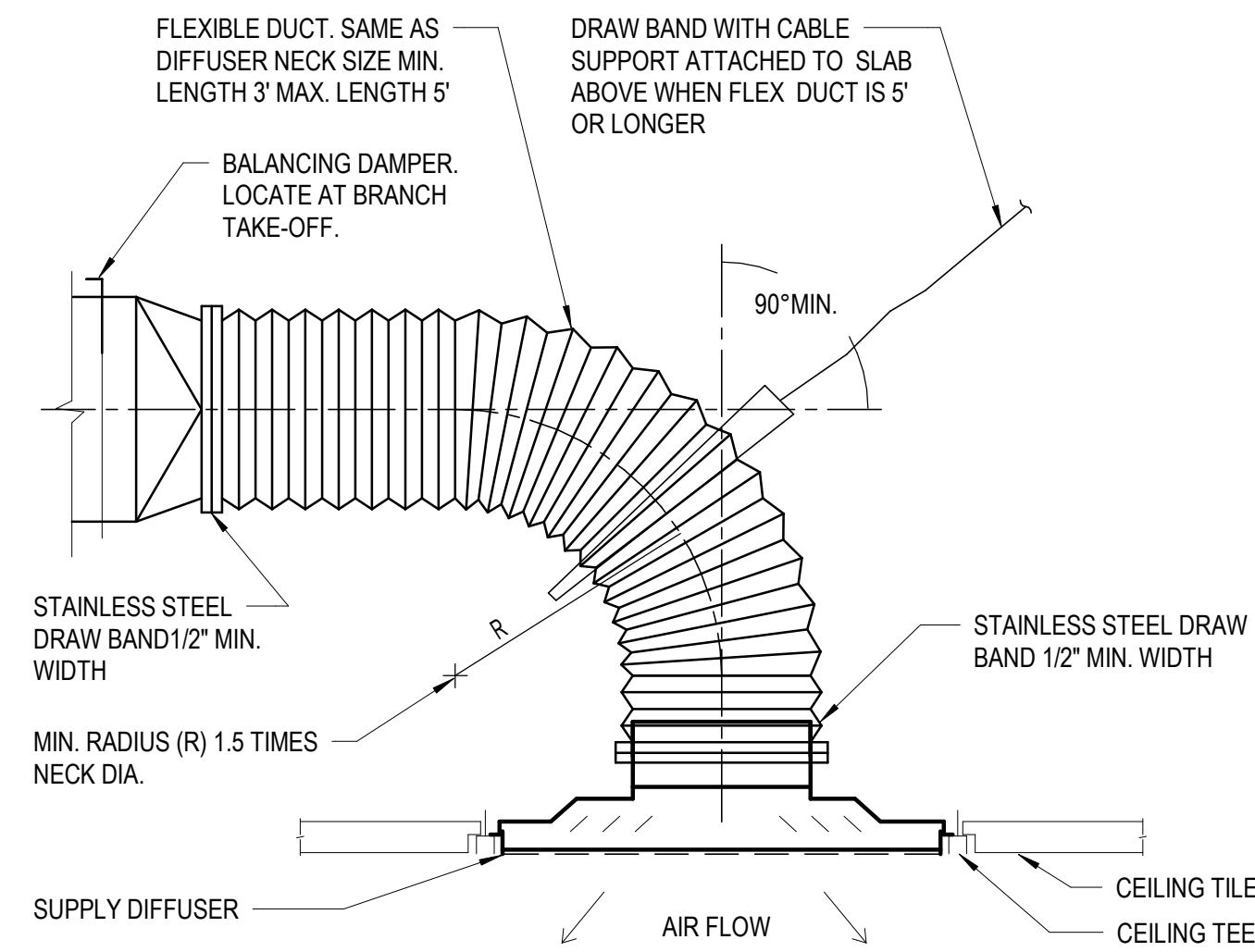
3 FLEXIBLE DUCT CONNECTION

12" = 1'-0"



