C:\Users\JReed-Shultz\Documents\Paragon Star HUB_R21_Central_jreedshultz@finklewilliams.com.rvt

RENDERING FOR CONCEPTUAL REFERENCE ONLY. IMAGE MAY NOT REFLECT LATEST DESIGN. REFERENCE ELEVATIONS AND SCHEDULES FOR FINISHES.



LOT 20 - HUB BUILDING

PROJECT NUMBER
19050.02

RELEASE DATE
08/06/2021

ISSUED FOR
PERMIT SET

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A0.02 WALL TYPES
A0.10 ARCHITECTURAL SITE PLAN & DETAILS
A1.01 FIRST FLOOR PLAN
A2.01 ENLARGED TOILET PLANS AND DETAILS
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PROJECT TEAM

ARCHITECT
FINKLE + WILLIAMS ARCHITECTURE
8787 Renner Blvd, Suite 100
Lenexa, Kansas 66219
PH. 913.498.1550

CIVIL
GBA
9801 Renner Blvd, Suite 300
Lenexa, Kansas 66219
PH. 913-577-8341

LANDSCAPE
HOERR SCHAUDT / LAND3
2100 Central St, Suite 01C
Kansas City, Missouri 64108
PH. 312-492-6501

FOUNDATIONS
BSE STRUCTURAL ENGINEERS
11320 West 79th St.
Lenexa, Kansas 66214
PH. 913-492-7400

STRUCTURAL
BSE STRUCTURAL ENGINEERS
11320 West 79th St.
Lenexa, Kansas 66214
PH. 913-492-7400

CONTRACTOR
FOGEL ANDERSON
1212 E. 8th St.
Kansas City, Missouri 64106
PH. 816-842-6914

MECHANICAL
HENDERSON ENGINEERS
8345 Lenexa Dr, Suite 300
Lenexa, Kansas 66214
PH. 913-742-5000

PLUMBING
HENDERSON ENGINEERS
8345 Lenexa Dr, Suite 300
Lenexa, Kansas 66214
PH. 913-742-5000

ELECTRICAL
HENDERSON ENGINEERS
8345 Lenexa Dr, Suite 300
Lenexa, Kansas 66214
PH. 913-742-5000

FIRE PROTECTION
HENDERSON ENGINEERS
8345 Lenexa Dr, Suite 300
Lenexa, Kansas 66214
PH. 913-742-5000

FINKLE + WILLIAMS
ARCHITECTURE

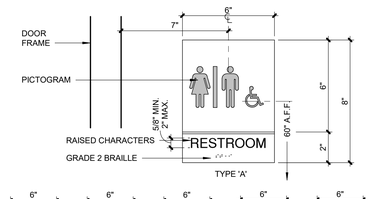
PROJECT ADDRESS
2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

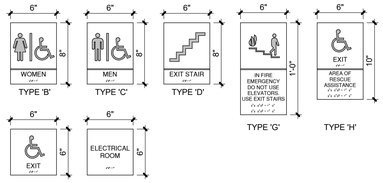
ACCESSIBLE SIGNAGE REQUIREMENTS

PERMANENT ROOMS AND SPACES

SEE SCHEDULE BELOW FOR INTERIOR SIGNAGE LOCATIONS:

SIGNS WHICH DESIGNATE PERMANENT ROOMS AND SPACES SHALL COMPLY WITH ADAAG SECTIONS 4.30.1, 4.30.4, 4.30.5, 4.30.6





INTERIOR SIGNAGE SCHEDULE

DOOR NO.	ROOM NAME	SIGN TYPE	SIGN TEXT
102.A	WATER SERVICE	F	WATER SERVICES
103.A	ELECTRICAL	F	ELECTRICAL ROOM
104.A	RESTROOM	A	

1. TACTILE & BRAILE CHARACTERS
   a. CHARACTERS SHALL BE RAISED MINIMUM 1/32"
   b. CHARATERS SHALL BE ACCOMPANIED BY GRADE 2 BRAILLE

2. TYPESTYLES
   a. CHARACTERS SHALL BE UPPER CASE & SANS SERIF OR SERIF TYPESTYLE
   b. CHARACTERS SHALL BE A MINIMUM OF 5/8" HIGH AND MAXIMUM 2" HIGH

3. PICTOGRAMS (SYMBOLS)
   a. PICTOGRAMS SHALL BE ACCOMPANIED BY THE EQUIVALENT VERBAL DESCRIPTION PLACED DIRECTLY BELOW THE PICTORGRAM AS INDICATED.
   b. THE BORDER DIMENSION OF THE PICTORGRAM SHALL BE 6" MIN. IN HEIGHT

4. MATERIAL AND FINISH
   A. INTERIOR SIGNAGE
      1. GLARE FINISH AS RECOMMENDED BY THE SIGN MANUFACTURER.
      2. BACKGROUND SHALL CONSIST OF 1/4" ACRYLIC, COLOR TO MATCH **SW 7068 "GRIZZLE GREY"**
      3. CHARACTERS AND SYMBOLS SHALL BE WHITE
   B. EXTERIOR SIGNAGE
      1. SOLID ALUMINUM CONSTRUCTION
      2. CUSTOM PAINT BODY COLOR TBD TO MATCH MB-1
      3. GLARE FINISH AS RECOMMENDED BY THE SIGN MANUFACTURER.

1. MOUNTING LOCATION AND HEIGHT
   a. MOUNT AT 60" ABOVE FINISH FLOOR TO THE CENTER OF SIGN
   b. MOUNT ON WALL ADJACENT TO THE LATCH SIDE OF THE DOOR
   c. IF NO WALL SPACE EXISTS ON THE LATCH SIDE OF THE DOOR, INCLUDING DOUBLE LEAF DOORS, MOUNT ON THE NEAREST ADJACENT WALL

2. FIRE SPRINKLER ROOM
   a. INCLUDE 4" HIGH VINYL WHITE LETTERS W/ MIN. 0.5" STROKE READING "SPRINKLER ROOM" APPLIED TO EXTERIOR SIDE OF DOOR, AS REQUIERD BY LOCAL FIRE DEPT.

DIRECTIONAL INFORMATION

OTHER SIGNS WHICH PROVIDE DIRECTION TO OR INFORMATION ABOUT FUNCTIONAL SPACES OF THE BUILDING SHALL COMPLY WITH ADAAG SECTIONS: 4.30.1, 4.30.2, 3.30.3, 4.30.5

DRAWING SYMBOLS LEGEND

EXISTING CONSTRUCTION TO REMAIN

EXISTING CONSTRUCTION TO BE DEMOLISHED

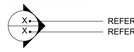
NEW CONSTRUCTION

XX — WALL TYPE DESIGNATION -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE DRAWING *A0.02* FOR CONSTRUCTION REQUIREMENTS.

X / X — ROOM NAME AND NUMBER -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE FINISH SCHEDULE FOR FINISHES.

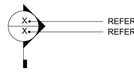
XX — DOOR AND FRAME DESIGNATION -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE DOOR AND FRAME SCHEDULE FOR REQUIREMENTS.

ELEVATION SYMBOL



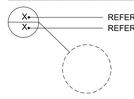
REFERENCE ELEVATION
REFERENCE SHEET

SECTION SYMBOL



REFERENCE SECTION
REFERENCE SHEET

ENLARGED DETAIL / ENLARGED PLAN SYMBOL



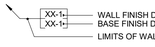
REFERENCE DETAIL
REFERENCE SHEET

INTERIOR ELEVATION SYMBOL



REFERENCE ELEVATION
REFERENCE SHEET

FINISH DESIGNATION SYMBOL



WALL FINISH DESIGNATION
BASE FINISH DESIGNATION
LIMITS OF WALL AND BASE FINISHES

REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE FINISH SCHEDULE FOR DESCRIPTIONS.

XX-# — FLOOR FINISH DESIGNATION -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE FINISH SCHEDULE FOR DESCRIPTIONS.

X — REVISION NOTE

XX — CONSTRUCTION NOTE

— DEMOLITION NOTE

— RESTROOM ACCESSORY DESIGNATION -

CJ —— GYPSUM BOARD CONTROL JOINT -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE DETAIL **2/A0.01** FOR CONSTRUCTION REQUIREMENTS.

CMJ —— CONCRETE MASONRY CONTROL JOINT -
REFERENCE FLOOR PLAN(S) FOR LOCATIONS.
REFERENCE DETAIL **3/A0.01** FOR CONSTRUCTION REQUIREMENTS.

FE — WALL MOUNTED FIRE EXTINGUISHER BY LARSEN'S MANUFACTURING COMPANY, WWW.LARSENMFG.COM, MODEL MP10 W/B2 MOUNTING BRACKET, REFERENCE FLOOR PLAN(S) FOR LOCATIONS. MOUNT SO CENTERLINE OF EXTINGUISHER IS 46" A.F.F.

FEC — SEMI-RECESSED FIRE EXTINGUISHER BY LARSEN'S MANUFACTURING COMPANY, WWW.LARSENMFG.COM OR APPROVED EQUAL: ARCHITECTURAL SERIES, MODEL # AL-2409-6R. ALUMINUM, SEMI-RECESSED (2 ½" PROTRUSION FROM WALL WITH ROLLED EDGES), SOLID DOOR WITH RECESSED HANDLE, ENGRAVED VERTICAL LETTERS WITH NO BACKFILL "FIRE EXTINGUISHER" ON DOOR. CABINET TO BE PROVIDED WITH MP10 FIRE EXTINGUISHER AND MANUFACTURER'S STANDARD MOUNTING BRACKET. MOUNT SO CENTERLINE OF CABINET HANDLE IS 46" A.F.F.

GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE MINIMUM STANDARDS OF THE APPLICABLE CODE INDICATED IN THE BUILDING SUMMARY COLUMN AND ALL LOCAL CODES PRESENTLY IN EFFECT UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.
2. ALL NEW CONSTRUCTION SHALL COMPLY W/THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) AND CHAPTER 11 OF THE INTERNATIONAL BUILDING CODE (INCLUDES ICC A117.1 PER IBC)
3. THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES, AND ALL UTILITY CHARGES, AND ARRANGE FOR ALL REQUIRED INSPECTIONS.
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING BUILDING & SITE UTILITIES BETWEEN CIVIL & MEP DRAWINGS. THE CONTRACTOR SHALL ALSO CONTACT ALL APPLICABLE UTILITY COMPANIES & PROVIDE CONDUIT & OTHER FACILITIES AS REQUIRED.
5. THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY ALL DIMENSIONS & CONDITIONS ON THE JOB SITE PRIOR TO THE BIDDING OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES.

   IN CASES OF DISCREPANCY CONCERNING DIMENSIONS, QUANTITIES AND LOCATION, THE CONTRACTOR SHALL, IN WRITING, CALL TO THE ATTENTION OF THE ARCHITECT ANY DISCREPANCIES BETWEEN SPECIFICATIONS, PLANS, DETAILS OR SCHEDULES. THE ARCHITECT WILL THEN INFORM THE CONTRACTOR, IN WRITING, WHICH DOCUMENT TAKES PRECEDENCE. THERE SHALL BE NO ADJUSTMENT TO THE COST OR TIME OF THE WORK RESULTING FROM CLARIFICATION OF SUCH DISCREPANCIES.
6. DIMENSIONS ON DRAWINGS ARE SHOWN TO FINISHED FACE OF WALLS AND PARTITIONS OF EXISTING OR NEW CONSTRUCTION UNLESS OTHERWISE NOTED. CEILING HEIGHT DIMENSIONS AND ALL OTHER VERTICAL DIMENSIONS ARE TO THE FINISHED FLOOR SURFACE UNLESS OTHERWISE NOTED.
7. ALL MATERIALS SPECIFIED OR NOTED SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING SHOP DRAWINGS, PRODUCT DATA, OR SAMPLES FOR CASEWORK, FINISHES, DOORS, FRAMES, HARDWARE, MECHANICAL, ELECTRICAL, AND PLUMBING FIXTURES, AND OTHER ITEMS REQUIRING ARCHITECT'S REVIEW FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS, AND FOR ALL ITEMS WHICH ALLOWED CONTRACTOR OPTIONS. PRIOR TO FORWARDING TO THE ARCHITECT FOR REVIEW. THESE SUBMITTALS MUST BE REVIEWED BY THE CONTRACTOR FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL AFFIX A STAMP TO SUBMITTAL INDICATING HIS REVIEW. SUBMITTALS FORWARDED WITHOUT A STAMP WILL BE RETURNED. ALL SUBMITTALS MUST BE REVIEWED BY THE ARCHITECT PRIOR TO CONSTRUCTION.
9. CONTRACTOR SHALL GUARANTEE ALL WORK AGAINST FAULT OF ANY MATERIAL OR WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE YEAR AFTER COMPLETION OR ACCEPTANCE. FAULTY WORK SHALL BE REPLACED OR REPAIRED AS REQUIRED AT NO COST TO THE OWNER.
10. CONTRACTOR SHALL COORDINATE WITH OWNER ALL ITEMS TO BE SALVAGED PRIOR TO SUBMISSION OF BIDS AND START OF CONSTRUCTION. OWNER SHALL HAVE SALVAGE RIGHTS TO RETAIN ALL REMOVED ITEMS.
11. ALL CHANGES PROPOSED DURING CONSTRUCTION WHICH RESULT IN A CHANGE TO THE CONTRACT TIME AND/OR SUM SHALL BE SUBMITTED TO THE ARCHITECT IN WRITING AND APPROVED BY THE ARCHITECT AND OWNER BEFORE SUCH WORK SHALL COMMENCE.
12. CONTRACTOR SHALL COORDINATE CLEAR OPENINGS FOR ALL APPLIANCES PRIOR TO CONSTRUCTION OF CASEWORK.
13. CONTRACTOR SHALL FURNISH AND INSTALL CONCEALED FIRE-RETARDANT TREATED WOOD BLOCKING BEHIND ALL CABINETS, TOILET ACCESSORIES, PLUMBING FIXTURES, AND OTHER WALL MOUNTED ITEMS AS REQUIRED FOR ADEQUATE SUPPORT.
14. CONTRACTOR SHALL COORDINATE ALL LOCK AND LATCH SETS AND FINAL KEYING WITH OWNER. DOUBLE KEYED LOCKS ARE NOT PERMITTED ON ANY REQUIRED OR MARKED EXIT. MATCH EXISTING KEYING SYSTEM IF ONE IS EXISTING.
15. ALL DOOR HARDWARE ON EXIT DOORS SHALL BE READILY OPERABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR EFFORT.
16. CONTRACTOR SHALL PREPARE ALL NEW AND EXISTING SURFACES SCHEDULED TO RECEIVE NEW FINISHES IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR THE SUBSTRATE & FINISH BEING APPLIED.
17. CONTRACTOR SHALL COORDINATE FINAL QUANTITY AND LOCATIONS OF FIRE EXTINGUISHERS WITH THE FIRE DEPARTMENT AND/OR BUILDING DEPARTMENT. SEE SYMBOLS LEGEND FOR TYPE OF EXTINGUISHER.
18. ALL CONSTRUCTION MATERIALS EXPOSED WITHIN PLENUMS SHALL BE NON-COMBUSTIBLE OR SHALL HAVE A MAXIMUM FLAME SPREAD RATING OF 25 AND MAXIMUM SMOKE DEVELOPED RATING OF 50.
19. ALL PIPING, LOW VOLTAGE WIRE AND CABLE, OPTICAL FIBER, PNEUMATIC TUBING, AND ALL DUCT AND DUCT COVERINGS, LININGS AND CONNECTORS INSTALLED WITHIN PLENUMS MUST BE RATED FOR PLENUM USE.
20. TENANT SHALL BE RESPONSIBLE FOR COORDINATION AND INSTALLATION OF VOICE AND DATA CABLING AND EQUIPMENT.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE AUTOMATIC SPRINKLER SYSTEM. THE DESIGN SHALL BE PER NFPA REQUIREMENTS.
22. ALL NEW GLASS AND GLAZING LOCATED IN HAZARDOUS LOCATIONS AS DEFINED IN IBC SECTION 2406.3 SHALL MEET THE REQUIREMENTS FOR SAFETY GLAZING AS DEFINED IN IBC SECTION 2406.
23. IF THE CONTRACTOR FAILS TO SUBMIT A MATERIAL FOR APPROVAL, THE MATERIAL MAY BE REQUIRED TO BE REMOVED BY THE CONTRACTOR EITHER BY DIRECTION OF THE OWNER OR ARCHITECT.
24. ALL HIGH-PILED STORAGE SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE APPLICABLE EDITION OF THE INTERNATIONAL FIRE CODE.
25. THE CONTRACTOR IS TO PROVIDE AS BUILT DRAWINGS IN HARD COPY & AN ELECTRONIC AUTOCAD FILE TO THE OWNER AT THE CONCLUSION OF THE PROJECT.
26. INSTALL ELASTOMERIC JOINT SEALER AROUND ALL PIPES, DUCTWORK, & STRUCTURE PASSING THRU INTERIOR NON-RATED CONCRETE AND MASONRY WALLS, GYPSUM BOARD PARTITIONS, AND CONCRETE FLOOR/ROOF SLABS. FOR FIRE RATED INTERIOR CONCRETE AND MASONRY WALLS, GYPSUM BOARD PARTITIONS, AND CONCRETE FLOOR/ROOF SLABS SEAL ALL PIPES, DUCTWORK, AND STRUCTURE. INSTALL FIRESTOP MATERIALS IN ALL GAPS PRIOR TO SEALANT APPLICATION. INSTALL SEALER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
27. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF ALL EXISTING CONSTRUCTION INDICATED TO REMAIN AND SHALL REPAIR AND/OR REPLACE ALL AREAS AND /OR MATERIAL DAMAGED DURING CONSTRUCTION AT A MINIMUM TO THE CONDITION WHICH EXISTED PRIOR TO CONSTRUCTION.

PROFESSIONAL SERVICES DISCLAIMER

THIS DISCLAMER SERVES NOTICE OF ACCEPTANCE OF RESPONSIBILITY AND DISCLAIMER OF RESPONSIBILITY AS TO THE CONTRACT DOCUMENTS PREPARED FOR PROJECT NUMBER:

19050.02, LOT 20 - HUB BUILDING BY FINKLE + WILLIAMS, INC.

THE UNDERSIGNED ARCHITECT, AND FINKLE + WILLIAMS, INC., ARE RESPONSIBLE FOR PREPARATION OF ONLY THE NOTED CONSTRUCTION DRAWINGS BELOW:

NO.	TITLE	DATE
A0.00	COVER SHEET	8/06/21
A0.01	LEGENDS & GEN. NOTES	8/06/21
A0.02	WALL TYPES	8/06/21
A0.10	ARCHITECTURAL SITE PLAN & DETAILS	8/06/21
A1.01	FIRST FLOOR PLAN	8/06/21
A2.01	ENLARGED TOILET PLANS AND DETAILS	8/06/21
A2.10	INTERIOR ELEVATIONS	8/06/21
A3.01	ROOF PLAN	8/06/21
A4.01	EXTERIOR ELEVATIONS	8/06/21
A4.02	EXTERIOR ELEVATIONS	8/06/21
A5.00	BUILDING SECTIONS	8/06/21
A5.01	WALL SECTIONS	8/06/21
A5.02	WALL SECTIONS	8/06/21
A5.03	WALL SECTIONS	8/06/21
A7.01	DETAILS	8/06/21
A7.02	DETAILS	8/06/21
A8.01	DOOR SCHEDULE AND DETAILS	8/06/21
A8.02	DOOR & WINDOW DETAILS	8/06/21
A8.10	FINISH SCHEDULE AND DETAILS	8/06/21
A9.01	REFLECTED CEILING PLAN	8/06/21
A11.10	PROJECT SPECIFICATIONS	8/06/21
A11.11	PROJECT SPECIFICATIONS	8/06/21
A11.12	PROJECT SPECIFICATIONS	8/06/21

THE UNDERSIGNED ARCHITECT AND FINKLE + WILLIAMS DISCLAIM RESPONSIBILITY FOR ALL OTHER CONSTRUCTION DOCUMENTS, AND ANY OTHER SPECIFICATIONS, REPORTS, ESTIMATES, SHOP DRAWINGS, ETC. RELATING TO OR INTENDED TO BE USED FOR ANY PART OF THE ARCHITECTURAL OR ENGINEERING PROJECT, INCLUDING ANY GEOTECHNICAL ENGINEERING SERVICES, OR ENVIRONMENTAL REPORTS.

THIS NOTICE IS EXECUTED BY THE UNDERSIGNED AND AUTHENTICATED BY THE ARCHITECTURAL SEAL OF THE PERSON PREPARING THIS NOTICE.

ARCHITECT: DAVID A. WILLIAMS

BUILDING SUMMARY

GENERAL BUILDING INFORMATION

PROJECT NAME: LOT 20 - HUB BUILDING
ADDRESS: 2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081
PROPOSED USE: BUSINESS (B)

APPLICABLE CODES

INTERNATIONAL BUILDING CODE (IBC)	2018 EDITION
INTERNATIONAL MECHANICAL CODE (IMC)	2018 EDITION
INTERNATIONAL PLUMBING CODE (IPC)	2018 EDITION
NATIONAL ELECTRIC CODE (NEC)	2017 EDITION
INTERNATIONAL FIRE CODE (IFC)	2018 EDITION
INTERNATIONAL FUEL GAS CODE (IFGC	2018 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE (IECC)	2018 EDITION
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) LIFE SAFETY CODE 101	2000 EDITION
DEPT OF JUSTICE ADA STANDARDS FOR ACCESSIBLE DESIGN	2010 EDITION

GENERAL BUILDING LIMITATIONS (CHAPTER 3, 5)

OCCUPANCY CLASSIFICATION: Group (B)
CONSTRUCTION TYPE: TYPE II-B
BASIC ALLOWABLE FLOOR AREA: 23,000 S.F.
BASIC ALLOWABLE HEIGHT: 3 STORIES, 55 FT

HEIGHT MODIFICATIONS (Sec. 504)
SPRINKLER INCREASE: Sprinkler increase = 20' and (1) Story

TOTAL ALLOWABLE HEIGHT: 75', (4) Stories
TOTAL PROPOSED HEIGHT: 20', (1) Stories

FIRE PROTECTION

FIRE SPINKLER SYSTEM: PROVIDED THROUGHOUT PER IBC 903 AND INSTALLED PER NFPA 13

FIRE ALARM & DETECTION SYSTEM: PROVIDED THROUGHOUT PER IBV 907 AND INSTALLED PER NFPA 72

GENERAL EXITING LIMITATIONS (CHAPTER 10)

OCCUPANT LOAD (1004):

BUSINESS:
OPEN OFFICE: 1247 / 150 SF = 9 OCCUPANTS
ACCESSORY STORAGE / MECHANICAL: 458 / 300SF = 2 OCCUPANTS
ALL OTHER SPACES = (ANCILLARY)
TOTAL = **11 OCCUPANTS**

MAXIMUM TRAVEL DISTANCE (1016):
TABLE 106.2: B = 300 FT (FULLY SPRINKLERED)

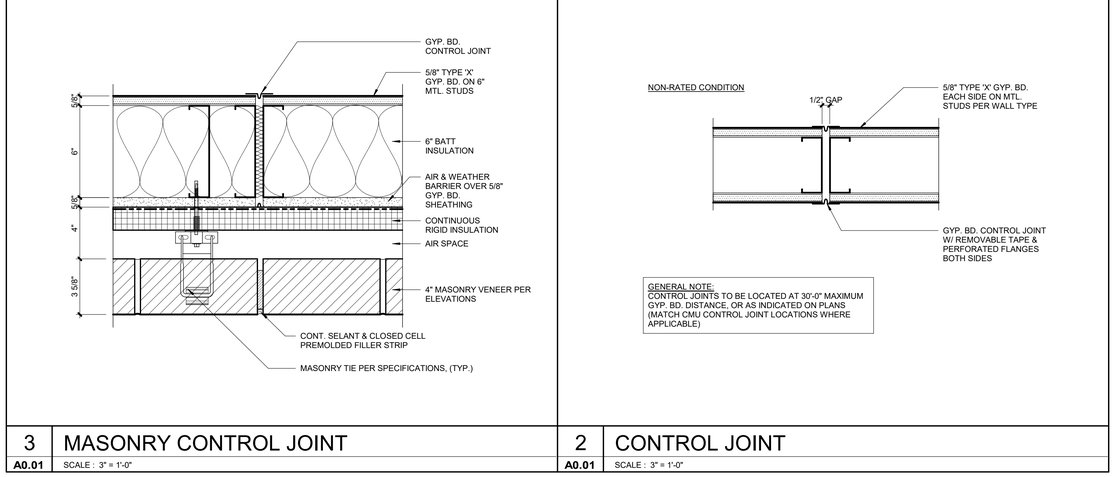
MINIMUM PLUMBING FIXTURE COUNT (CHAPTER 29)

OCC.	OCCUPANT LOAD	WATER CLOSETS		LAVATORIES		DRINKING FOUNTAINS~	OTHER
		MALE*	FEMALE	MALE*	FEMALE		
		REQ'D/PROV.	REQ'D/PROV.	REQ'D/PROV.	REQ'D/PROV.	REQ'D/PROV.	
(B)	11 OCC. PER CODE PLAN	1 / 1	1 / 1	1 / 1	1 / 1	0 / 0*	1 Serv. Sink

Water coolers or bottled water dispensers shall be permitted to be substituted for no more than 50 percent of the required drinking fountains as permitted by section 410.1 of the IPC.