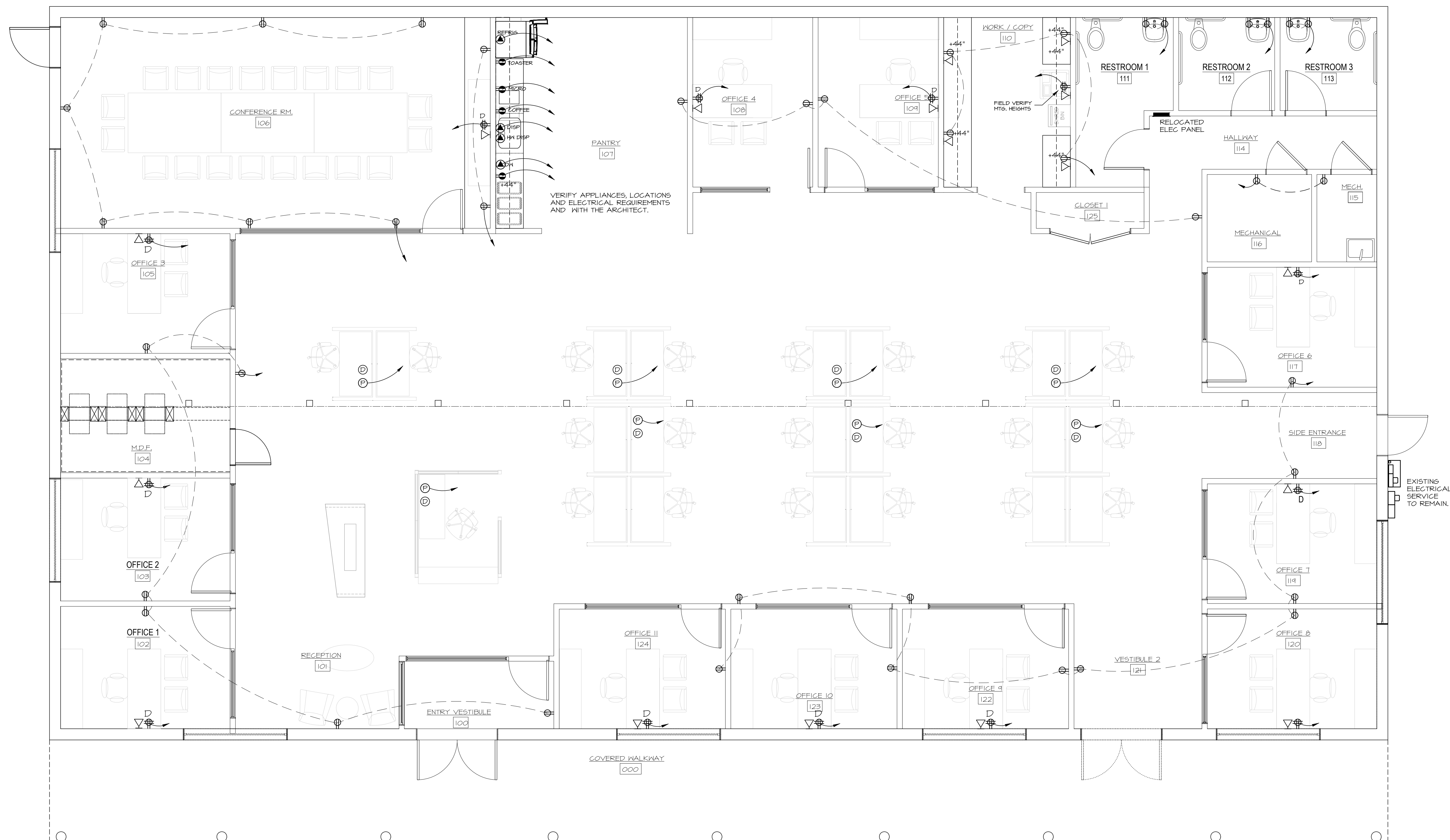
2 DOAS DETAIL

12" = 1'-0"



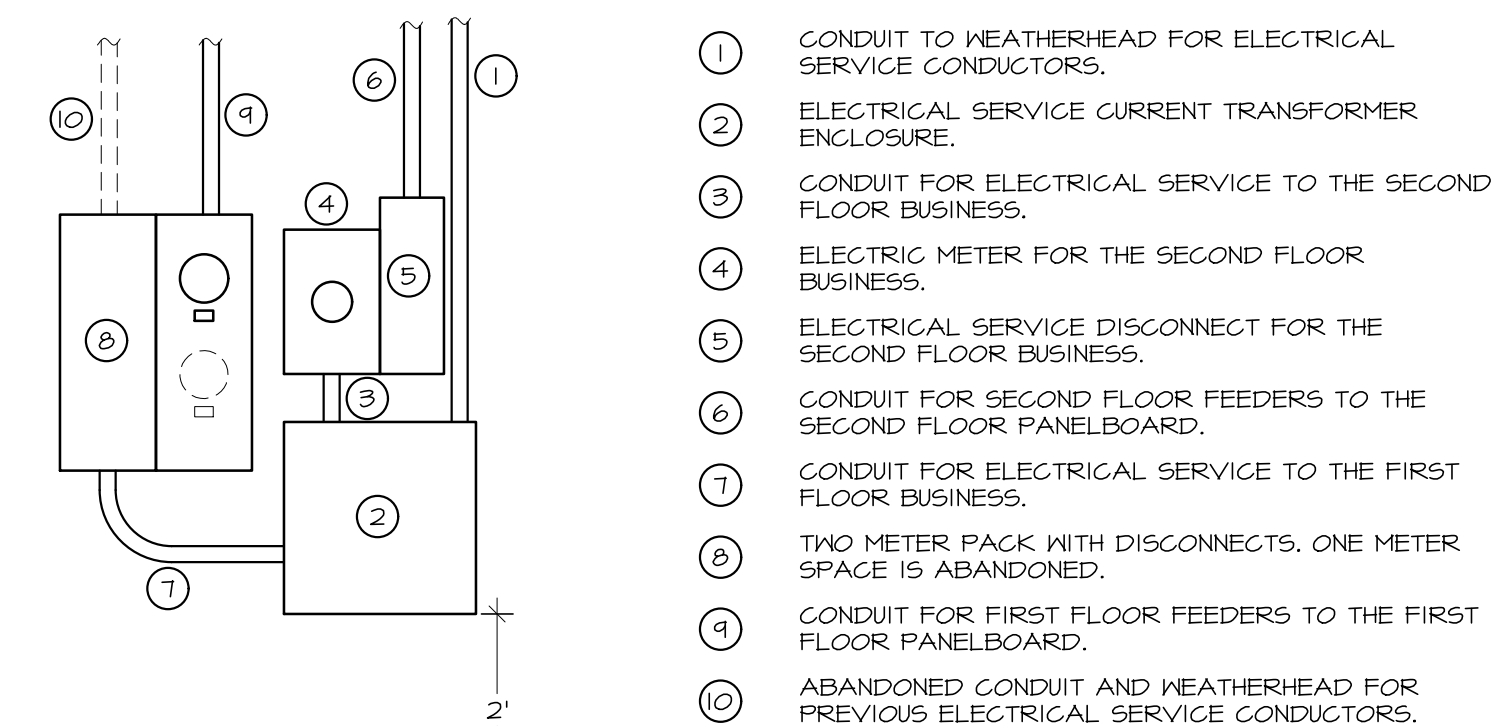
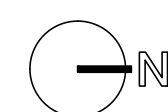
1 DIFFUSER CONNECTION DETAIL

12" = 1'-0"



ELECTRICAL POWER PLAN

SCALE: 1/4" = 1'-0"