403.2 Separate Facilities: Exception 4:
- Separate facilities shall not be required in business occupancies in which a maximum occupant load is 25 or fewer.

*410.2 Small Occupancies:
- Drinking foundtains shall not be required for an occupant load of 15 or fewer.

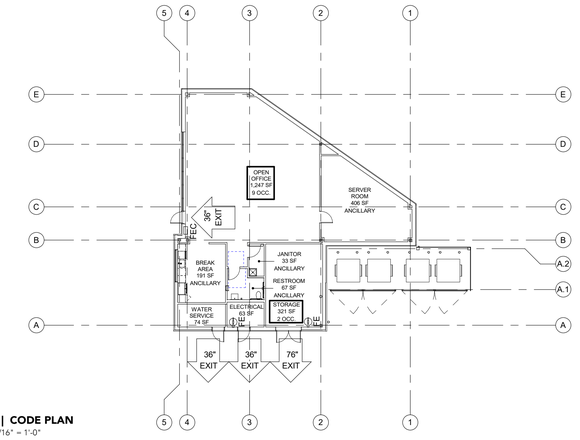


3 | MASONRY CONTROL JOINT
A0.01 SCALE : 3" = 1'-0"

GENERAL NOTE:
CONTROL JOINTS TO BE LOCATED AT 30'-0" MAXIMUM GYP. BD. DISTANCE, OR AS INDICATED ON PLANS (MATCH CMU CONTROL JOINT LOCATIONS WHERE APPLICABLE)

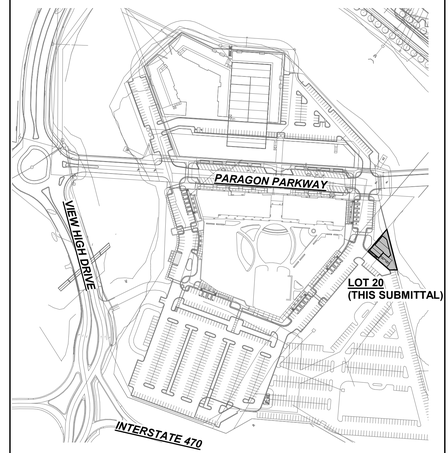
2 | CONTROL JOINT
A0.01 SCALE : 3" = 1'-0"

CODE REVIEW PLANS



1 | CODE PLAN
1/16" = 1'-0"

LOCATION PLAN



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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI — DAVID ALAN WILLIAMS — NUMBER A-5540 — REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

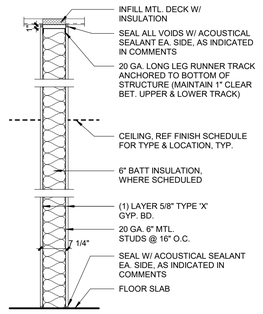
FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913.498.1550
www.finklewilliams.com

SHEET TITLE

LEGENDS & GEN. NOTES

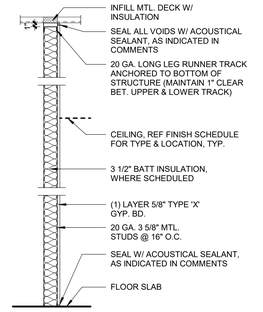
SHEET NUMBER

A0.01



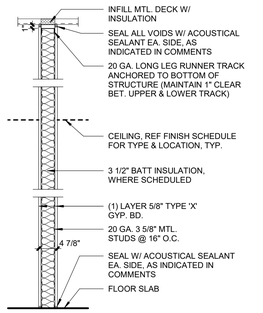
11

Type	Batt Insulation	Mold & Water Resist GWB	Fire Rating	Comments
11c	Yes	Yes		Seal w/ acoustical sealant, top and bottom



04

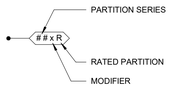
Type	Batt Insulation	Mold & Water Resist GWB	Fire Rating	Comments
04	No	No		
04b	No	Yes		



01

Type	Batt Insulation	Mold & Water Resist GWB	Fire Rating	Comments
01	No	No		
01b	No	Yes		
01c	Yes	Yes		Seal w/ acoustical sealant, top and bottom

PARTITION LEGEND



PARTITION SERIES	
01 - 39	METAL STUD WALLS
40 - 79	MASONRY WALLS
80 - 99	WOOD STUD WALLS

MODIFIER	
a	SOUND BATT INSULATION FULL DEPTH OF STUD
b	MOLD & WATER RESISTANT GYP. BD.
c	INSULATION AND MOLD & WATER RESISTANT GYP. BD.
d-z	VARIES, SEE PARTITION SCHEDULE COMMENTS

RATING	
R	FIRE RATED, SEE SCHEDULE FOR ADDITIONAL INFO.

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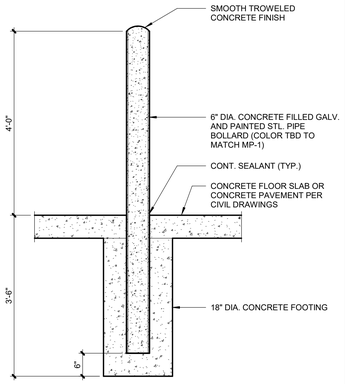
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SHEET TITLE

WALL TYPES

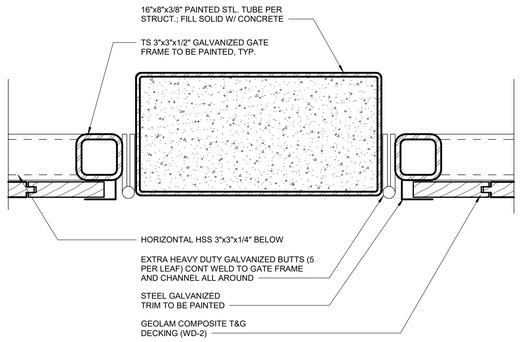
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A0.02



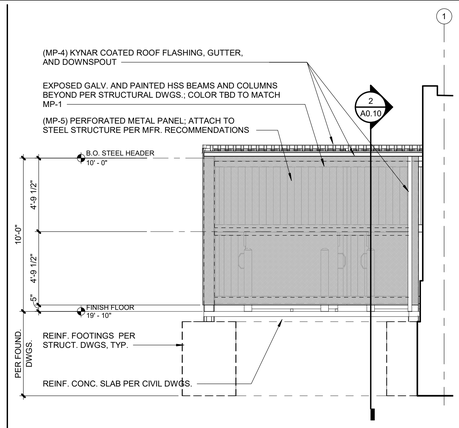
11 BOLLARD DETAIL

A0.10 SCALE : 3/4" = 1'-0"



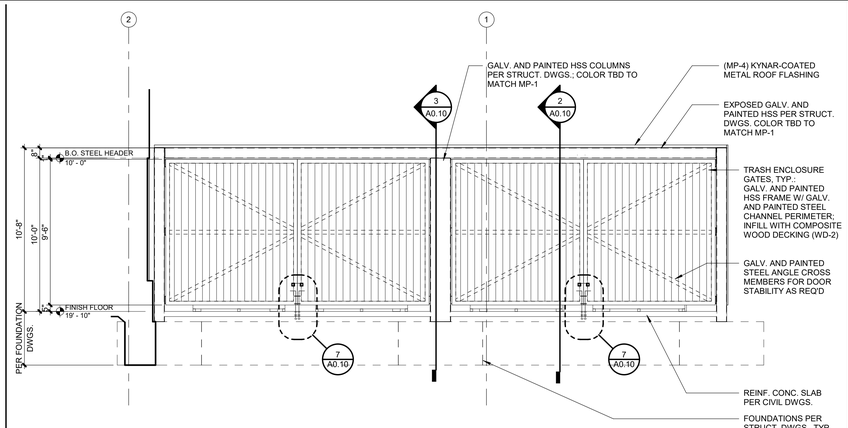
10 JAMB DETAIL

A0.10 SCALE : 3" = 1'-0"



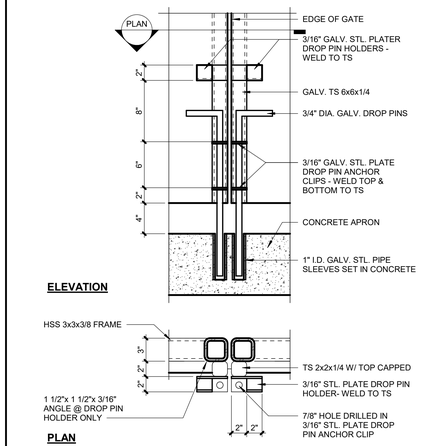
9 TRASH ENCLOSURE ELEVATION

A0.10 SCALE : 1/4" = 1'-0"



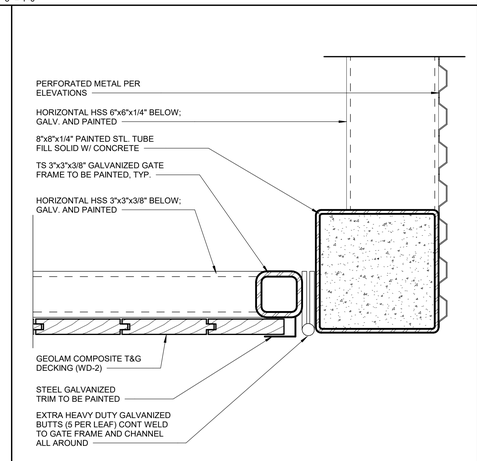
8 TRASH ENCLOSURE ELEVATION

A0.10 SCALE : 1/4" = 1'-0"



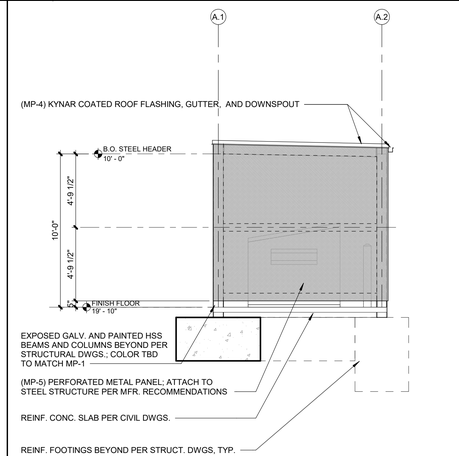
7 DROP PIN DETAILS

A0.10 SCALE : 1 1/2" = 1'-0"



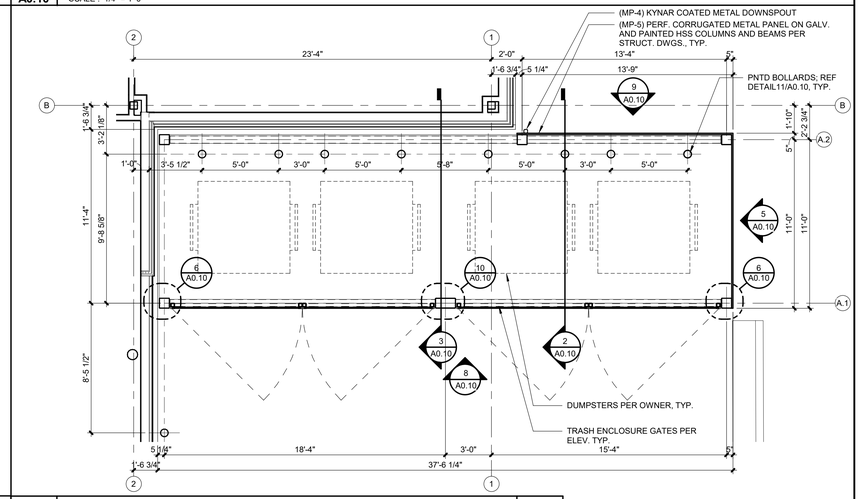
6 JAMB DETAIL

A0.10 SCALE : 3" = 1'-0"



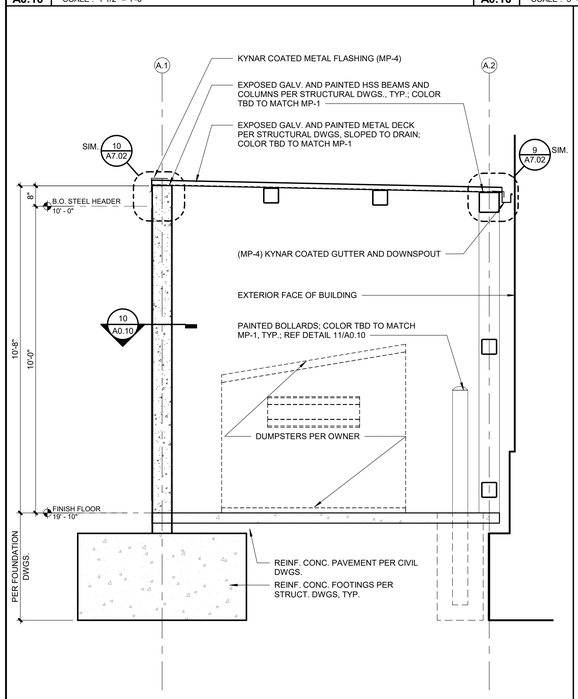
5 TRASH ENCLOSURE ELEVATION

A0.10 SCALE : 1/4" = 1'-0"



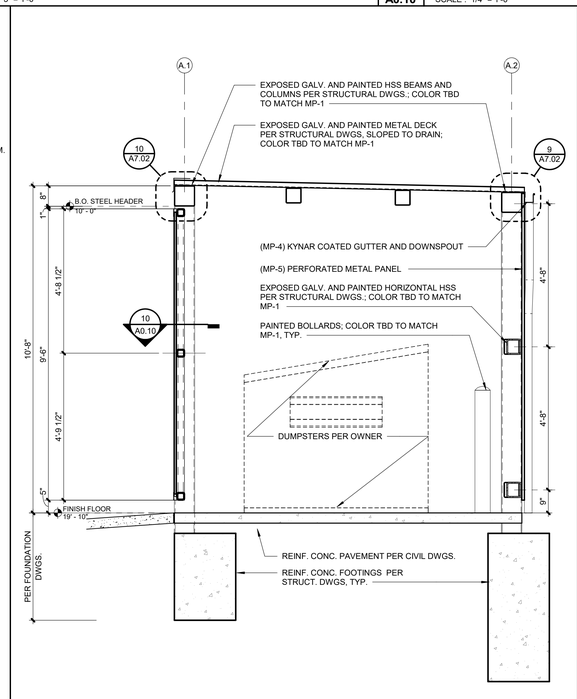
4 ENLARGED TRASH ENCLOSURE PLAN

A0.10 SCALE : 1/4" = 1'-0"



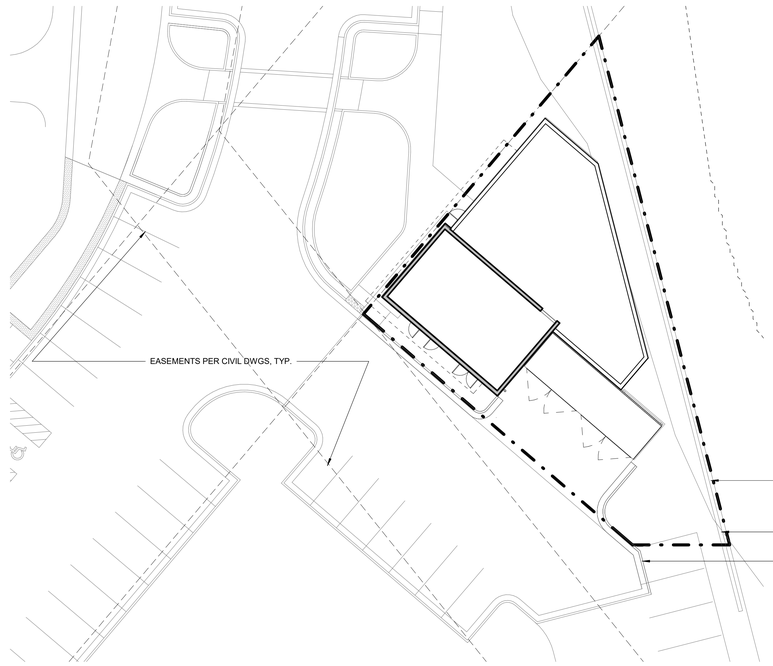
3 TRASH ENCLOSURE SECTION

A0.10 SCALE : 1/2" = 1'-0"



2 TRASH ENCLOSURE SECTION

A0.10 SCALE : 1/2" = 1'-0"



1 ARCHITECTURAL SITE PLAN

A0.10 SCALE : 1/16" = 1'-0"

SITE PLAN GENERAL NOTES

1. CONTROL JOINT SEALANT FOR CONCRETE PAVING AND BETWEEN BUILDING AND PAVING TO BE GRAY COLOR TO MATCH CONCRETE.

EXTERIOR MATERIAL LEGEND

MP-1	ALUMINUM COMPOSITE METAL (ACM) DRY SYSTEM: ALUCOBOND, COLOR: NAUTRAL BRUSHED CARBON; ACM PANEL JOINTS TO ALIGN W/ GLAZING PER ELEVATIONS
MP-2	KYNAR-COATED 24 GA BREAK METAL COPING TO MATCH MP-1
MP-3	KYNAR-COATED 24 GA BREAK METAL COPING TO MATCH ST-1
MP-4	KYNAR-COATED METAL FLASHING, GUTTER AND DOWNSPOUT; COLOR TBD TO MATCH MP-1
MP-5	PAC-CLAD MIDNIGHT BRONZE PERFORATED CORRUGATED METAL PANEL; .050 ALUM. 1/4" ROUND W/ 1/2" STAGGERED, 23% OPEN AREA PER MFR.
WD-1	GEOLAM VERTIGO 5010 COMPOSITE CLADDING, COLOR: MOLESKIN
WD-2	GEOLAM QUALITA 020C VERTICAL T&G COMPOSITE DECKING, COLOR: MOLESKIN
GL-1	2" x 4.5" KAWNEER PERMACOAT SMOKE GRAY ALUMINUM CENTER GLAZED STOREFRONT SYSTEM W/ 1" INSULATED LOW-E GLAZING UNIT
ST-1	ELDORADO CULTURED STONE VANTAGE 30, DRY-STACK NON-GROUTED; COLOR: WHITE ELM
MB-1	GROUND FACE 4X16 VENEER MASONRY BLOCK, BURNISHED FINISH, COLOR: MIDWEST SLATE
AWN-1	CANOPY: GALV. AND PAINTED STEEL CHANNEL FRAME (PER STRUCT. DWGS.) WITH GEOLAM SOLEO 6008 COMPOSITE WOOD @ 8" O.C. PER SHEET A7.02; COLOR: MOLESKIN

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PROJECT TEAM

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CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
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STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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SHEET TITLE

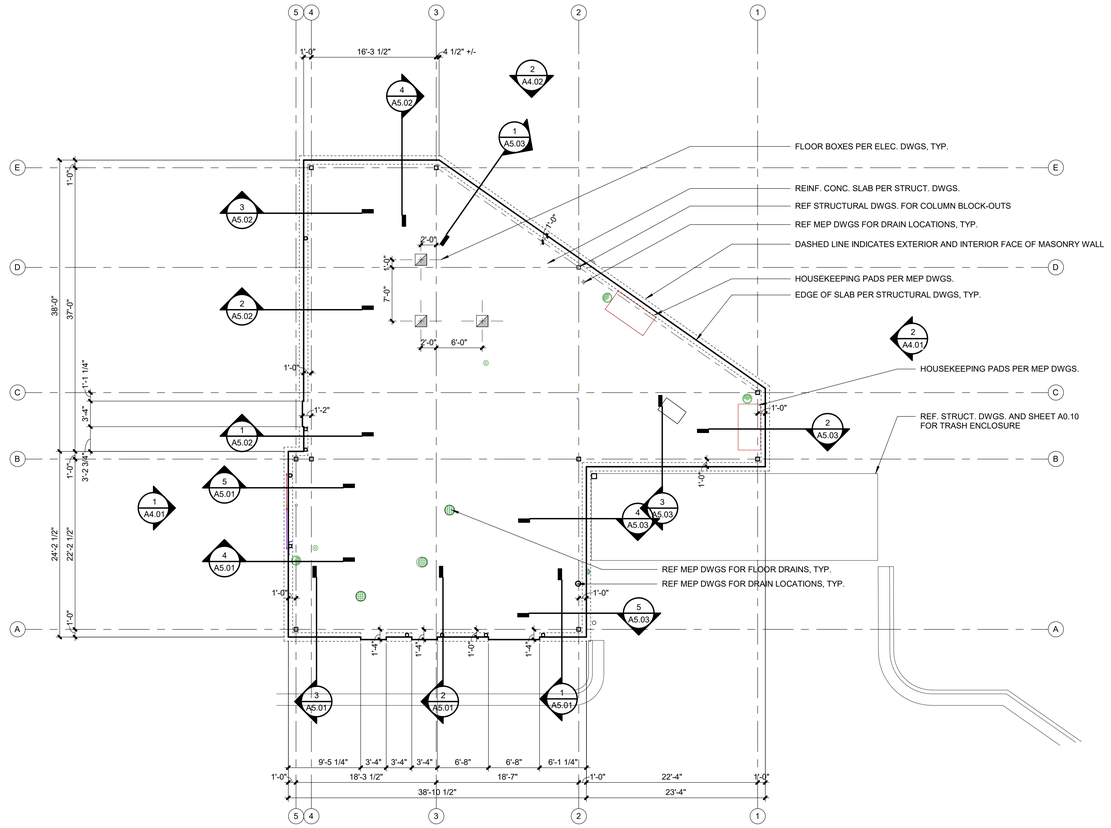
ARCHITECTURAL SITE PLAN & DETAILS

SHEET NUMBER

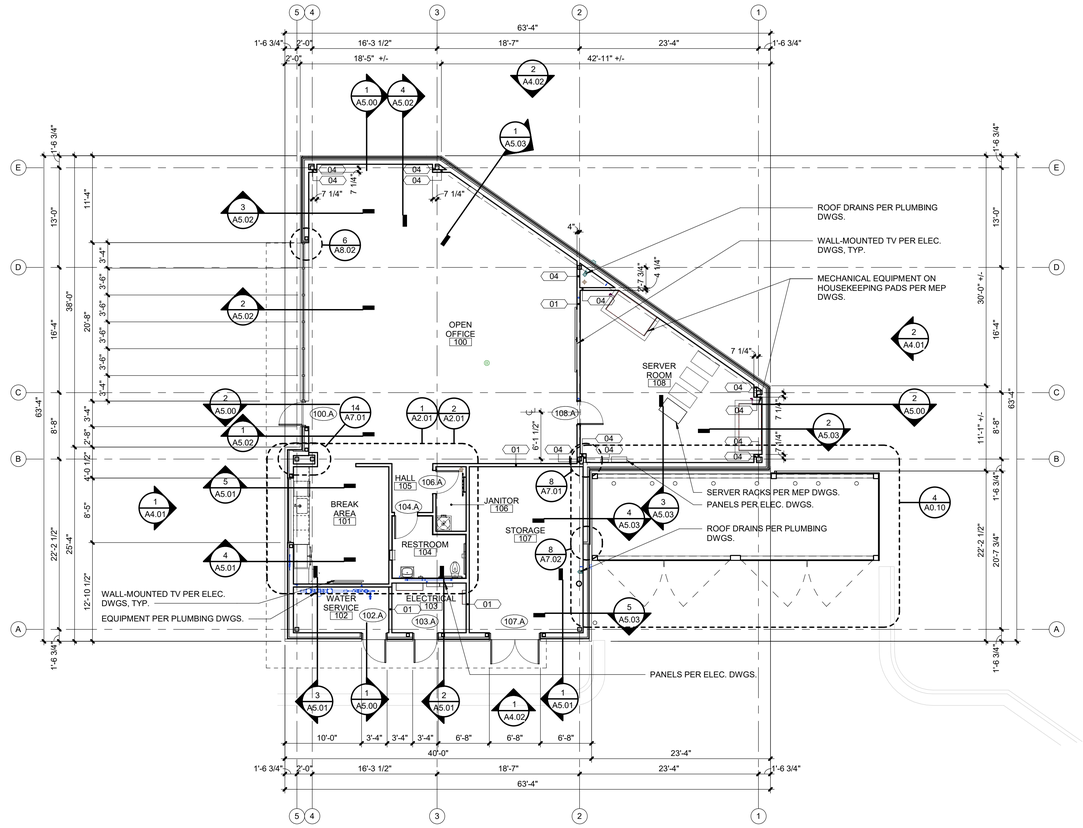
A0.10

CONSTRUCTION GENERAL NOTES

1. PROVIDE TERMITE CONTROL UNDER NEW FLOOR SLABS.
2. ALL STRUCTURAL STEEL TO BE FACTORY PRIMED GRAY.
3. ALL CMU CORNERS ARE TO BE CONSTRUCTED OF BULLNOSE BLOCK.
4. ALL SWITCHES, RECEPTACLES, PHONE/DATA, AND CONTROLS ARE TO BE GRAY COLOR WITH STAINLESS STEEL COVER PLATES.



2 A1.01 — EDGE OF SLAB PLAN - 1ST FLOOR — 1/8" = 1'-0" — PLAN — TRUE



1 A1.01 — 1ST FLOOR PLAN — 1/8" = 1'-0" — PLAN — TRUE

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REGISTRATION

STATE OF MISSOURI — DAVID ALAN WILLIAMS — NUMBER A-5540 — REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
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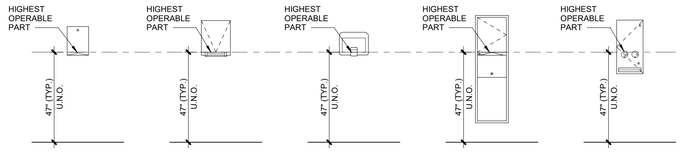
SHEET TITLE

FIRST FLOOR PLAN

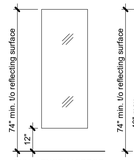
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A1.01

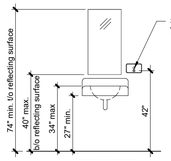
TOILET ACCESSORY MOUNTING HEIGHTS



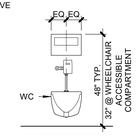
TOWEL DISPENSER (MANUAL) | TOWEL DISPENSER (AUTOMATIC) | HAND DRYER | TOWEL DISPENSER/ WASTE RECEPTACLE | SANITARY NAPKIN DISPENSER



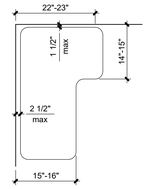
FULL LENGTH MIRROR



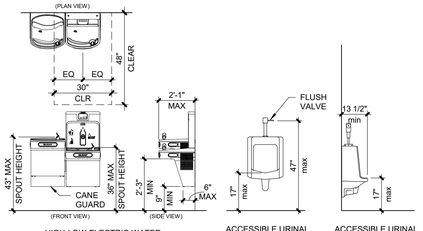
LAVATORY/MIRROR/ SOAP DISPENSER



SEAT COVER DISPENSER



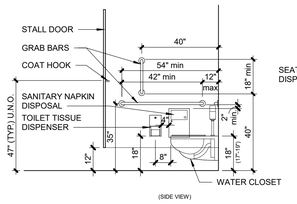
ACCESSIBLE SHOWER SEAT



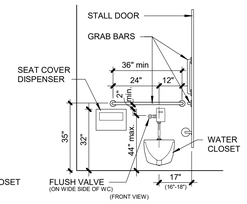
HIGH-LOW ELECTRIC WATER COOLER W/ BOTTLE FILL

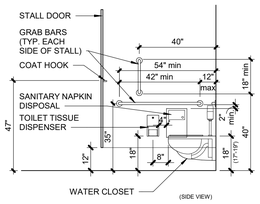
ACCESSIBLE URINAL FRONT

ACCESSIBLE URINAL SIDE

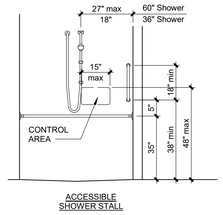


WHEELCHAIR ACCESSIBLE TOILET COMPARTMENT

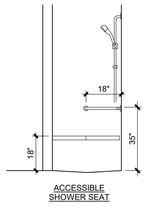




AMBULATORY ACCESSIBLE TOILET COMPARTMENT



ACCESSIBLE SHOWER STALL



ACCESSIBLE SHOWER SEAT

Maximum Reach Depth	.05 inch	2 inches	5 inches	6 inches	9 inches	11 inches
Maximum Reach Height	48 inches	46 inches	42 inches	40 inches	36 inches	34 inches

TABLE 603.6 - ANSI-117.1-2009

TOILET ACCESSORY / EQUIPMENT LEGEND

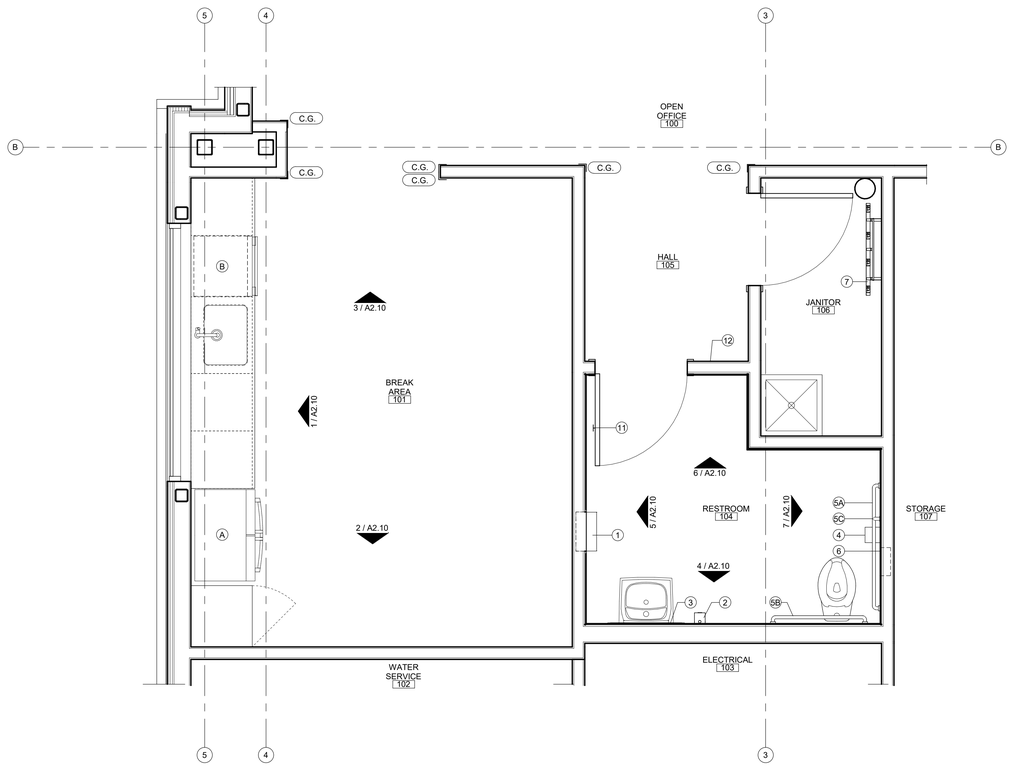
ALL ACCESSORIES SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE.
ALL ACCESSORIES SHALL BE DESIGNED TO MEET ADA STANDARDS.

1. COMBINATION PAPER TOWEL DISPENSER/WASTE RECEPTACLE, RECESSED (BOBRICK B-3944)
2. AUTOMATIC WALL MOUNTED SOAP DISPENSER (BOBRICK B-2012)
3. FRAMED MIRROR (BOBRICK B-165) 30"W X 48"H
4. MULTI-ROLL TOILET TISSUE DISPENSER W/NO KEYED LOCK (BOBRICK B-2888)
5. GRAB BARS AS SHOWN ON PLANS AND ELEVATIONS (BOBRICK B-6806 SERIES)
- 5A. GRAB BAR (BOBRICK B6806 X 42) LOCATE AS SHOWN IN ACCESSORY MOUNTING HEIGHTS
- 5B. GRAB BAR (BOBRICK B6806 X 36) LOCATE AS SHOWN IN ACCESSORY MOUNTING HEIGHTS
- 5C. GRAB BAR (BOBRICK B6806 X 18) LOCATE AS SHOWN IN ACCESSORY MOUNTING HEIGHTS
6. SANITARY NAPKIN DISPOSAL, RECESSED WALL MOUNT (BOBRICK B-353)
7. U-LINE WALL-MOUNT UTILITY HOOKS
11. COAT AND HAT HOOK (BOBRICK B-6827)
12. A.D.A. RESTROOM SIGNAGE, SEE SHEET A0.01

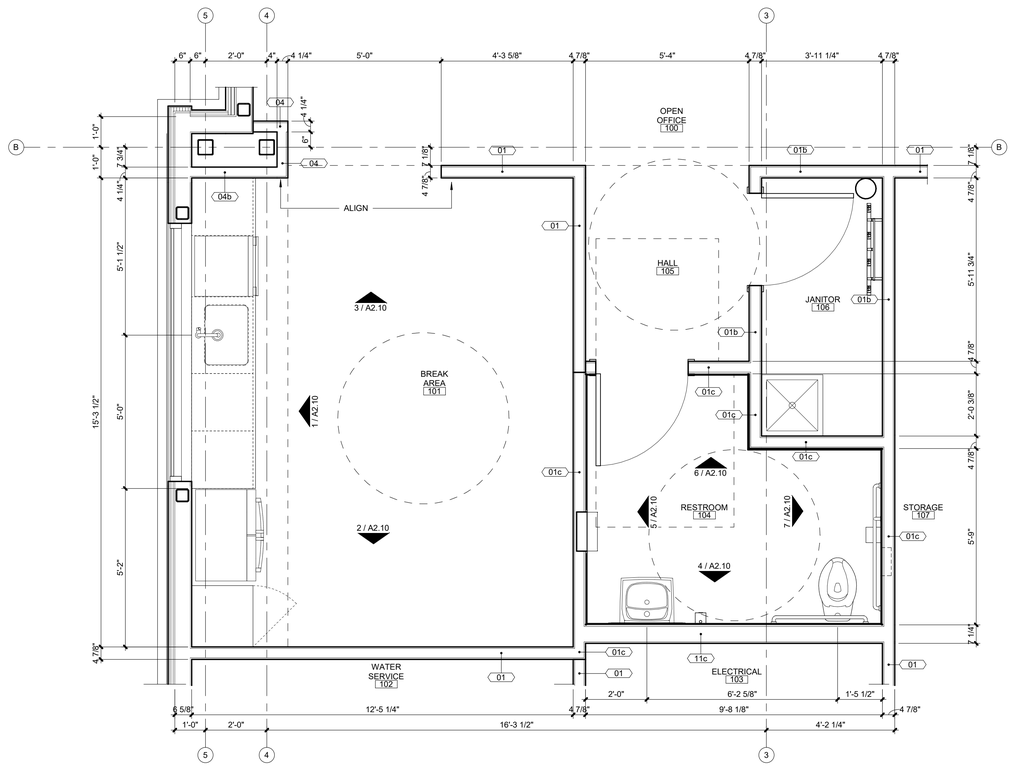
APPLIANCE LEGEND

OWNER PROVIDED, CONTRACTOR-INSTALLED APPLIANCES AS NOTED BELOW.

- A. REFRIGERATOR - PER OWNER
- B. ADA DISHWASHER - PER OWNER



2 ENLARGED PLAN - ACCESSORIES
A2.01 1/2" = 1'-0"



1 ENLARGED PLAN
A2.01 1/2" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI — DAVID ALAN WILLIAMS — NUMBER A-5540 — REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

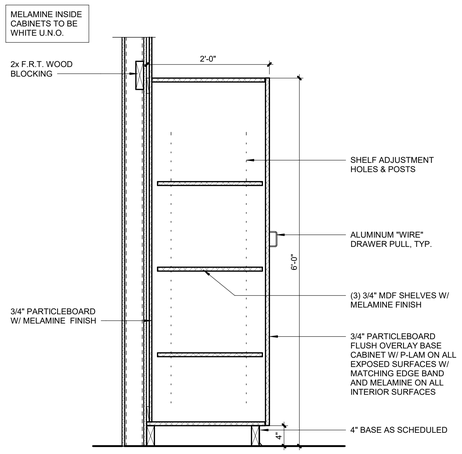
FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

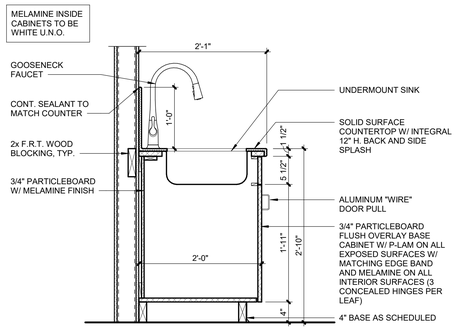
ENLARGED TOILET PLANS AND DETAILS

SHEET NUMBER

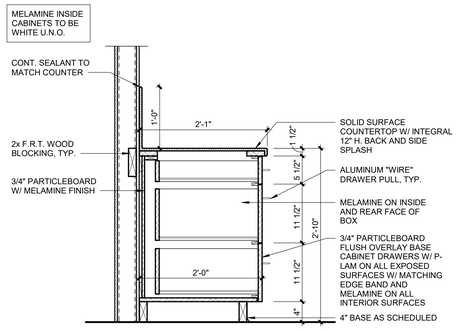
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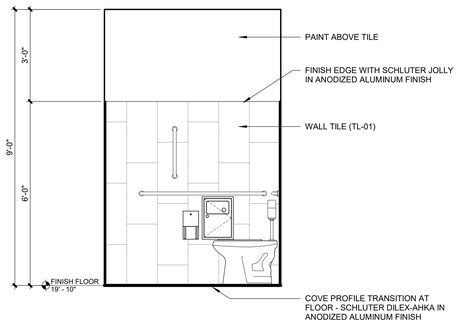
10 | CASEWORK DETAIL
A2.10 | SCALE : 1" = 1'-0"



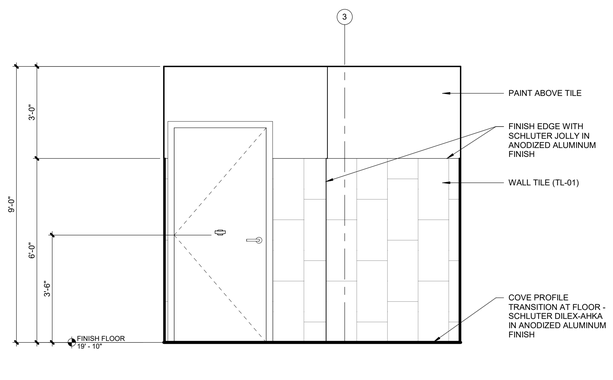
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A2.10 | SCALE : 1" = 1'-0"



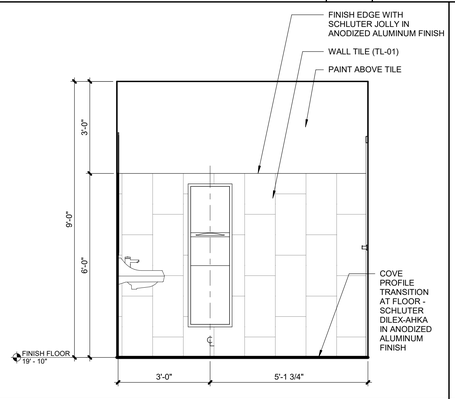
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A2.10 | SCALE : 1" = 1'-0"



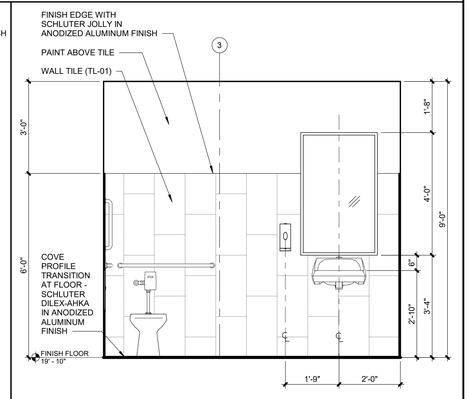
7 | INTERIOR ELEV. - RESTROOM
A2.10 | SCALE : 1/2" = 1'-0"



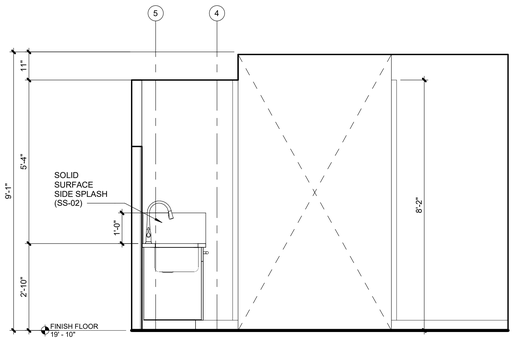
6 | INTERIOR ELEV. - RESTROOM
A2.10 | SCALE : 1/2" = 1'-0"



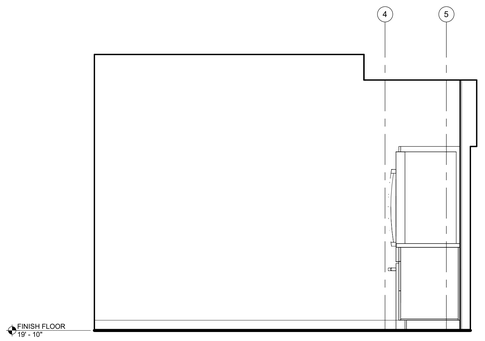
5 | INTERIOR ELEV. - RESTROOM
A2.10 | SCALE : 1/2" = 1'-0"



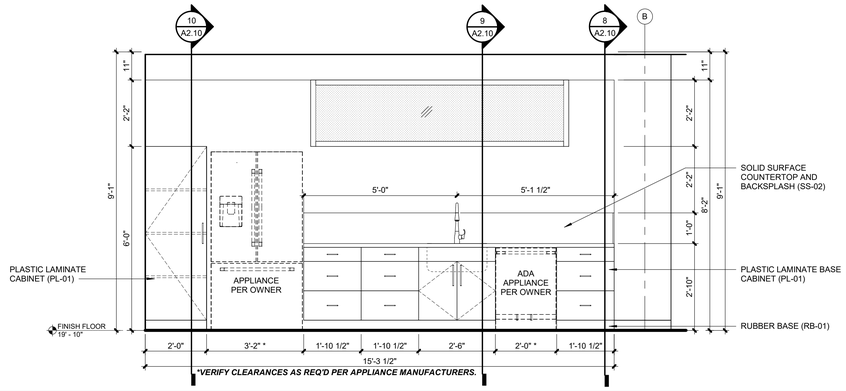
4 | INTERIOR ELEV. - RESTROOM
A2.10 | SCALE : 1/2" = 1'-0"



3 | INTERIOR ELEV. - BREAKROOM
A2.10 | SCALE : 1/2" = 1'-0"



2 | INTERIOR ELEV. - BREAKROOM
A2.10 | SCALE : 1/2" = 1'-0"



1 | INTERIOR ELEV. - BREAKROOM
A2.10 | SCALE : 1/2" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

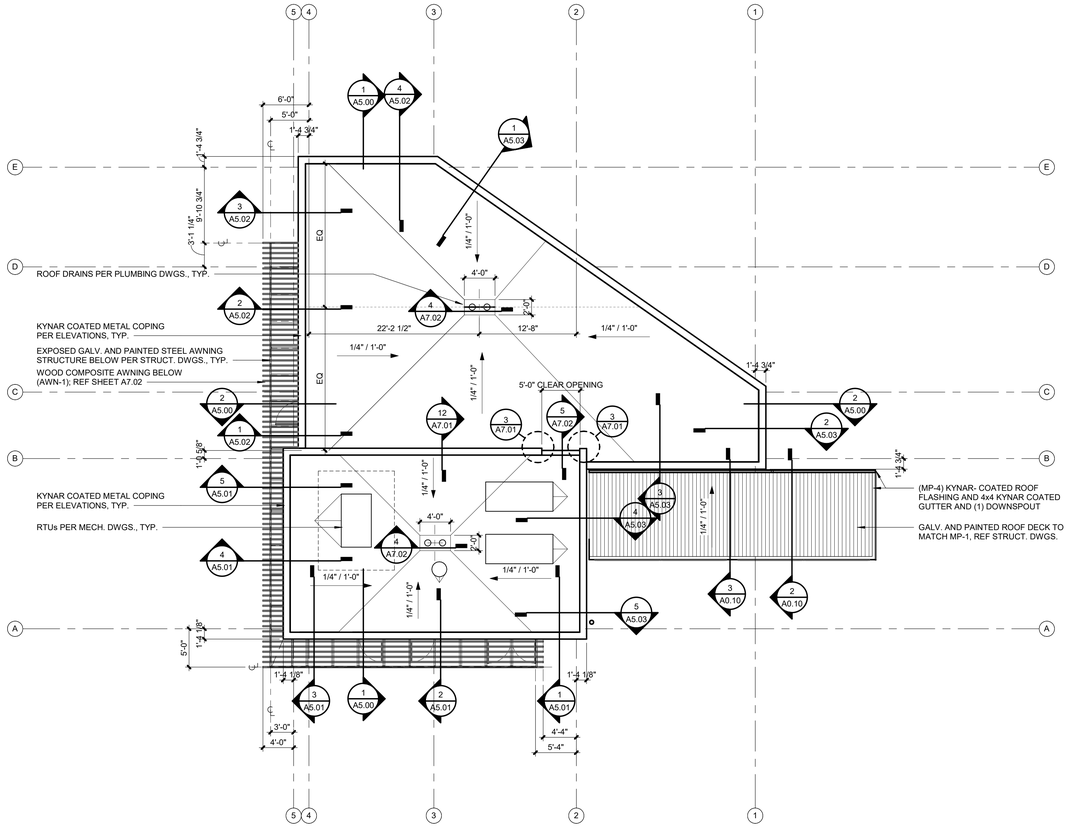
INTERIOR ELEVATIONS

SHEET NUMBER

A2.10

ROOF PLAN GENERAL NOTES

1. THE SINGLE PLY ROOF SHALL BE TPO, 60 MIL, WHITE MEMBRANE, FULLY ADHERED, W/A 20 YEAR NO DOLLAR LIMIT MANUFACTURER'S WARRANTY.
2. ROOF DRAINS ARE TO BE COLLECTED UNDERGROUND AND CONTINUED PER CIVIL ENGINEERING PLANS.
3. SEE SHEET A7.01 FOR ROOF PARAPET DETAILS
4. SEE PLUMBING AND MECHANICAL PLANS FOR ROOF TOP EQUIPMENT AND PENETRATION LOCATIONS.