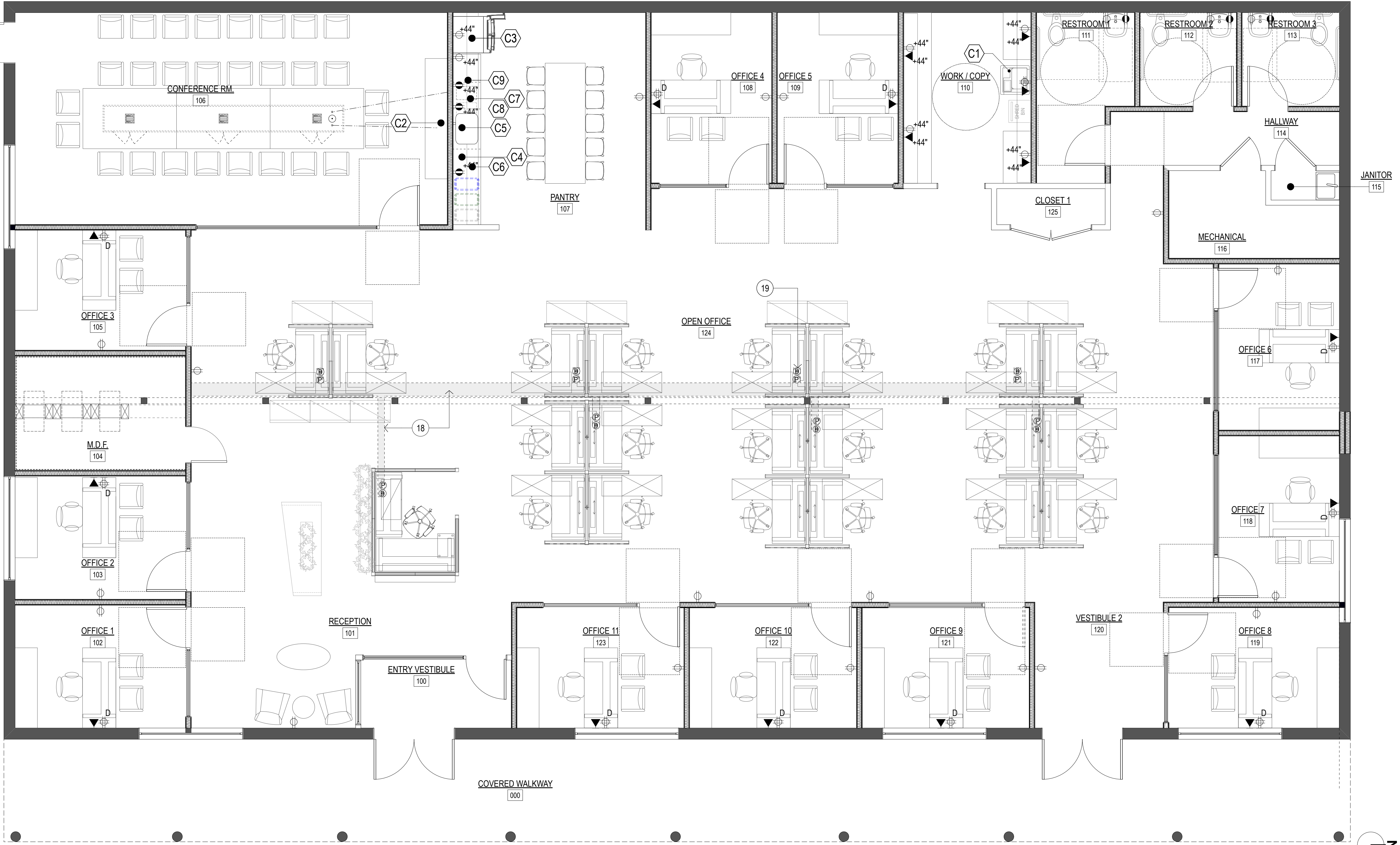


EXISTING ELECTRICAL SERVICE EQUIPMENT

SCALE: 1/2" = 1'-0"