1 ROOF PLAN
A3.01 SCALE : 1/8" = 1'-0"

PARAGON STAR

LOT 20 - HUB BUILDING

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SHEET TITLE

ROOF PLAN

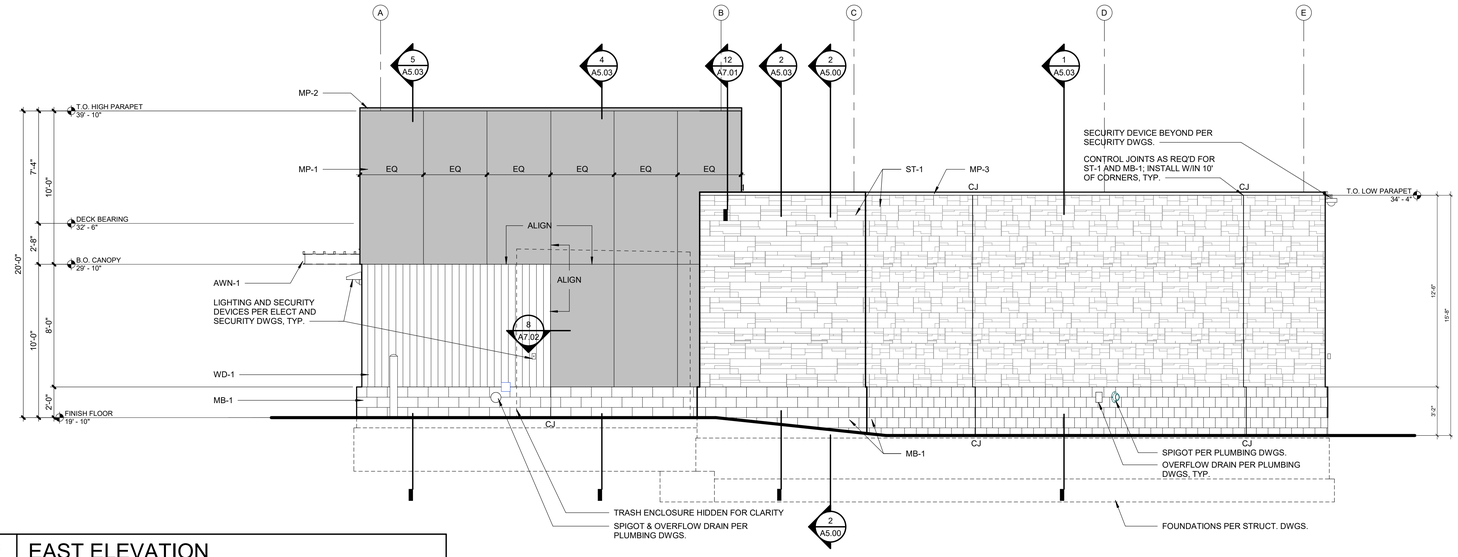
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A3.01

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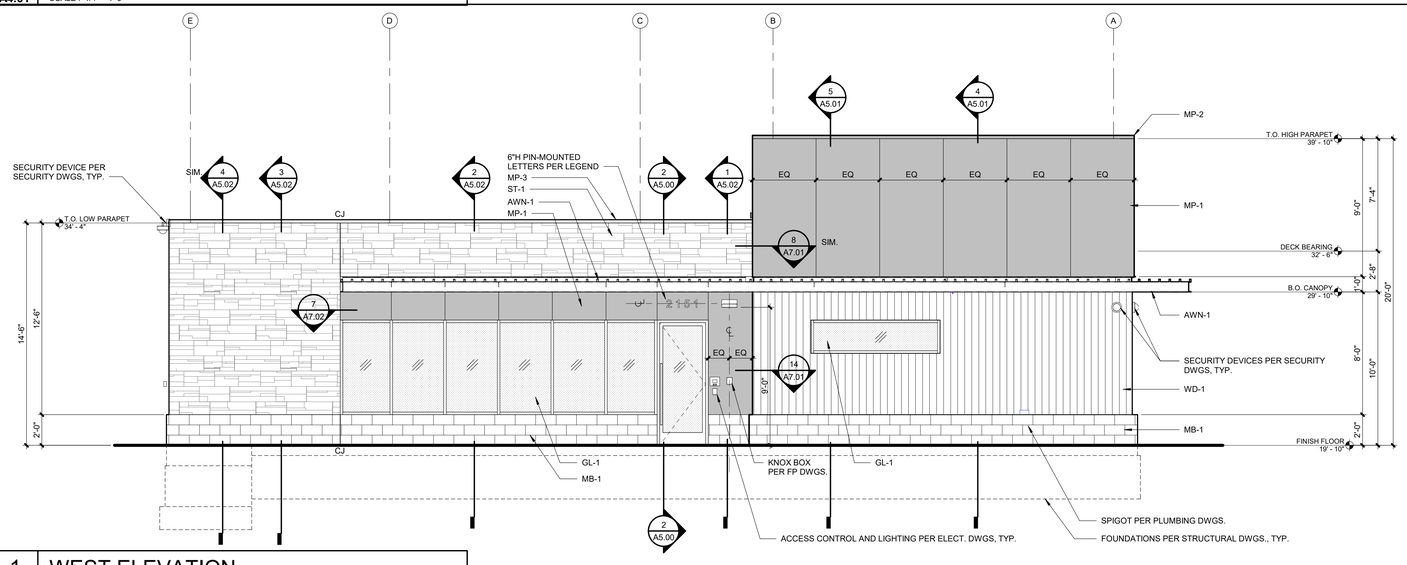
EXTERIOR MATERIAL LEGEND

MP-1	ALUMINUM COMPOSITE METAL (ACM) DRY SYSTEM: ALUCOBOND, COLOR: NAUTRAL BRUSHED CARBON; ACM PANEL JOINTS TO ALIGN W/ GLAZING PER ELEVATIONS
MP-2	KYNAR-COATED 24 GA BREAK METAL COPING TO MATCH MP-1
MP-3	KYNAR-COATED 24 GA BREAK METAL COPING TO MATCH ST-1
MP-4	KYNAR-COATED METAL FLASHING, GUTTER AND DOWNSPOUT; COLOR TBD TO MATCH MP-1
MP-5	PAC-CLAD MIDNIGHT BRONZE PERFORATED CORRUGATED METAL PANEL: .050 ALUM. 1/4" ROUND W/ 1/2" STAGGERED, 23% OPEN AREA PER MFR.
WD-1	GEOLAM VERTIGO 5010 COMPOSITE CLADDING, COLOR: MOLESKIN
WD-2	GEOLAM QUALITA 020C VERTICAL T&G COMPOSITE DECKING, COLOR: MOLESKIN
GL-1	2" x 4.5" KAWNEER PERMACOAT SMOKE GRAY ALUMINUM CENTER GLAZED STOREFRONT SYSTEM W/ 1" INSULATED LOW-E GLAZING UNIT
ST-1	ELDORADO CULTURED STONE VANTAGE 30, DRY-STACK NON-GROUTED; COLOR: WHITE ELM
MB-1	GROUND FACE 4X16 VENEER MASONRY BLOCK, BURNISHED FINISH, COLOR: MIDWEST SLATE
AWN-1	CANOPY: GALV. AND PAINTED STEEL CHANNEL FRAME (PER STRUCT. DWGS.) WITH GEOLAM SOLEO 6008 COMPOSITE WOOD @ 8" O.C. PER SHEET A7.02; COLOR: MOLESKIN
	ADDRESS LETTERS ABV MAIN ENTRY DOOR PER 2018 IFC 505.1: 6"H PIN-MOUNTED LETTERS, FINISH: BRUSHED ALUM.



2 EAST ELEVATION

A4.01 SCALE : 1/4" = 1'-0"



1 WEST ELEVATION

A4.01 SCALE : 1/4" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/24/21
Issued For: CITY COMMENTS

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

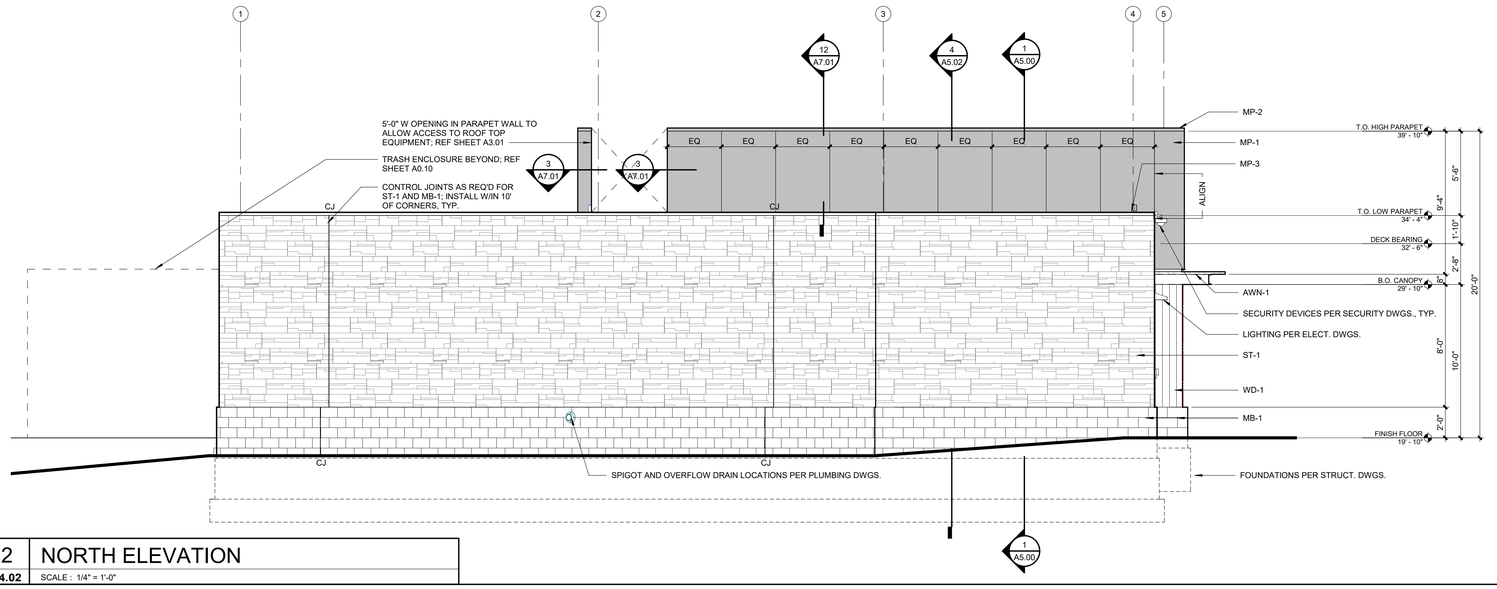
EXTERIOR ELEVATIONS

SHEET NUMBER

A4.01

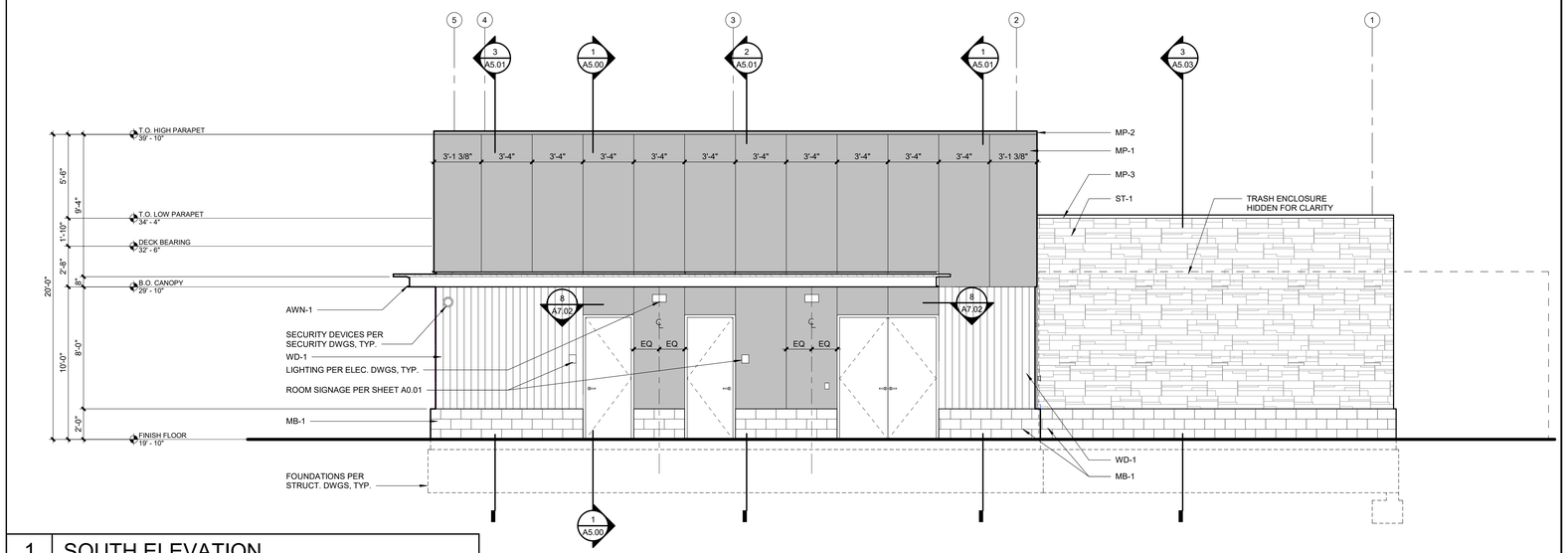
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2 NORTH ELEVATION

A4.02 SCALE : 1/4" = 1'-0"



1 SOUTH ELEVATION

A4.02 SCALE : 1/4" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
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FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

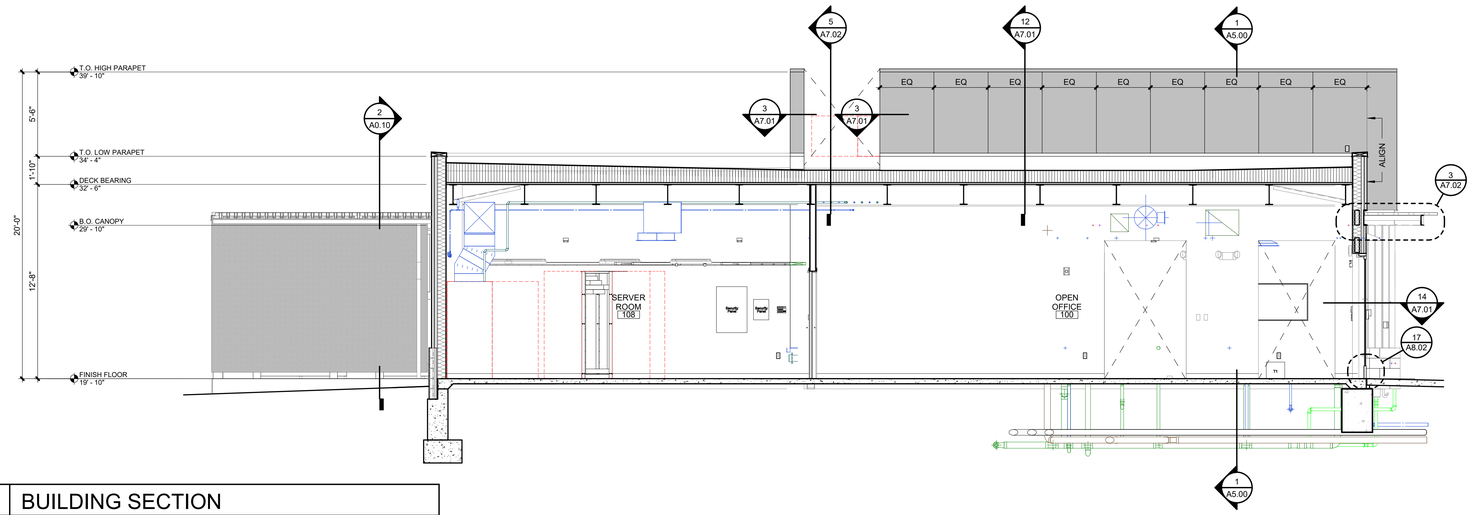
FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

EXTERIOR ELEVATIONS

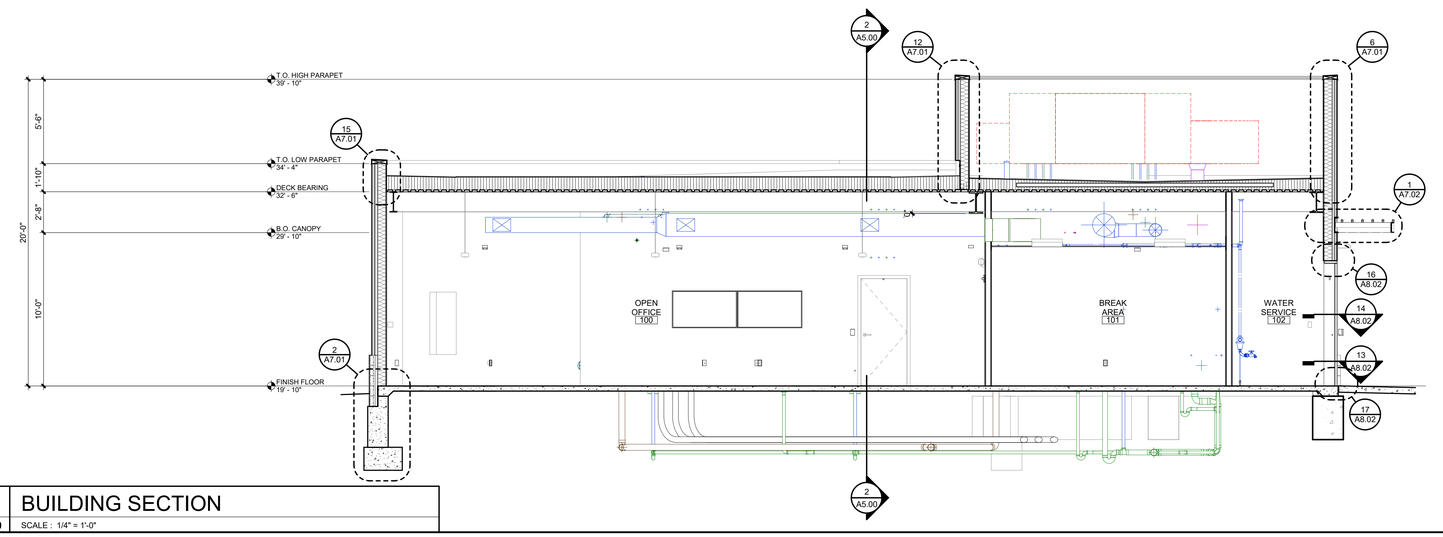
SHEET NUMBER

A4.02



2 BUILDING SECTION

A5.00 SCALE : 1/4" = 1'-0"



1 BUILDING SECTION

A5.00 SCALE : 1/4" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
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No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
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FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

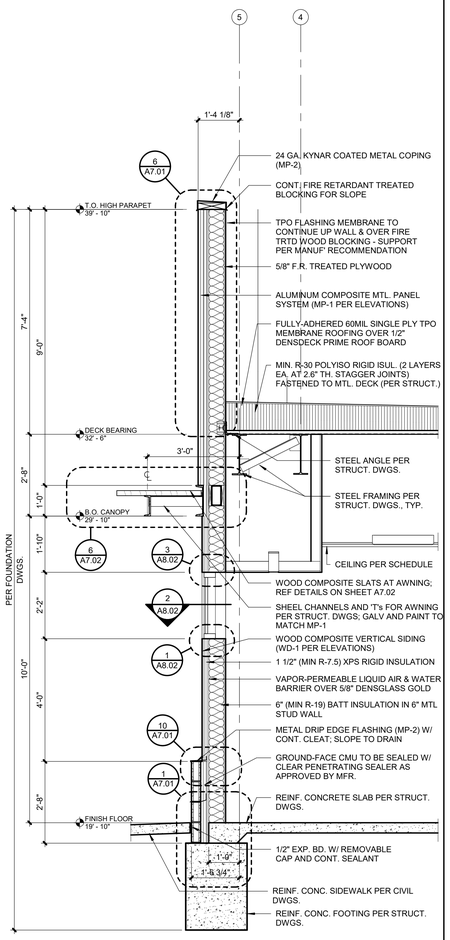
FINKLE + WILLIAMS
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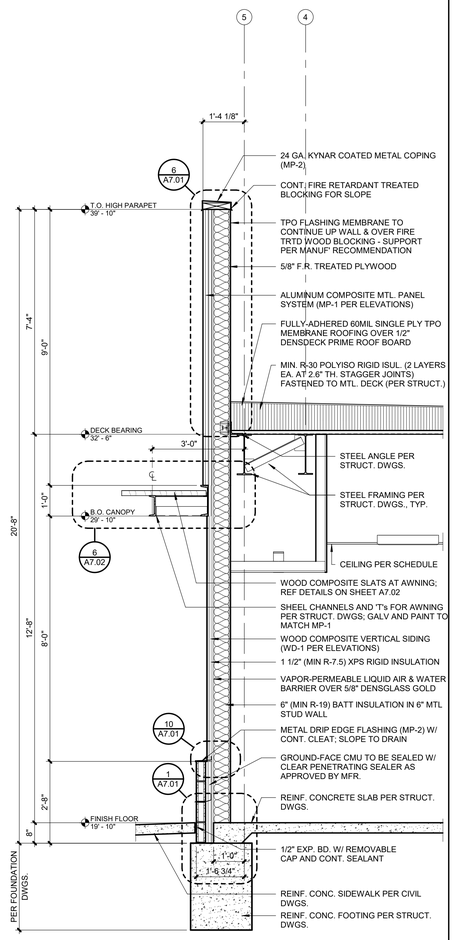
BUILDING SECTIONS