ELECTRICAL NOTES

1. ALL OUTLET LOCATIONS ARE TO BE FIELD VERIFIED BY ARCHITECT PRIOR TO CORING OR WALL INSTALLATION.
2. INDICATED DIMENSIONS ARE TO BE THE CENTERLINE OF THE OUTLET OR CLUSTER OF OUTLETS, U.O.N.
3. STANDARD WALL OUTLETS SHALL BE MOUNTED VERTICALLY TO CENTERLINE, 18" ABOVE THE FINISHED FLOOR, U.O.N.
4. FOR OUTLETS INDICATED AT SPECIAL MOUNTING HEIGHTS, HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF OUTLET MOUNTED VERTICALLY.
5. WHERE CONFLICTS OCCUR, ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER ENGINEERING DRAWINGS FOR LOCATION AND TYPE OF OUTLET.
6. WHERE OUTLETS ARE SHOWN BACK-TO-BACK, INSTALL THE OUTLETS OFFSET WITH A STUD IN BETWEEN.
7. AT COPIER LOCATIONS, PROVIDE AND INSTALL A DEDICATED 20AMP RECEPTACLE, "NEMA" TYPE.
8. FOR OUTLETS/RECEPTACLES MOUNTED ON FINISHED WOOD PANELS/PLANTERS, OUTLET/RECEPTACLE & FACE PLATE SHALL BE **BLACK**, 'DECORA'. ALL OTHER OUTLETS/RECEPTACLES & LIGHT SWITCHES SHALL BE **WHITE**, 'DECORA'.
9. AT FURNITURE SYSTEM POWER WALL/FLOOR FEED LOCATIONS, FIELD CONNECTIONS BY THE ELECTRICAL CONTRACTOR.
10. PROVIDE AND INSTALL SWITCHED OUTLET FOR GARBAGE DISPOSAL IN THE PANTRY.
11. FURNITURE IS SHOWN FOR INFORMATIONAL PURPOSES ONLY.
12. CONTRACTOR TO COORDINATE LAYOUT OF FURNITURE WITH FURNITURE SUPPLIER PRIOR TO INSTALLATION OF WALL & FLOOR MOUNTED DEVICES.
13. SEE ELECTRICAL DRAWINGS FOR CONDUIT SIZES FEEDING ALL OFFICE, WORKSTATION AND CONFERENCE ROOM VOICE/DATA LOCATIONS.
14. IN MDF/IDF ROOMS PROVIDE & INSTALL 3/4" RATED PLYWOOD BACKER BOARD X 8' HIGH ON ALL WALLS. PAINT PLYWOOD P-1, TYP. PLYWOOD SHOWN DASH ON PLANS.
15. ALL EXISTING ELECTRICAL AND DATA OUTLET LOCATIONS SHALL BE FIELD VERIFIED. TYPICAL.
16. ALL PENETRATIONS FOR TEFLON CABLES AND CONDUITS THROUGH BARRIERS TO BE PROVIDED WITH CODE COMPLYING TYPE SLEEVES.
17. VERIFY ALL EQUIPMENT MOUNTING REQUIREMENTS OF ALL ELECTRICAL DATA AND OTHER EQUIPMENT.
18. SURVEY FIELD CONDITIONS AND VERIFY THAT WORK IS FEASIBLE AS SHOWN. VERIFY LOCATION OF FLOOR OUTLETS AND OTHER OUTLETS IN RELATION TO STRUCTURAL AND OTHER ELEMENTS.
18. TRENCH (E) SLAB TO ACCOMODATE REQUIRED POWER + DATA CONDUITS. SEE E102 FOR CONDUIT SIZING
19. FLOOR FEED POWER AND DATA. SEE E102



16 ELECTRICAL / FURNITURE PLAN
(X) → SEE NOTES BELOW

Scale: 1/4" = 1'-0"

MDF/IDF ROOM READY REQ'MTS

THE MINIMUM CONDITIONS REQUIRED FOR THE TELCO (AT&T / VERIZON) TO INSTALL SERVICES & LOW VOLTAGE VENDOR TO BUILDOUT THE ROOM, INSTALL RACKS, LADDER WORK, LACE & TERMINATE CABLES ARE OUTLINED BELOW. THE TIME FRAME FOR CONSTRUCTION OF THIS ROOM IS A PRIORITY. SERVICES TO THIS ROOM WILL NOT BE PULLED UNTIL REQUIREMENTS OUTLINED BELOW ARE COMPLETE.