SHEET NUMBER

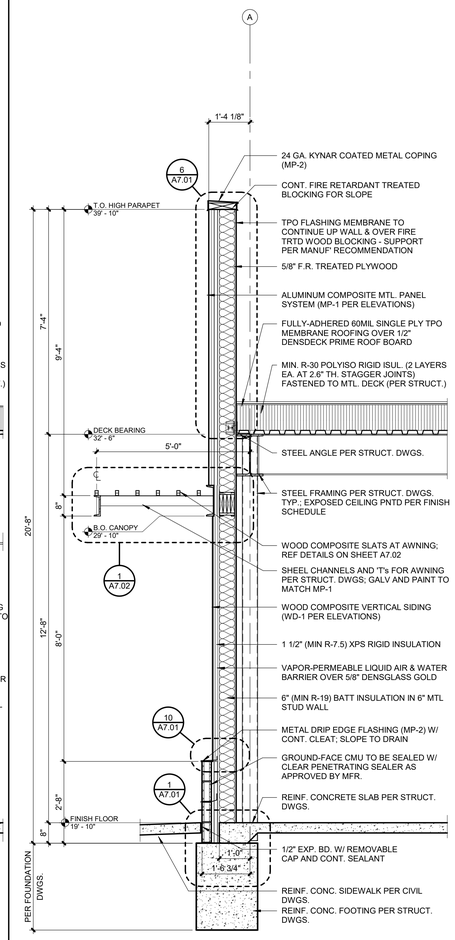
A5.00



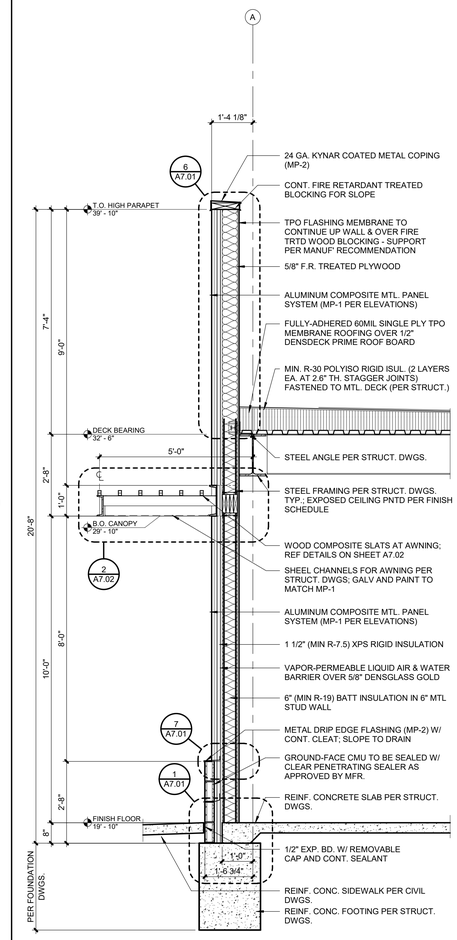
5	WALL SECTION
A5.01	SCALE: 1/2" = 1'-0"



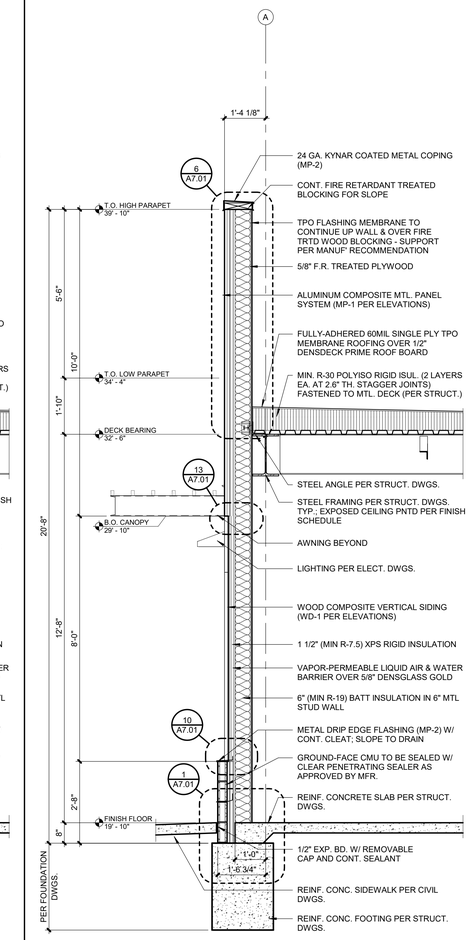
4	WALL SECTION
A5.01	SCALE: 1/2" = 1'-0"



3	WALL SECTION
A5.01	SCALE: 1/2" = 1'-0"



2	WALL SECTION
A5.01	SCALE: 1/2" = 1'-0"



1	WALL SECTION
A5.01	SCALE: 1/2" = 1'-0"

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PARAGON STAR

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STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

FINKLE + WILLIAMS
ARCHITECTURE

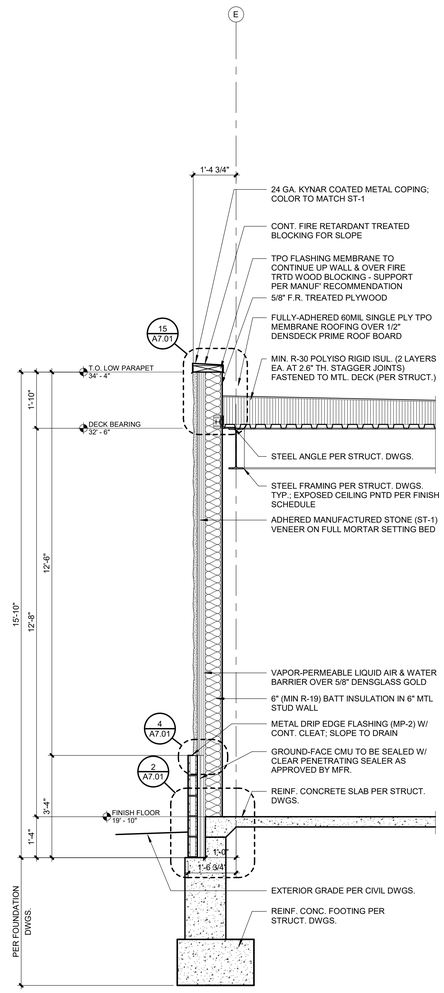
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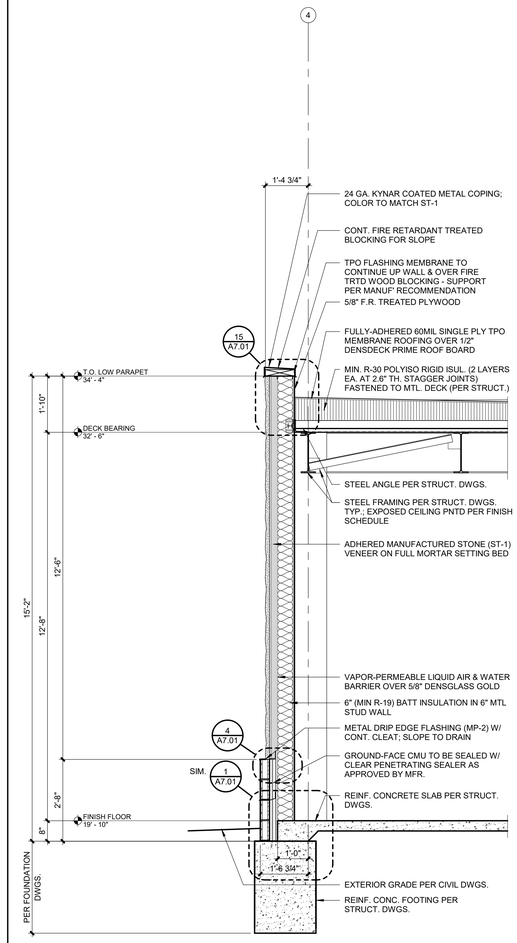
WALL SECTIONS

SHEET NUMBER

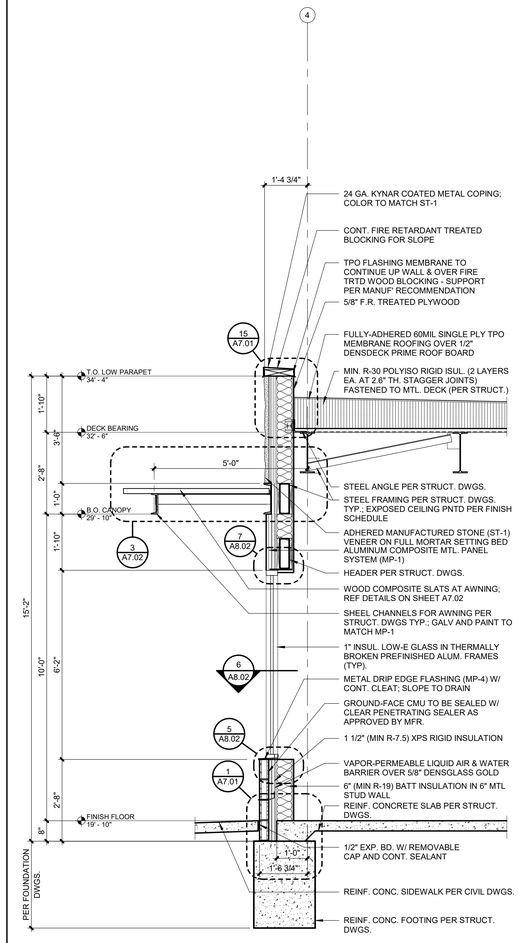
A5.01



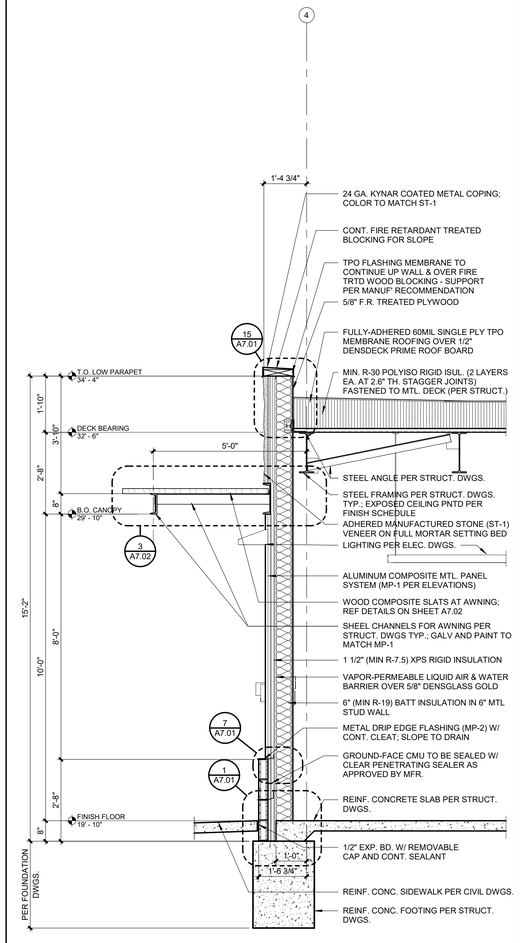
4 WALL SECTION
A5.02 SCALE : 1/2" = 1'-0"



3 WALL SECTION
A5.02 SCALE : 1/2" = 1'-0"



2 WALL SECTION
A5.02 SCALE : 1/2" = 1'-0"



1 WALL SECTION
A5.02 SCALE : 1/2" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

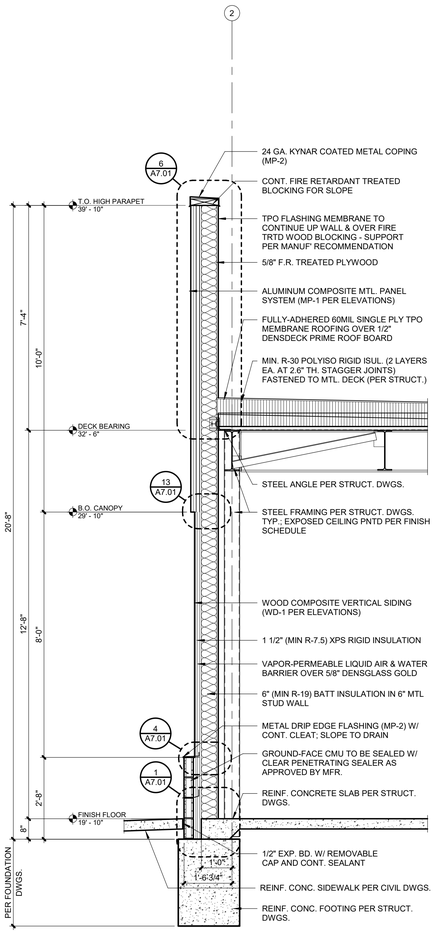
FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

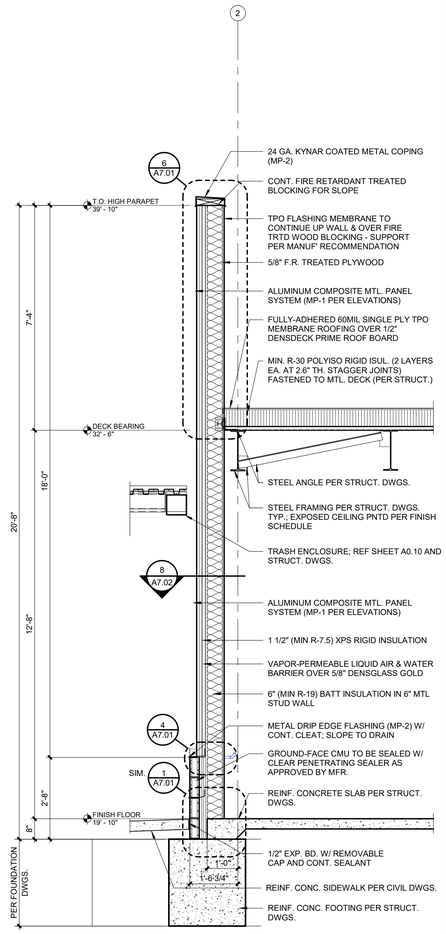
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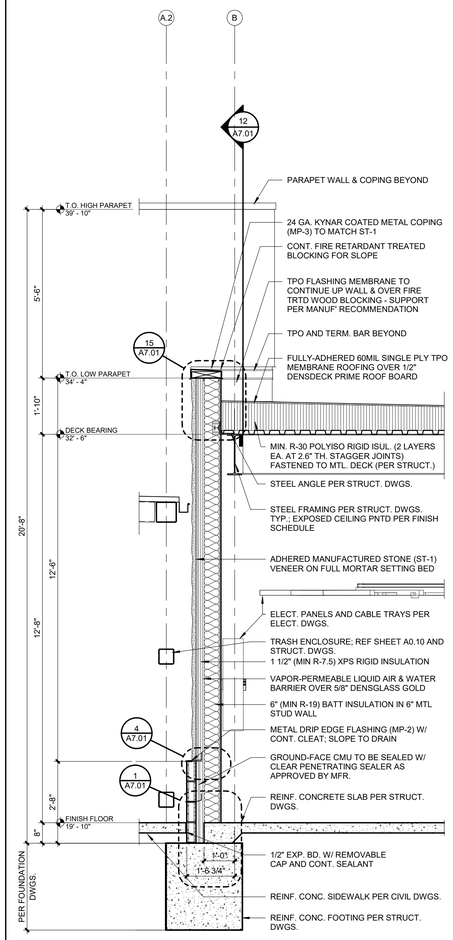
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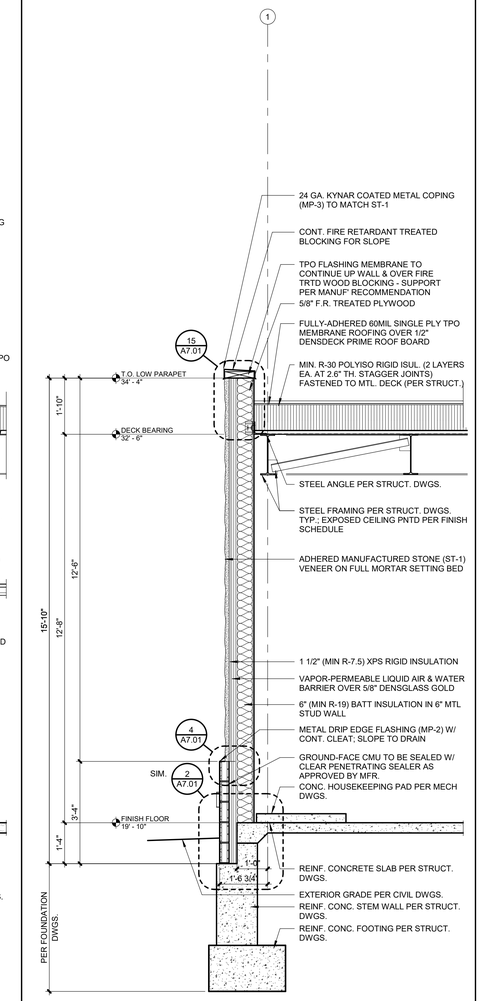
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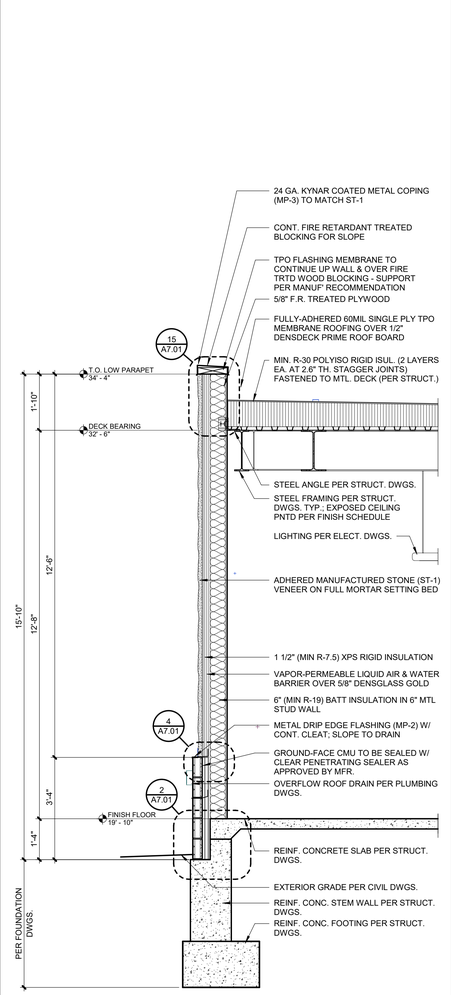
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A5.03	SCALE : 1/2" = 1'-0"



3	WALL SECTION
A5.03	SCALE : 1/2" = 1'-0"



2	WALL SECTION
A5.03	SCALE : 1/2" = 1'-0"



1	WALL SECTION
A5.03	SCALE : 1/2" = 1'-0"

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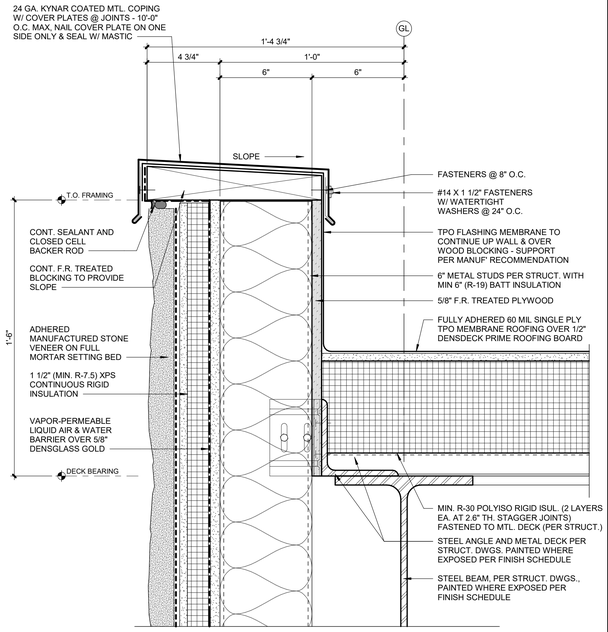
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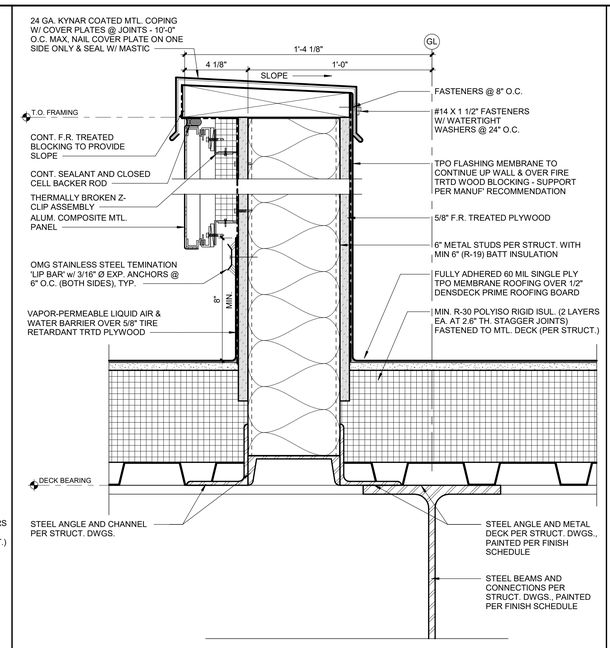
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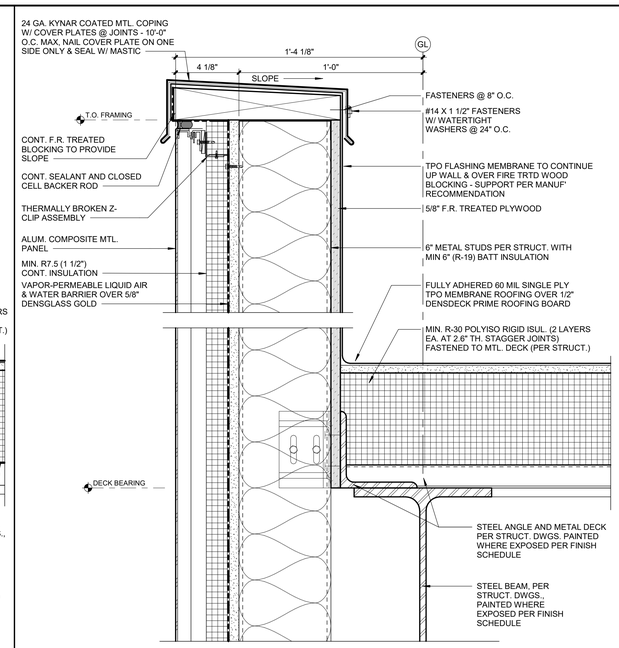
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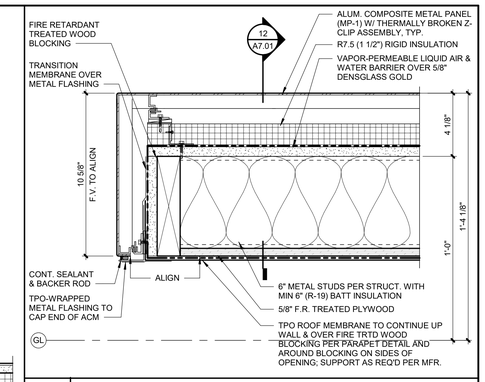
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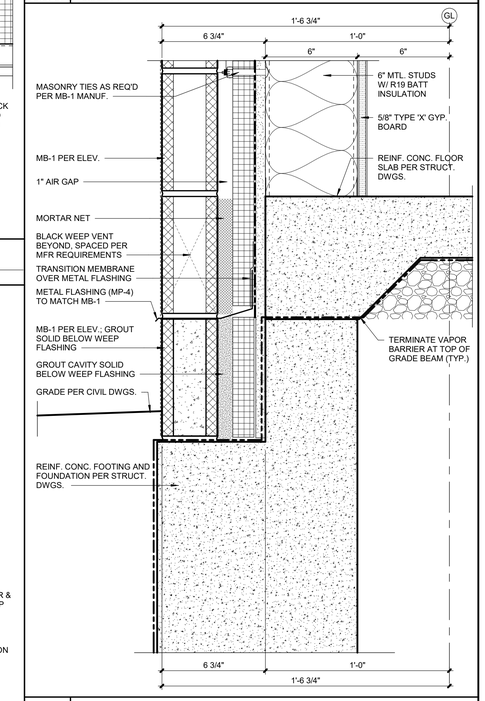
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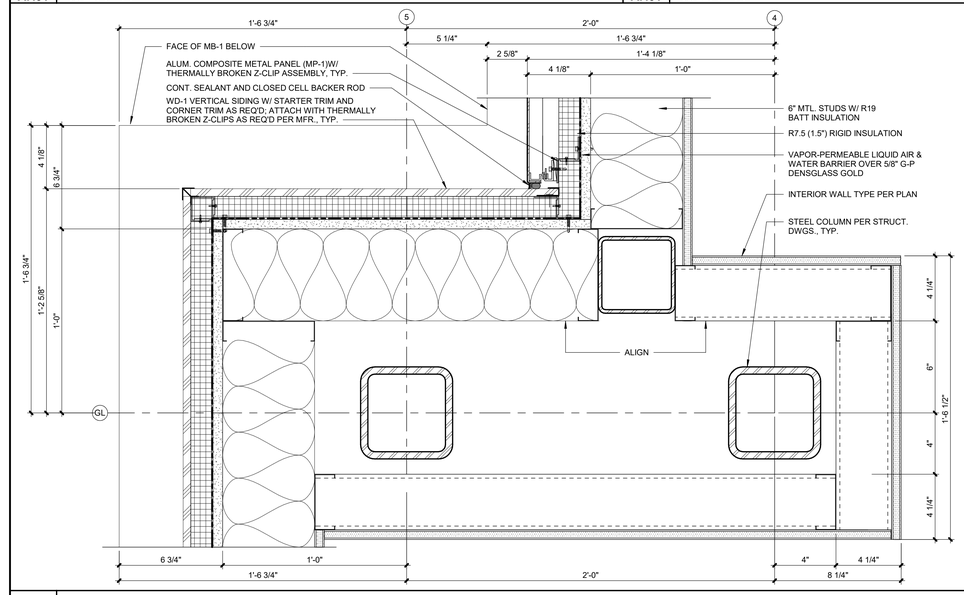
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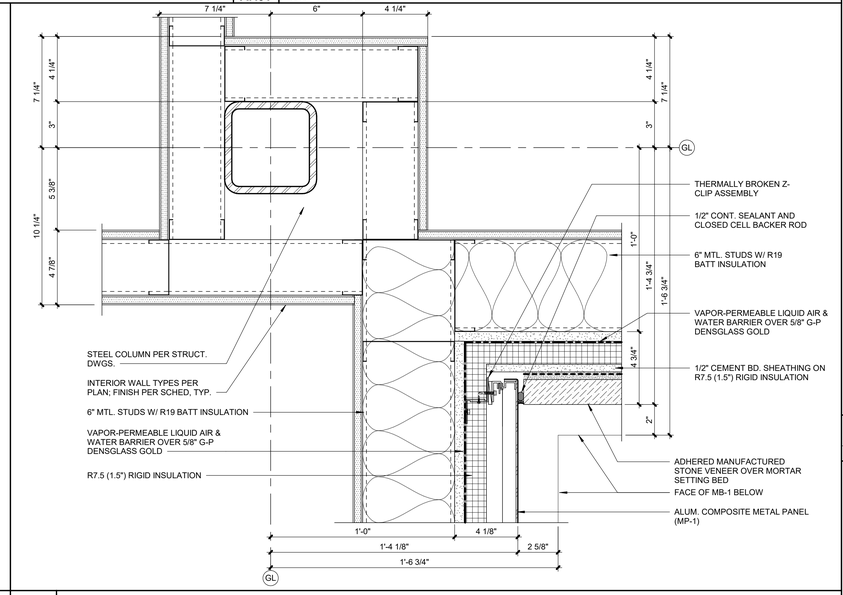
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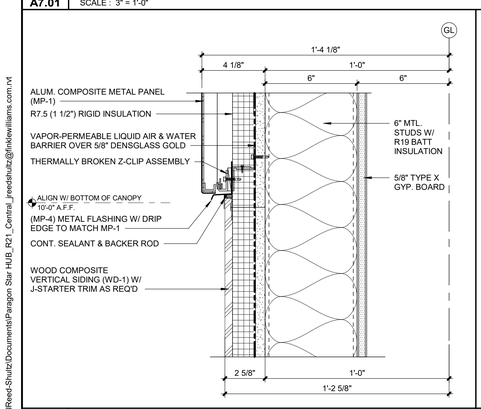
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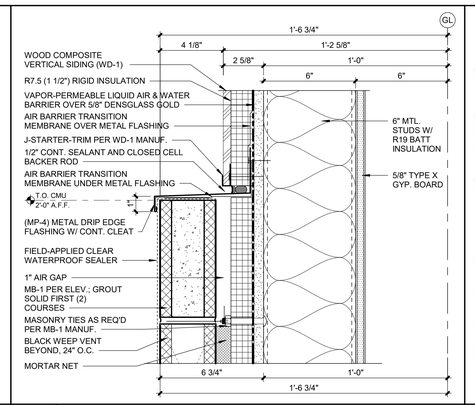
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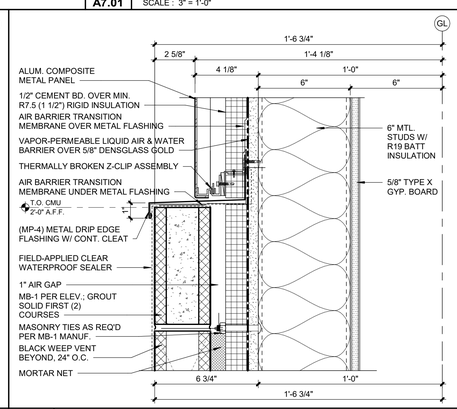
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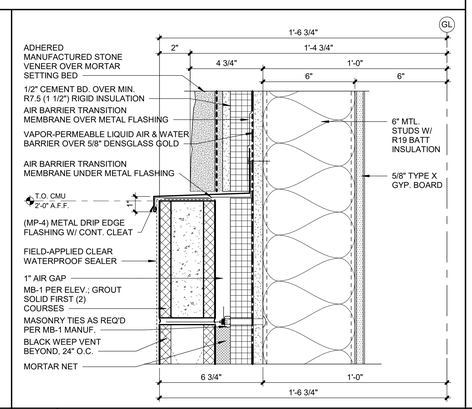
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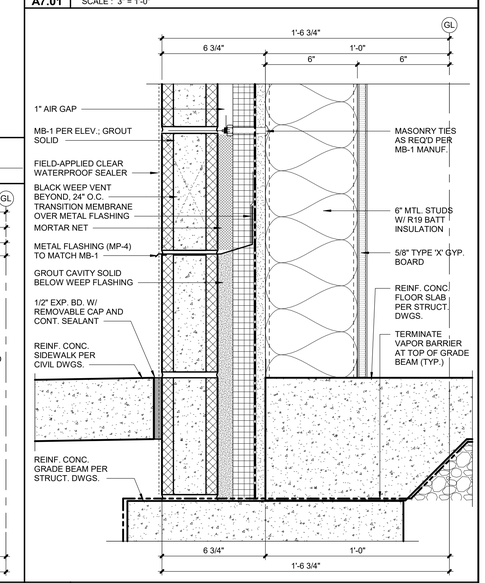
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7 TRANSITION DETAIL
A7.01 SCALE : 3" = 1'-0"



4 TRANSITION DETAIL
A7.01 SCALE : 3" = 1'-0"



1 FOUNDATION DETAIL
A7.01 SCALE : 3" = 1'-0"

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.:	19050.02
Date:	08/06/2021
Issued For:	PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

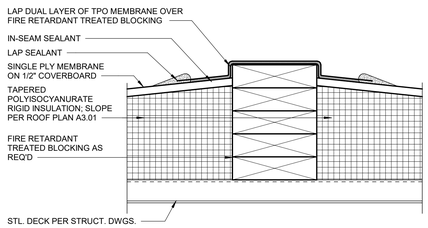
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SHEET TITLE

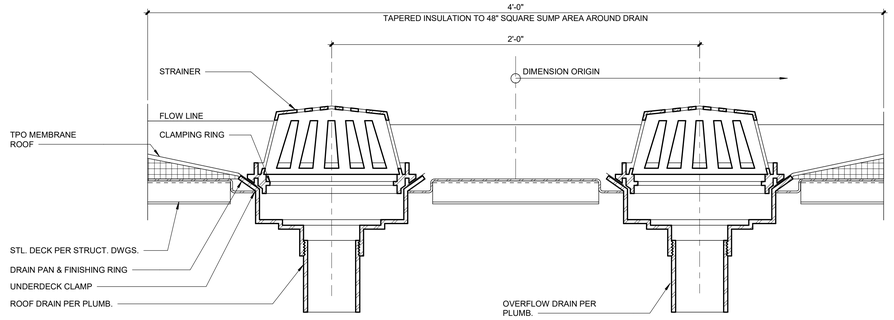
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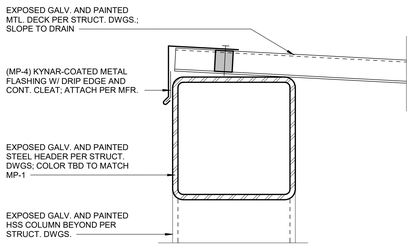
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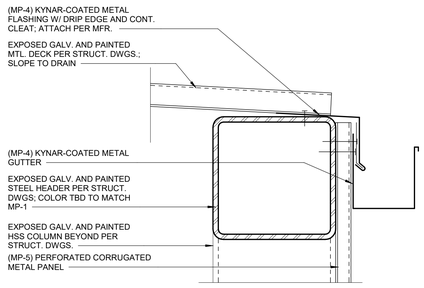
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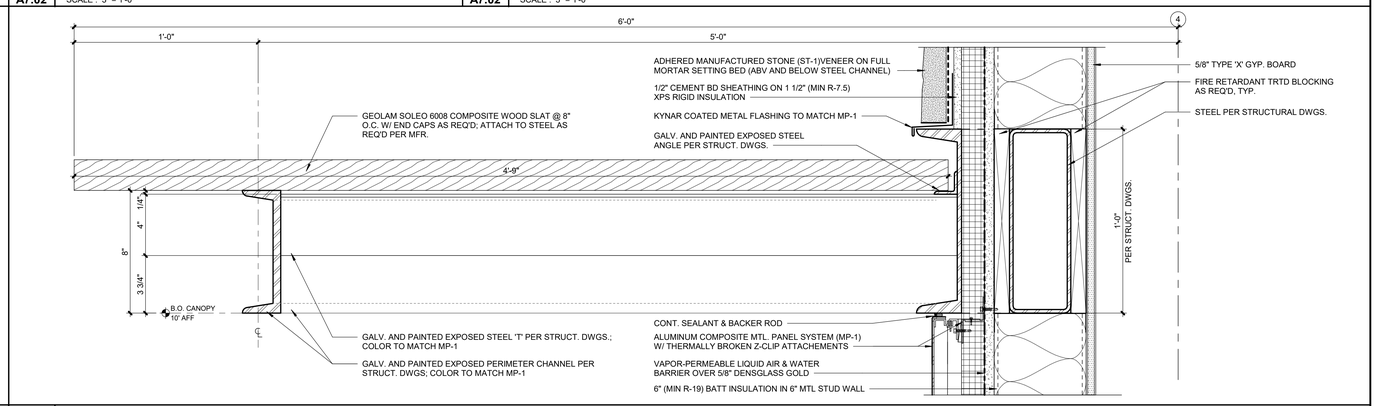
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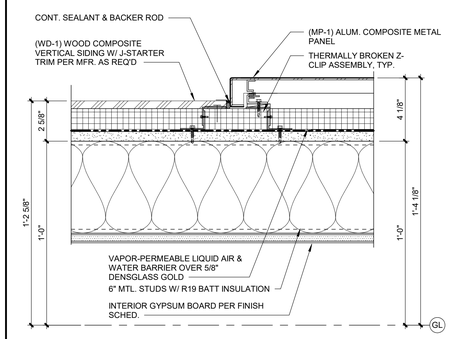
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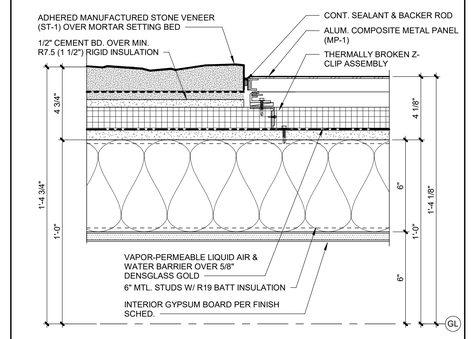
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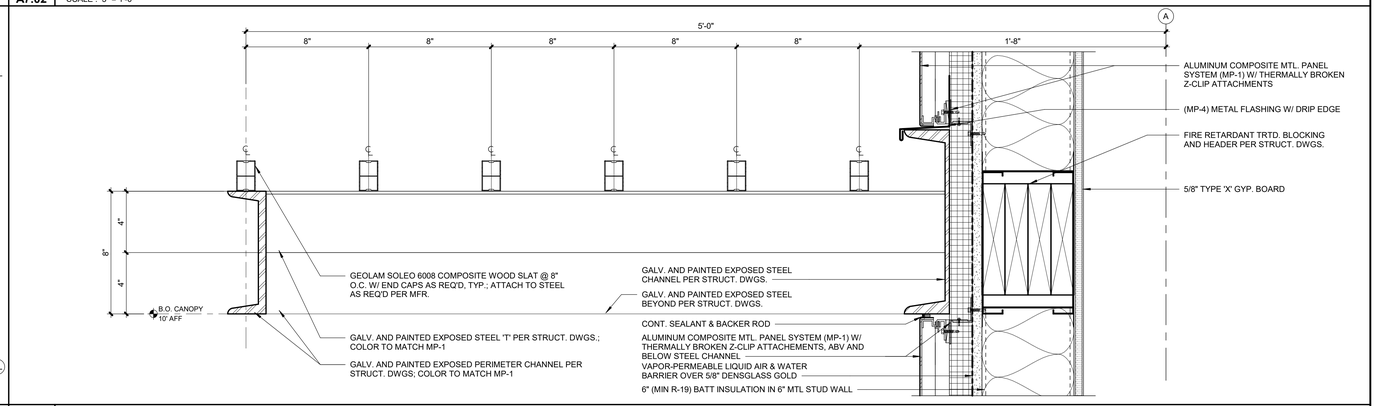
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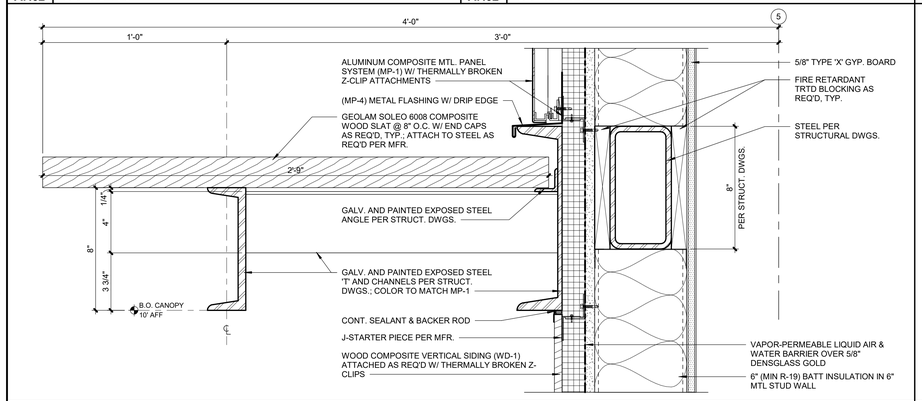
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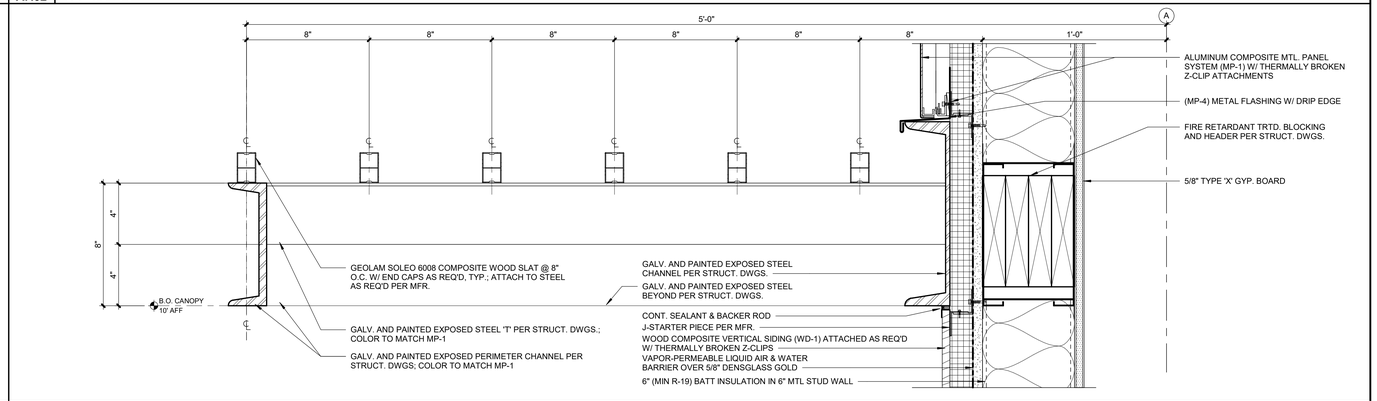
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2 SHADE DETAIL
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6 SHADE DETAIL
A7.02 SCALE : 3" = 1'-0"



1 SHADE DETAIL
A7.02 SCALE : 3" = 1'-0"

PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
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REVISIONS

No.	Date	Description

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STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5548
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
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ELECTRICAL	HENDERSON ENGINEERS
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SHEET TITLE

DETAILS

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HARDWARE SETS

SEE SPECIFICATIONS FOR DETAILED HARDWARE INFORMATION.

GENERAL NOTES:

1. ALL HARDWARE SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
2. ALL DOOR HARDWARE SHALL BE FINISH US26D OR EQUIVALENT.
3. ALL LATCHSETS AND LOCKSETS SHALL BE EQUIPPED WITH LEVER TYPE OPERATING TRIM W/ THE "CLUTCH" FEATURE.
4. ALL CLOSERS SHALL BE LOCATED ON ROOMS SIDES OF DOORS.
5. CONTRACTOR'S HARDWARE CONSULTANT SHALL BE RESPONSIBLE FOR DETERMINING APPROPRIATE HARDWARE FUNCTION AND OPTIONS.
6. CONTRACTOR SHALL COORDINATE FINAL KEYING WITH OWNER.

(LK) INTERIOR LOCKSETS

SET # LK.1 (INTERIOR SINGLE W/ LOCK)
- HINGES
- LOCKSET
- WALL STOP
- SILENCERS

SET # LK.2 (INTERIOR SINGLE W/ LOCK & CLOSER)
- HINGES
- LOCKSET
- CLOSER
- WALL STOP
- SILENCERS

(EL) EXTERIOR LOCKSETS

SET # EL.1 (EXTERIOR SINGLE W/ LOCK)
- HINGES
- LOCKSET
- CLOSER
- THRESHOLD
- WEATHERSTRIP
- BOTTOM SWEEP
- DRIP CAP
- LATCH GUARD
- STORM CHAIN

SET # EL.3 (EXTERIOR PAIR W/ LOCK, CLOSERS, & AUTO FLUSHBOLTS)
- HINGES
- LOCKSET
- FLUSHBOLTS
- ASTRAGAL
- CLOSERS
- COORDINATOR
- THRESHOLD
- WEATHERSTRIP
- BOTTOM SWEEP
- DRIP CAP
- LATCH GUARD
- STORM CHAIN

(AL) ALUMINUM DOORS

SET # AL.1 (EXTERIOR SINGLE ALUMINUM)
- HINGES (CONT. HEAVY DUTY)
- CLOSER
- PULL
- EXIT DEVISE
- THRESHOLD
- WEATHERSTRIP
- BOTTOM SWEEP
-

DOOR TYPES

ALL HOLLOW METAL DOORS TO BE FACTORY PRIMED. PAINT TO BE SPRAYED



MED. STILE CLEAR PREFINISHED ALUMINUM DOOR W/ 1" PREFINISHED TEMPERED CLEAR GLASS

(A1)



EXT. DOOR TO BE GRADE III EXTRA HEAVY DUTY, MODEL 4 INSUL., MIN. 16 GA. GALV. STL. (FINISH W/ 2 COATS SEMI-GLOSS ACRYLIC LATEX PAINT)

(H1)



PAIR: EXT. DOOR TO BE GRADE III EXTRA HEAVY DUTY, MODEL 4 INSUL., MIN. 16 GA. GALV. STL. (FINISH W/ 2 COATS SEMI-GLOSS ACRYLIC LATEX PAINT)

(H2)

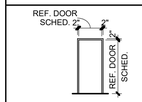


SOLID CORE FLUSH WOOD DOOR: EDPCUF CORE, MAPLE VENEER, PLAIN SLICED, CUSTOM STAINED TO MATCH ARCHITECT'S SAMPLE

(W1)

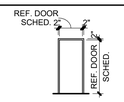
FRAME TYPES

ALL HOLLOW METAL FRAMES TO BE FACTORY PRIMED. PAINT TO BE SPRAYED



14 GA. GALV. WELDED HOLLOW METAL FRAMES, FINISH TO BE SPRAYED W/ 2 COATS SEMI-GLOSS ACRYLIC LATEX PAINT

(1)



16 GA. WELDED HOLLOW METAL FRAMES, FINISH TO BE SPRAYED W/ 2 COATS SEMI-GLOSS ACRYLIC LATEX PAINT

(2)

DOOR AND FRAME SCHEDULE

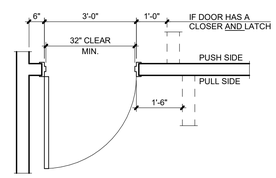
NO.	DOOR SIZE W.	DOOR SIZE H.	DOOR SIZE Th.	DOOR TYPE	DOOR MAT.	FRAME TYPE	FRAME MAT.	RATING	DETAILS JAMB	DETAILS HEAD	DETAILS SILL	HARDWARE	REMARKS
100.A	3' - 0"	8' - 0"	1 3/4"	A1	AL	-	AL	-	9 & 10/A8.02	11/A8.02	17/A8.02	AL.1	(1)
102.A	3' - 0"	8' - 0"	1 3/4"	H1	HM	1	HM	-	13,14,15/A8.02	16/A8.02	17/A8.02	EL.1	
103.A	3' - 0"	8' - 0"	1 3/4"	H1	HM	1	HM	-	13 & 14/A8.02	16/A8.02	17/A8.02	EL.1	
104.A	3' - 0"	7' - 0"	1 3/4"	W1	WD	2	HM	-	18/A8.02	19/A8.02	-	LK.2	
106.A	3' - 0"	7' - 0"	1 3/4"	W1	WD	2	HM	-	18/A8.02	19/A8.02	-	LK.1	
107.A	6' - 4"	8' - 0"	1 3/4"	H2	HM	1	HM	-	13,14,15/A8.02	16/A8.02	17/A8.02	EL.3	(1)
108.A	3' - 0"	7' - 0"	1 3/4"	W1	WD	2	HM	-	18/A8.02	19/A8.02	-	LK.2	

REMARKS

(1) ACCESS CONTROL DOORS WITH PANIC HARDWARE: PROVIDE APPROVED ENTRANCE AND EGRESS ACCESS CONTROL SYSTEM, LISTED IN ACCORDANCE WITH UL 294 AND INSTALLED IN COMPLIANCE WITH CRITERIA 1 THROUGH 8 IN SECTION 1010.1.9.7 OF IBC 2018; REF SECURITY DWGS. AND SPECS.