MDF ROOM READY REQUIREMENTS FOR THE LOW VOLTAGE TEAM:

- SHEETROCK INSTALLED
- F.R. PLYWOOD INSTALLED & PAINTED
- ELECTRIC OUTLETS - HOT
- GROUND INSTALLED
- VCT FLOORING & BASE INSTALLED
- DOOR & LOCK INSTALLED (TEMP IS OK)
- MDF CONDUIT TO MPOE (SIZE & NUMBER OF CONDUIT DEPENDS ON SITE)
- MDF CONDUIT TO IDF CLOSET(S) (WHERE APPLIES)
- 4" SLEEVES BUILD-TO SUIT
- GC MARK LOCATION OF HVAC IN ROOM (IF WALL MOUNTED)

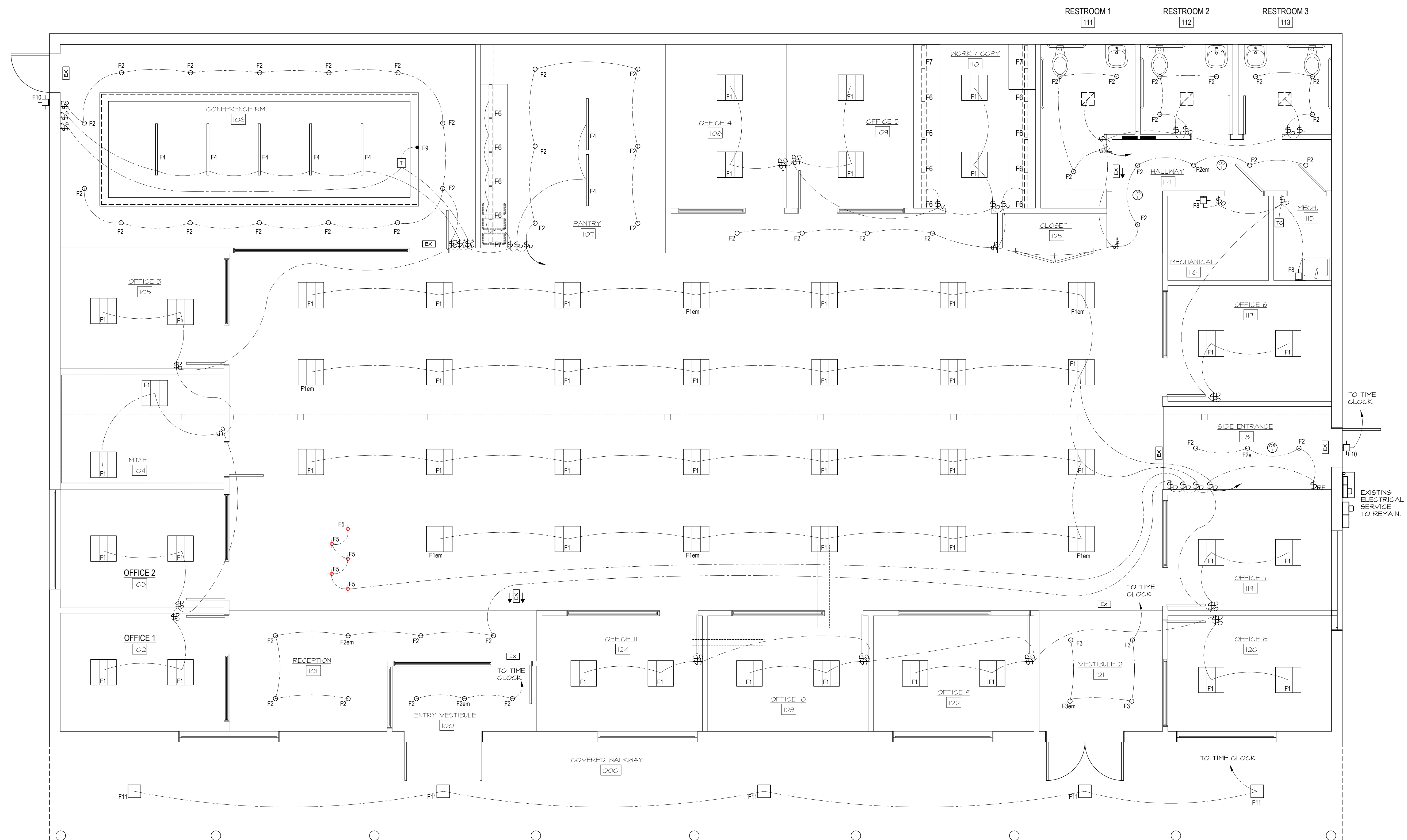
CEILING GRID & PERMANENT LIGHTS CAN BE INSTALLED AT THE END OF THE CONSTRUCTION. HVAC MUST BE OPERATIONAL FOR THE NETWORK GEAR TO BE INSTALLED