DOOR LOCATION PLAN

FOR ALL DOORS NOT LOCATED ON PLAN



MATERIAL LEGEND

GL	-	GLASS
HM	-	HOLLOW METAL
WD	-	WOOD
STL	-	STEEL
AL	-	ALUMINUM
MFR	-	PER MANUFACTURER
POLY	-	POLYETHYLENE
P	-	POLYCARBONATE

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LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

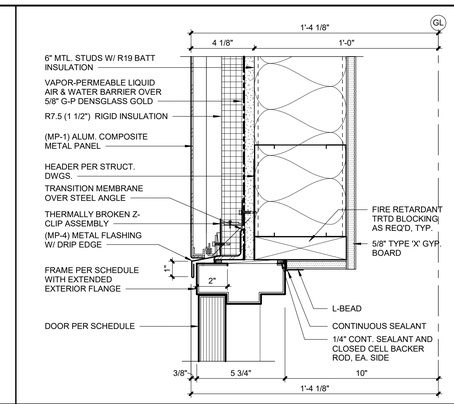
SHEET TITLE

DOOR SCHEDULE AND DETAILS

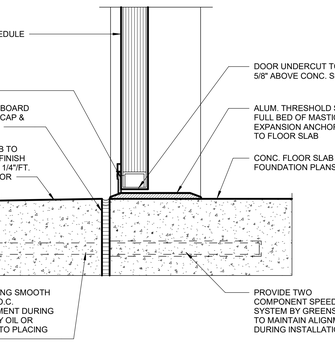
SHEET NUMBER

A8.01

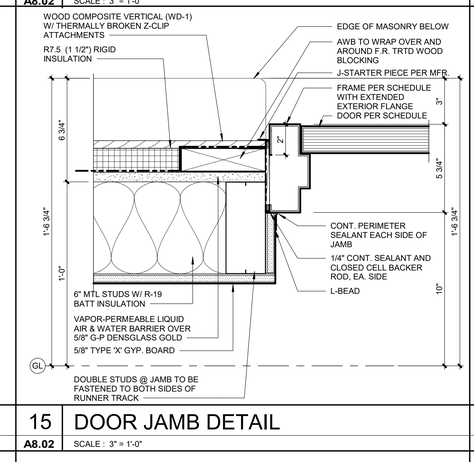
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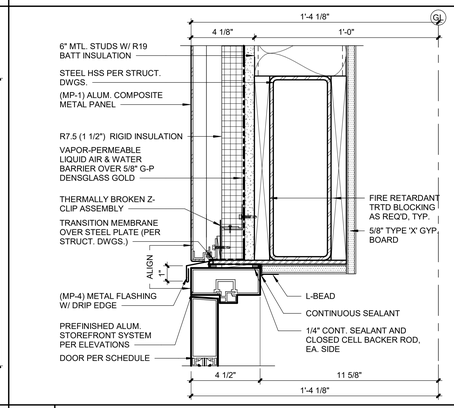
16 DOOR HEAD DETAIL
A8.02 SCALE : 3" = 1'-0"



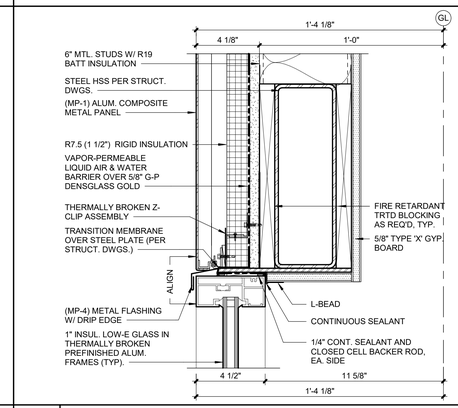
19 DOOR HEAD DETAIL
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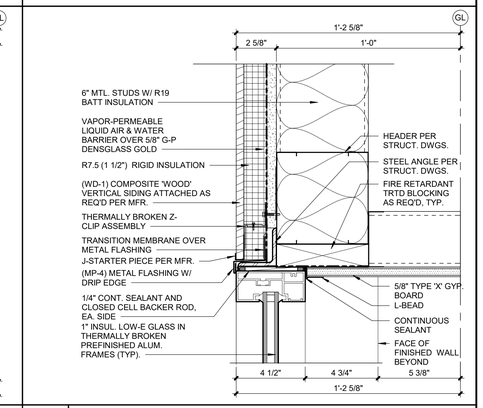
15 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"



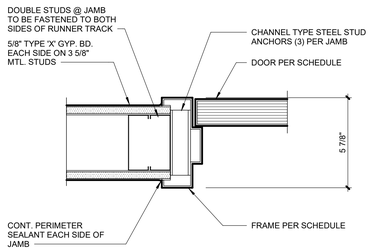
11 DOOR HEAD DETAIL
A8.02 SCALE : 3" = 1'-0"



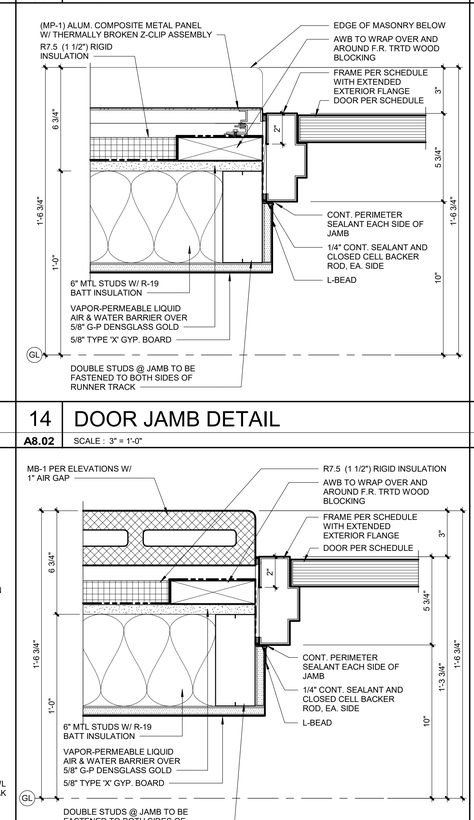
7 WINDOW HEAD DETAIL
A8.02 SCALE : 3" = 1'-0"



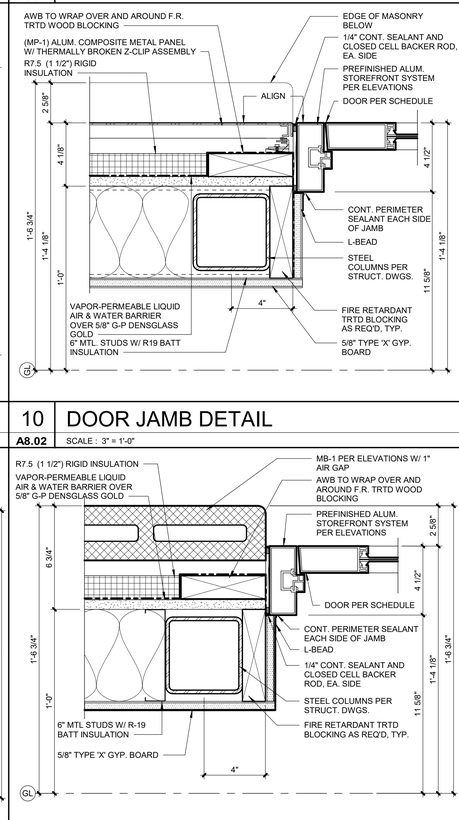
3 WINDOW HEAD DETAIL
A8.02 SCALE : 3" = 1'-0"



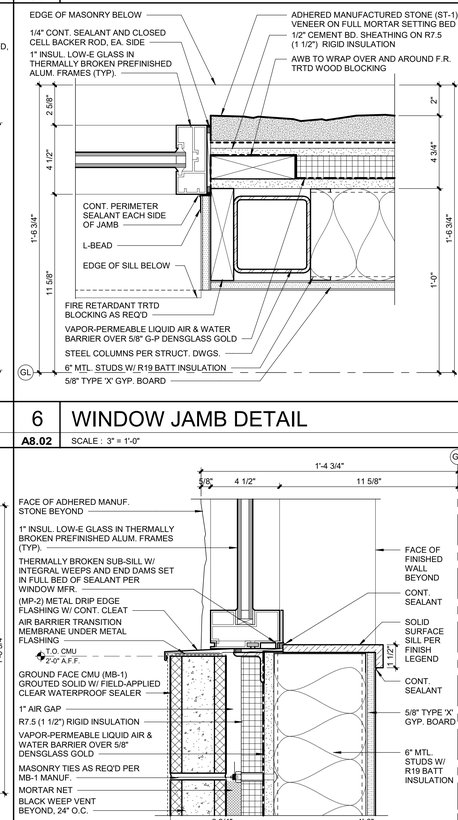
18 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"



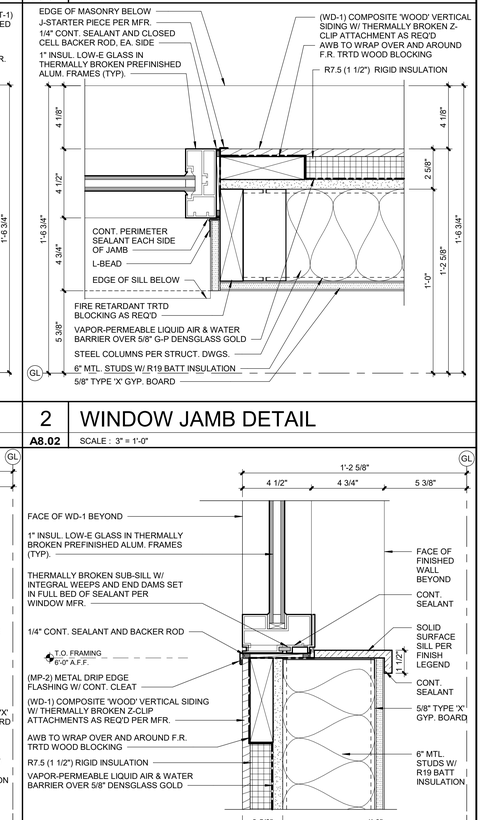
14 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"



10 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"



6 WINDOW JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"



2 WINDOW JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"

17 SILL DETAIL
A8.02 SCALE : 3" = 1'-0"

13 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"

9 DOOR JAMB DETAIL
A8.02 SCALE : 3" = 1'-0"

5 WINDOW SILL DETAIL
A8.02 SCALE : 3" = 1'-0"

1 WINDOW SILL DETAIL
A8.02 SCALE : 3" = 1'-0"

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SHEET TITLE

DOOR & WINDOW DETAILS

SHEET NUMBER

A8.02

ROOM FINISH LEGEND

FLOOR FINISHES

CONCRETE

- **SC-01**: SEALED CONCRETE W/ASHFORD FORMULA SEALER WITH METZGER/MCGUIRE RE 88 SEMI-RIGID POLYUREA OR EQUAL FLOOR JOINT FILLER.
- **PC-01**: POLISHED CONCRETE FLOOR GRINDED, HONED, AND POLISHED TO 'SURFACE CREAM FINISH.' METZGER/MCGUIRE RE 80 SEMI-RIGID POLYREA OR EQUAL FLOOR JOINT FILLER TO BE USED TO FILL ALL FLOOR JOINTS. REFERENCE PROJECT SPECIFICATIONS. INITIAL PASS TO BE DONE PRIOR TO WALL CONSTRUCTION & FLOOR TO BE ***PROTECTED WITH MASONITE FOR THE DURATION OF CONSTRUCTION.*** REFERENCE 03 3555 POLISHED FLOOR FINISH SPECIFICATION.

BASE FINISHES

REFERENCE ROOM FINISH DESIGNATIONS ON FLOOR PLAN & INTERIOR ELEVATIONS FOR BASE FINISH LOCATIONS & TRANSITIONS.

RB: .125" THERMOPLASTIC RUBBER RESILIENT WALL BASE

- **RB-01:** MFR: ROPPE, SIZE: 4" COVE, COLOR: 100 BLACK, NOTE: ROLL GOODS ONLY

WALL FINISHES

ALL GYPSUM BOARD WALLS PERPENDICULAR TO EXTERIOR WALL WITH WINDOWS TO RECEIVE PAINT ARE TO HAVE A LEVEL 5 DRYWALL FINISH.

PT: ACRYLIC LATEX COATING - 2 FINISH COATS OVER PRIMER

- **PT-01:** SHERWIN WILLIAMS, COLOR NAME, SW 7064 "PASSIVE", EGGSHELL FINISH

EP: POLYAMIDE EPOXY COATING - 2 FINISH COATS OVER PRIMER

- **EP-01:** SHERWIN WILLIAMS, COLOR NAME, SW 7064 "PASSIVE", SEMI-GLOSS EPOXY COATING

T: TILE W/ MANUFACTURER'S MINIMUM RECOMMENDED GROUT JOINTS

- **T-01:** MFR: CAESAR CERAMICS USA, PATTERN: LINK, COLOR: HOOK, SIZE: 12"x24", INSTALLATION: VERTICAL RUNNING BOND, GROUT: TEC ACCUCOLOR PLUS, LIGHT PEWTER 927

CEILING FINISHES

REFERENCE REFLECTED CEILING PLAN(S) FOR CEILING FINISH LOCATIONS & TRANSITIONS.

AC: ACOUSTICAL CEILING

- **AC-01:** MFR: ARMSTRONG, PATTERN: OPTIMA SQUARE LAY-IN #3150, SIZE: 24"x24"x3/4", INSTALLATION: PRELUDE XL 15/16" SUSPENSION SYSTEM IN BLIZZARD WHITE
-

EXP: EXPOSED CEILING (STRUCTURE AND MEP), PRIMED AND PAINTED

- **EXP-01:** LATEX DRY FALL FLAT FINISH PAINT, SHERWIN WILLIAMS SW 2849 "WESTCHESTER GRAY"

GB: GYPSUM WALLBOARD W/ FLAT FINISH ACRYLIC LATEX PAINT - 2 FINISH COATS OVER PRIMER

- **GB-01:** SHERWIN WILLIAMS SW 7006 "EXTRA WHITE"

CASEWORK FINISHES

REFERENCE ELEVATIONS AND CASEWORK DETAILS FOR FINISH LOCATIONS

PL: HIGH PRESSURE LAMINATE

- **PL-01:** MFR: WILSONART, PATTERN: 15603-31 SESAME VELVET ELM

SS: SOLID SURFACE

- **SS-01:** MFR: WILSONART, COLOR: 9222SS TITANIUM GREY, MATTE FINISH
- **SS-02:** MFR: FORMICA, COLOR: 748 WHITE RENEW, MATTE FINISH

MISCELLANEOUS FINISHES

CG: CORNER GUARD

- **CG-01:** MFR: KOROGARD, TYPE: GS SERIES STAINLESS STEEL CORNER GUARD # GS20, SIZE: 2" WING, FULL HEIGHT, FINISH: S6, NOTE: SURFACE MOUNTED

GENERAL FINISH NOTES

1. PAINT ALL HOLLOW METAL DOORS AND FRAMES W/ 2 COATS OF SEMI-GLOSS, ACRYLIC LATEX PAINT TO MATCH PT-01
2. SOLID SURFACE WINDOW SILLS TO BE SS-01
3. ROOM FINISH SCHEDULE IS FOR GENERAL COORDINATION OF FINISHES. REFERENCE ROOM FINISH PLANS, INTERIOR ELEVATIONS AND REFLECTED CEILING PLANS FOR COORDINATION OF ALL FINAL FINISHES.
4. ALL SOFFITS TO BE PAINTED SHERWIN WILLIAMS #SW7006 "EXTRA WHITE" UNLESS NOTED OTHERWISE
5. PAINT METAL WALL-MOUNTED ACCESS DOORS, GRILLES AND UNFINISHED COVER PLATES TO MATCH ADJACENT WALL SURFACE.

ROOM FINISH SCHEDULE

ROOM				WALLS					MILLWORK		
NO.	NAME	FLOOR	BASE	N	E	S	W	CEILING	TOP	BASE	REMARKS
100	OPEN OFFICE	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	EXP-01			9 OCC.
101	BREAK AREA	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	GB-01 / AC-01	SS-02	PL-01	ANCILLARY
102	WATER SERVICE	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	-			
103	ELECTRICAL	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	-			
104	RESTROOM	PC-01	-	TL-01 / EP-01	TL-01 / EP-01	TL-01 / EP-01	TL-01 / EP-01	GB-01			ANCILLARY
105	HALL	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	GB-01			
106	JANITOR	PC-01	RB-01	EP-01	EP-01	EP-01	EP-01	-			ANCILLARY
107	STORAGE	PC-01	RB-01	EP-01	EP-01	EP-01	EP-01	-			2 OCC.
108	SERVER ROOM	PC-01	RB-01	PT-01	PT-01	PT-01	PT-01	EXP-01			ANCILLARY

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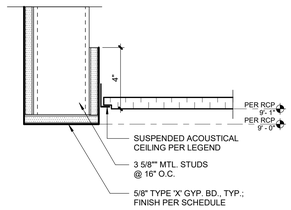
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FINISH SCHEDULE AND DETAILS

SHEET NUMBER

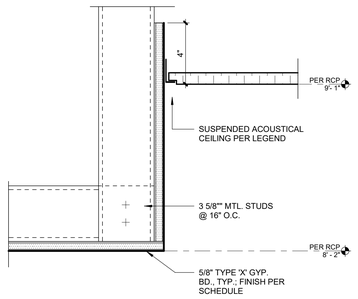
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3 CEILING TRANSITION DETAIL

A9.01 SCALE : 3" = 1'-0"



2 CEILING TRANSITION DETAIL

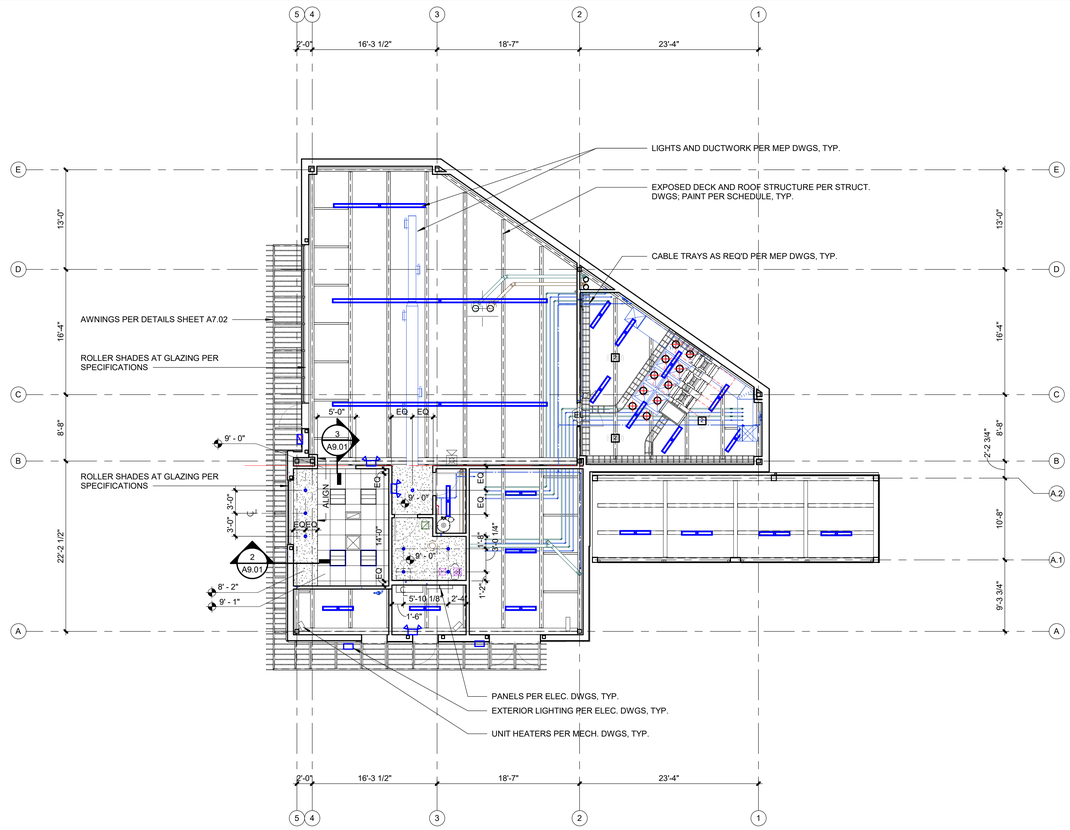
A9.01 SCALE : 3" = 1'-0"

REFLECTED CEILING PLAN GENERAL NOTES

1. SUSPENDED ACOUSTICAL TILE NOTE: NO CEILING EDGE TILE IS TO BE UNDER 6" WIDE. USE MATCHING STYLE 2'X4' CEILING TILE CUT TO THE PERIMETER SIZE AS NEEDED.
2. NO BUILDING ELEMENTS SHALL BE CONNECTED TO OR SUSPENDED FROM DUCTWORK. ALL MATERIALS SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE.
3. FIRE SPRINKLER NOTE: PROVIDE VICTAULIC FLEXIBLE HOSE ASSEMBLIES FOR ALL SUSPENDED ACOUSTICAL TILE CEILINGS. CENTER WHITE SPRINKLERS AND HEADS IN THE 2'x2' CEILING TILE.