EQUIPMENT LEGEND

- C1 PHOTO COPIER (N.I.C.): KONICA MINOLTA #C754e
- C2 56" LCD MONITOR DISPLAY 'SAMSUNG' (N.I.C.)
- C3 REFRIGERATOR: 'GE' CAFE SERIES MODEL #CWE23SSHSS W/ ICE MAKER, COLOR: STAINLESS STEEL
- C4 DISH WASHER: BOSCH 300 SERIES: #SGE53U55UCL. ADA COLOR: STAINLESS STEEL
- C5 GARBAGE DISPOSAL: IN SINK-ERATOR MODEL #333
- C6 HOT/COLD WATER DESPENSER (N.I.C.): WELLSYS WS 7000 WATER SUPPLY - PLUMBED. REFER TO PLUMBING DRAWING.
- C7 COFFEE MAKER (N.I.C.): KEURIG MODEL #K-3000 WATER SUPPLY - PLUMBED
- C8 MICROWAVE OVEN (N.I.C.)
- C9 TOASTER OVEN (N.I.C.)

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
WALL FLOOR		WALL FLOOR	
	120v DUPLEX OUTLET 18" A.F.F. TO CL @ WALL MOUNTED ONLY, 'D' DENOTES DEDICATED OUTLET		JUNCTION BOX W/1" CONDUIT TO ACCESSIBLE CEILING
	120v QUADRIPEX OUTLET 'D' DENOTES DEDICATED OUTLET 18" A.F.F. TO CL U.O.N.		ATM VESTIBULE ACCESS CARD READER @ +40" A.F.F.
	120V DUPLEX OUTLET W/ GROUND FAULT INTERRUPTER 18" A.F.F. TO CL @ WALL MOUNTED ONLY, 'D' DENOTES DEDICATED OUTLET		AUTO DOOR OPERATOR @ +40"/7" A.F.F.
	DATA/TELEPHONE OUTLET 18" A.F.F. TO CL U.O.N.		
	DEDICATED 20A NEMA TYPE COPIER OUTLET 18" A.F.F. TO CL U.O.N.		LCD SIGNAGE (N.I.C.) POWER/DATA FLOOR CORE FEED
	SINGLE GANG J-BOX 24" TO CL, U.O.N. PROVIDE RING & STRING		EXTERIOR CABINET SIGN POWER FEED - SEE ELECTRICAL NOTE #18 ON SHEET A-4
	FLUSH FLOOR OUTLET COMBINATION POWER & VOICE/ DATA		208v OUTLET MOUNTED TO CABLE TRAY
	CARD READER @ +40" A.F.F. TO CL		
	WORKSTATION VOICE/DATA FLOOR FEED		
	WORKSTATION POWER FLOOR FEED		



LIGHTING CONTROL PLAN

SCALE: 1/4" = 1'-0"