REFLECTED CEILING PLAN LEGEND

- FLAT FINISH ACRYLIC LATEX PAINT ON GYPSUM WALLBOARD, 2 FINISH COATS OVER PRIMER.
- 2'x2' SUSPENDED ACOUSTICAL CEILING. REFERENCE FINISH SCHEDULE FOR TYPE.
- 2'x4' SUSPENDED ACOUSTICAL CEILING. REFERENCE FINISH SCHEDULE FOR TYPE.
- 2'x4' DIRECT INDIRECT LIGHT TROFFER PER ELECTRICAL DRAWINGS
- 2'x2' DIRECT INDIRECT LIGHT TROFFER PER ELECTRICAL DRAWINGS
- LINEAR DIRECT LED PER ELECTRICAL DRAWINGS
- 4' STRIP FIXTURE WITH STEEL HOUSING PER ELECTRICAL DRAWINGS
- LED CAN LIGHT FIXTURE PER ELECTRICAL DRAWINGS
- LINEAR PENDANT LIGHT FIXTURE PER ELECTRICAL DRAWINGS
- PENDANT LIGHT FIXTURE PER ELECTRICAL DRAWINGS
- SUPPLY AIR DIFFUSER PER MECHANICAL DRAWINGS
- RETURN AIR DIFFUSER PER MECHANICAL DRAWINGS
- LINEAR SLOT DIFFUSER PER MECHANICAL



1 REFLECTED CEILING PLAN

A9.01 1/8" = 1'-0"

PLAN TRUE

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DIVISION 1 - GENERAL REQUIREMENTS

1. ALTERNATES
   A. IF ANY ALTERNATES ARE INDICATED IN THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL FURNISH A SEPARATE PRICE FOR ALL MATERIAL, TAXES, FREIGHT, MARKUP, DELIVERY, LABOR, OVERHEAD AND PROFIT FOR THAT PORTION OF THE WORK. THE PROPOSED ALTERNATE MAY THEN BE ADDED OR DEDUCTED FROM THE CONTRACT SUM IF THE OWNER ACCEPTS THE ALTERNATE.

2. UNIT PRICES
   A. IF ANY UNIT PRICES ARE REQUESTED IN THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL FURNISH A PRICE INCLUDING ALL NECESSARY MATERIAL, TAXES, FREIGHT, MARKUP, DELIVERY, LABOR, OVERHEAD, AND PROFIT PER UNIT OF MEASUREMENT FOR WORK THAT MAY BE ADDED OR DEDUCTED FROM THE CONTRACT SUM IF ESTIMATED QUANTITIES OF WORK REQUIRED BY THE CONSTRUCTION DOCUMENTS ARE INCREASED OR DECREASED.

3. CHANGE ORDERS
   A. WHEN CHANGES TO THE CONTRACT SUM OR SCHEDULE ARE NECESSARY, CONTRACTOR SHALL SUBMIT AN ELECTRONIC COPY OF THE PROPOSED CHANGE ORDER AND SUPPORTING DOCUMENTATION TO THE ARCHITECT FOR REVIEW. BEFORE PROCEEDING WITH WORK RELATED TO CHANGE ORDERS, CONTRACTOR SHALL OBTAIN OWNER'S WRITTEN APPROVAL.

4. PAYMENT APPLICATIONS
   A. PRIOR TO SUBMITTAL OF EACH FORMAL MONTHLY PAYMENT APPLICATION, THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT AN ELECTRONIC DRAFT OF THE PROPOSED PAYMENT APPLICATION WITH A SCHEDULE OF VALUES INDICATING THE ESTIMATED PERCENT COMPLETE IN EACH CATEGORY.
   B. FOLLOWING REVIEW AND ADJUSTMENT (IF ANY) OF THE DRAFT, CONTRACTOR SHALL SUBMIT AN ELECTRONIC COPY OF THE PROPERLY EXECUTED PAYMENT APPLICATION, SCHEDULE OF VALUES, AND LIEN WAIVERS FOR ARCHITECT'S REVIEW.

5. SUBMITTALS
   A. CONTRACTOR SHALL PREPARE AND SUBMIT SUBMITTALS REQUIRED BY INDIVIDUAL SPEC SECTIONS ELECTRONICALLY, EMAILED OR ONLINE PROJECT MANAGEMENT SOFTWARE, FOR ARCHITECT'S REVIEW. PHYSICAL SAMPLES SHOULD BE DELIVERED TO THE ARCHITECT'S OFFICE.
   B. PROCESSING TIME:
      1. INITIAL REVIEW: MIN. 10 DAYS
      2. RESUBMITTAL REVIEW (AS REQUIRED): MIN. 5 DAYS
   C. CERTIFICATES AND CERTIFICATIONS SUBMITTALS: INCLUDES SIGNATURE OF ENTITY RESPONSIBLE FOR PREPARING CERTIFICATION [PROVIDE DIGITAL SIGNATURE ON ELECTRONICALLY SUBMITTED CERTIFICATES AND CERTIFICATIONS WHERE INDICATED]
   D. DELEGATED-DESIGN SERVICES CERTIFICATION: IN ADDITION TO OTHER REQUIRED SUBMITTALS, SUBMIT DIGITALLY SIGNED PDF ELECTRONIC FILE, SIGNED AND SEALED BY THE RESPONSIBLE DESIGN PROFESSIONAL.
   E. BIM INCORPORATION [BY CONTRACTOR] IF REQUIRED BY OWNER.
   F. CONTRACTOR'S SUBMITTAL REVIEW: CONTRACTOR SHALL REVIEW EACH SUBMITTAL AND CHECK FOR COORDINATION WITH OTHER WORK OF THE CONTRACT AND FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS. MARK WITH APPROVAL STAMP BEFORE SUBMITTING TO ARCHITECT.
      1. ARCHITECT WILL NOT REVIEW SUBMITTALS THAT DO NOT HAVE CONTRACTOR'S REVIEW AND APPROVAL.

1.8 CONSTRUCTION PERIOD TESTING
   A. THE OWNER SHALL ENGAGE AN INDEPENDENT TESTING AGENCY TO PERFORM CODE-REQUIRED "SPECIAL INSPECTIONS" AND QUALITY CONTROL TESTING. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING TIMES FOR TESTS, INSPECTIONS, AND OBTAINING SAMPLES AND NOTIFYING TESTING AGENCY.

1.9 REFERENCE STANDARDS
   A. CONSTRUCTION AND MATERIALS SHALL COMPLY WITH THE MOST RECENT STANDARDS IN EFFECT AS OF THE DATE OF THE CONSTRUCTION DOCUMENTS, UNLESS INDICATED OTHERWISE.

1.10 CLOSEOUT PROCEDURES
   A. PUNCHLIST - PRIOR TO SCHEDULING A SUBSTANTIAL COMPLETION WALK-THROUGH TO DEVELOP A PUNCHLIST OF ITEMS REQUIRING COMPLETION, PROJECT SHALL BE FINAL CLEANED, TOUCH-UP PAINTED, AND DAMAGED CEILING TILE REPLACED. UPON ARRIVAL, IF THE ARCHITECT DETERMINES THE PROJECT IS NOT READY FOR WALK-THROUGH, THE PUNCHLIST SHALL BE RESCHEDULED.
      1. WHEN THE CONTRACTOR CONSIDERS THE PUNCHLIST ITEMS FULLY COMPLETED, A FINAL WALK-THROUGH SHALL BE SCHEDULED TO REVIEW THE COMPLETED CONSTRUCTION.
   B. PRIOR TO PROJECT COMPLETION, CONTRACTOR SHALL SUBMIT/COMPLETE THE FOLLOWING:
      1. ONE (1) SET OF CONSTRUCTION DRAWINGS NEATLY MARKED UP TO SHOW ACTUAL INSTALLATION WHERE INSTALLATION VARIES FROM THAT SHOWN ON ORIGINALLY ON THE CONSTRUCTION DOCUMENTS.
      2. TWO (2) COPIES OF OPERATION AND MAINTENANCE MANUALS INCLUDING SUBCONTRACTOR AND SUPPLIER CONTACT INFORMATION, MAINTENANCE AND SERVICE INSTRUCTIONS, SCHEDULES, EMERGENCY INSTRUCTIONS, SPARE PARTS LISTS, WIRING DIAGRAMS, AND WARRANTY INFORMATION.
      3. TRAINING OF OWNER PERSONNEL ON USE AND MAINTENANCE OF MECHANICAL, ELECTRICAL, PLUMBING, FIRE SPRINKLER, ALARM, SECURITY, IRRIGATION, AND OTHER BUILDING SYSTEMS.

DIVISION 2 - SITE WORK

SEE CIVIL AND LANDSCAPE PLANS AND SPECIFICATIONS

DIVISION 3 - CONCRETE

SEE STRUCTURAL PLANS AND SPECIFICATIONS

DIVISION 4 - MASONRY

047200 CAST STONE

A. SUBMITTALS: PRODUCT DATA, SAMPLES, AND SHOP DRAWINGS INDICATING DIMENSIONS, JOINT LOCATIONS, RUSTICATION, EDGE CONDITIONS, EMBED LOCATIONS, AND ANCHORAGE DETAILS.

B. FABRICATOR: A PRODUCING MEMBER OF THE CAST STONE INSTITUTE.

C. CAST STONE UNITS: UNITS SHALL COMPLY WITH ASTM C1364, SHALL RESIST FREEZE-THAW, SLOPE HORIZONTAL SURFACES 1:12 MINIMUM AND SHALL HAVE DRIPS ON PROJECTING ELEMENTS UNLESS NOTED OTHERWISE.

D. COLOR AND TEXTURE: TO BE SELECTED

E. ANCHORS AND DOWELS: TYPE 304 STAINLESS STEEL.

F. MORTAR: TYPE N

G. INSTALLATION: UNITS SHALL BE FULLY CURED PRIOR TO INSTALLATION. INSTALL CAST STONE UNITS SET IN FULL BED OF MORTAR WITH FULL HEAD JOINTS. RAKE OUT ALL JOINTS TO MINIMUM 3/4" AND INSTALL SEALANT TO MATCH CAST STONE (COLOR TO BE SELECTED FROM MANUFACTURER'S FULL RANGE OF AVAIABLE COLORS AND SHALL BE VERIFIED FROM A 12" LONG FIELD APPLIED SAMPLE PRIOR TO COMPLETE INSTALLATION).

H. CLEANING AND PATCHING: EXPOSED FACES OF CAST STONE UNITS SHALL BE PROTECTED FROM MORTAR AND STAINING DURING CONSTRUCTION. AFTER MORTAR IS THOROUGHLY SET AND CURED, CAST STONE SHALL BE CLEANED WITH A PRODUCT EXPRESSLY APPROVED FOR USE BY CLEANER MANUFACTURER AND CAST STONE MANUFACTURER. EXCESSIVE STAINING AND AN UNEVEN APPEARANCE SHALL BE CAUSE FOR REJECTION. MINOR PATCHING SHALL BE ALLOWED PROVIDED PATCH CAN BE BLENDED TO MATCH UNITS. UNITS WITH SIGNIFICANT CHIPS OR BREAKAGE SHALL BE REFABRICATED.

042000 UNIT MASONRY ASSEMBLIES

A. SUBMITTALS: PRODUCT DATA FOR MASONRY UNITS AND ACCESSORIES INCLUDING THREE (3) SAMPLES OF EACH BRICK OR CMU UNIT TO ILLUSTRATE COLOR AND TEXTURE RANGE.

B. MASONRY UNITS: COMPLY WITH ACI 530.1/ASCE 6/TMS 602
   1. CONCRETE MASONRY UNITS: ASTM C90, NORMAL WEIGHT WITH SPECIAL SHAPES FOR LINTELS, CORNERS, JAMBS, SASH, CONTROL JOINTS, AND OTHER SPECIAL CONDITIONS. BULLNOSE UNITS FOR OUTSIDE CORNERS, DOOR AND WINDOW JAMBS, AND SILLS, UNLESS OTHERWISE INDICATED.
   2. DECORATIVE CONCRETE MASONRY UNITS: ASTM C90 NORMAL WEIGHT WITH INTEGRAL WATER REPELLANT AND SPECIAL SHAPES FOR LINTELS, CORNERS, JAMBS, SASH, CONTROL JOINTS, AND OTHER SPECIAL CONDITIONS. BULLNOSE UNITS FOR OUTSIDE CORNERS, DOOR AND WINDOW JAMBS, AND SILLS, UNLESS OTHERWISE INDICATED.
   3. CONCRETE LINTELS: PRECAST UNITS MATCHING CMU WITH REINFORCING AS INDICATED OR AS REQUIRED TO SUPPORT LOADING.
   4. FACE BRICK: ASTM C 216, GRADE SW, TYPE FBS, SIZE AND COLOR PER CONSTRUCTION DOCUMENTS.

C. MORTAR AND GROUT:
   1. MORTAR: ASTM C 270 PROPORTION SPECIFICATION, TYPE S ABOVE GRADE, TYPE M BELOW GRADE.
   2. GROUT: ASTM C 476 WITH A SLUMP OF 8-11 INCHES, 28-DAY COMPRESSIVE STRENGTH OF 2,000 PSI MINIMUM.
   3. CUSTOM GROUT COLOR TO MATCH MAIN BODY COLOR OF MB-1

D. REINFORCEMENT: SEE STRUCTURAL CONSTRUCTION DOCUMENTS FOR SPECIFICATIONS ON REINFORCEMENT.

E. TIES AND ANCHORS: HOT-DIP GALVANIZED STEEL. TWO-PIECE, ADJUSTABLE MASONRY VENEER ANCHORS THAT ALLOW VERTICAL OR HORIZONTAL ADJUSTMENT BUT RESIST TENSION AND COMPRESSION FORCES PERPENDICULAR TO THE PLANE OF THE WALL DESIGNED FOR ATTACHMENT OVER SHEATHING TO STUDS AND ACCEPTABLE TO AUTHORITY HAVING JURISDICTION.

F. FLASHING: [45 MIL EPDM], [STAINLESS STEEL 0.0156 INCH THICK]

G. ACCESSORIES:
   1. COMPRESSIBLE FILLER: PREMOLDED STRIPS ASTM 1056 GRADE 2A1
   2. PREFORMED CONTROL JOINTS: SBR OR PVC DESIGNED TO FIT STANDARD SASH BLOCK.
   3. WEEP HOLES: 1/4"-3/8"x24" COTTON OR POLYPROPYLENE ROPE.
   4. CAVITY INSULATION: POLYISOCYANURATE BOARD ASTM C 1289, TYPE 1, CLASS 2, ALUMINUM FOIL FACED
   5. MORTAR NET: INSTALL SAWTOOTH MESH MORTAR NET IN ALL MASONRY DRAINAGE CAVITIES.
   6. FIELD-APPLIED CLEAR WATERPROOF SEALER

(UNIT MASONRY CONT.)

H. INSTALLATION:
   1. MIX MASONRY UNITS FROM DIFFERENT PALLETS FOR UNIFORM BLEND OF COLOR AND TEXTURE. INSTALL MASONRY UNITS W/ UNIFORM BED AND HEAD JOINTS IN FULL BED OF MORTAR WITH FULL HEAD JOINTS IN RUNNING BOND (UNLESS NOTED OTHERWISE) KEEPING CAVITIES CLEAN OF MORTAR AND DEBRIS. TOOL MORTAR JOINTS SLIGHTLY CONCAVE.
   2. FLASHING: INSTALL THROUGH-WALL FLASHING AND WEEP HOLES AT 24" O.C. AT ALL SHELF ANGLES, LINTELS, LEDGES, AND OTHER OBSTRUCTIONS TO THE DOWNWARD FLOW OF WATER. FLASHING SHALL BE PLACED ON A SLOPING BED OF MORTAR AND SHALL EXTEND 1/4" BEYOND FACE OF MASONRY AND BE TRIMMED STRAIGHT AND TRUE. JOINTS IN FLASHING SHALL BE SEALED AND 2" HIGH DAMS SHALL BE FORMED AT END OF FLASHING. WICKS SHALL BE TRIMMED FLUSH WITH FACE OF MASONRY.
   3. LINTELS: INSTALL LINTELS ABOVE ALL OPENINGS AND WHERE INDICATED WITH MINIMUM 8" BEARING AT EACH JAMB AND FILL CORES IN MASONRY UNDER EACH LINTEL BEARING FULL HEIGHT OF JAMB.

I. CLEANING: CLEAN MASONRY AS THE WORK PROGRESSES AND WHEN MORTAR IS THOROUGHLY SET AND CURED, CLEAN WITH A PROPRIETARY CLEANER APPROVED BY BRICK MANUFACTURER TO REMOVE EXCESS MORTAR

044313.16 ADHERED STONE MASONRY VENEER

A. SUBMITTALS:
   1. PRODUCT DATA FOR CULTURED STONE PRODUCTS AND ACCESSORIES
   2. THREE (3) SAMPLES OF EACH STONE TO ILLUSTRATE COLOR AND TEXTURE RANGE
   3. SHOP DRAWINGS DEPICTING PROPER INSTALLATION AND FLASHING

B. WARRANTY:
   1. PROVIDE MANUFACTURERS 50-YEAR LIMITED WARRANTY

C. MANUFACTURED STONE VENEER:
   BASIS OF DESIGN: CULTURED STONE BY BORAL, REFER TO ELEVATIONS FOR COLOR, FINISH, AND LOCATIONS
   1. PERFORMANCE CRITERIA: CONFORMING WITH ASTM C1670:
      a. COMPRESSIVE STRENGTH: >1800 PSI FOR 5 SPECIMANS AND >2100 PSI FOR INDIVIDUAL SPECIMAN (ASTM C 39 AND ASTM C 192)
      b. BOND BETWEEN MANUFACTURED MASONRY UNIT, MORTAR AND BACKING: NOT LESS THAN 50 PSI (ASTM C177)
      c. THERMAL RESISTANCE: R-VALUE NOT LESS THAN 0.355 PER INCH (ASTM C 177)
      d. FREEZE/THAW: NO DISINTEGRATION AND < 3% WEIGHT LOSS (ASTM C 67)
      e. WATER ABSORPTION: TESTED IN ACCORDANCE WITH UBC 15-5 9-22%
      f. UNIT WEIGHT: <15 PSF SATURATED
      g. FLAMESPREAD: 25
      h. SMOKE DEVELOPMENT: 450
      i. UV STABLE - MINERAL OXIDE PIGMENTS
   2. CERTIFICATIONS:
      a. ICC ES AC 51 ACCEPTANCE CRITERIA FOR MANUFACTURED STONE VENEER
   3. ACCESSORIES:
      a. INCLUDE MATCHING CORNER PIECES
      b. EXPANDED METAL LATH: 3.4 LB/SQ YARD, SELF-FURRING, DIAMOND-MESH LATH COMPLYING WITH ASTM C 847, FABRICATE FROM STRUCTURAL QUALITY, ZINC-COATED (GALVANIZED) STEEL SHEET COMPLYING WITH ASTM A 653/A 653M, G60.
      c. MESH WEEP HOLES: FREE DRAINING MESH MADE FROM NONCORRODING STRANDS FULL WIDTH OF HEAD JOINT AND 3 INCHES HIGH BY THICKNESS OF STONE MASONRY, IN COLOR SELECTED FROM MFR FULL RANGE.
      d. WEEP SCREED: PVC MATERIAL MEETING ASTM D 1784 FOR PVC COMPOUNDS, COLOR SELECTED FROM MFR FULL RANGE.

D. MORTAR AND GROUT:
   1. GENERAL: DO NOT USE ADMIXTURES UNLESS OTHERWISE INDICATED.
      a. DO NOT USE CALCIUM CHLORIDE
      b. USE PORTLAND CEMENT-LIME MORTAR UNLESS OTHERWISE INDICATED.
   2. POLIMER/LATEX MODIFIED PORTLAND CEMENT SETTING MORTAR COMPLYING WITH ANSI 118.4, 118.11 OR 118.15 UNLESS OTHERWISE RECOMMENDED BY MFR.
   3. NO-GROUT, DRY-STACK LOOK PER MFR.

E. EMBEDDED FLASHING MATERIALS
   1. METAL FLASHING: PROVIDE STAINLESS STEEL, TYPE 304, .4MM THICK METAL FLASHING WHERE FLASHING IS EXPOSED. FABRICATE METAL DRIP EDGES FROM STAINLESS STEEL, EXTEND AT LEAST 3" INTO WALL AND 1/2" OUT FROM WALL WITH OUTER EDGE BENT DOWN 30 DEGREES AND HEMMED.
   2. FLEXIBLE FLASHING: FOR FLASHING UNEXPOSED TO EXTERIOR USE RUBBERIZED ASPHALT FLASHING NOT LESS THAN .030 INCHES THICK.

F. INSTALLATION:
   1. INSTALL PRODUCT IN ACCORDANCE WITH MVMA INSTALLATION GUIDE FOR ADHERED MANUFACTURED STONE VENEER, ASTM C 1780 AND IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   2. INSTALL/APPLY RELATED MATERIALS IN ACCORDANCE WITH TYPE OF SUBSTRATE AND MANUFACTURED STONE VENEER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   3. INSTALL EMBEDDED FLASHING AND WEEP HOLES AT SHELF ANGLES, LINTELS, LEDGES, OTHER OBSTRUCTIONS TO DOWNWARD FLOW OF WATER IN WALL AND WHERE INDICATED.
      A. AT STUD FRAMED WALLS, EXTEND FLASHING THROUGH STONE MASONRY, UP SHEATHING FACE AT LEAST 12 INCHES AND BEHIND WEATHER BARRIER.
      B.
   4. INSTALLATION OF ADHERED STONE MASONRY VENEER
      A. INSTALL NECESSARY WEEP SCREED AT BASE OF WALL AND OVER OPENINGS
      B. INSTALL LATH OVER BUILDING INSULATION AND SCRATCH COAT IN ACCORDANCE WITH TECHNICAL EVALUATION REPORT TER 1312-01 'BORAL STONE - ADHERED MASONRY VENEER APPLICATION OVER CONIUOUS INSULATION'
      C. INSTALL SCRATCH COAT OVER METAL LATH 1/2"-3/4" THICK TO FULLY ENGAGE LATH, COMPLY WITH ASTM C926
      D. COAT 100% OF THE BACKS OF STONE UNITS AND FACE OF SCRATCH COAT WITH CEMENT-PASTE BOND COAT, THEN BUTTER BOTH SURFACES WITH SETTING MORTAR. USE SUFFICIENT SETTING MORTAR, SO A SLIGHT EXCESS WILL BE FORCED OUT THE EDGES OF STONE UNITS AS THEY ARE SET. TAP UNITS INTO PLACE, COMPLETELY FILLING SPACE BETWEEN UNITS AND SCRATCH COAT.
   5. PROVIDE (2) LAYERS OF INSTALLATION OF ADHERED STONE MASONRY VENEER

A. CLEANING: CLEAN CULTURED STONE VENEER AS THE WORK PROGRESSES AND WHEN MORTAR IS THOROUGHLY SET AND CURED, CLEAN WITH A PROPRIETARY CLEANER APPROVED BY MANUFACTURER TO REMOVE EXCESS MORTAR

- END DIVISION 4 -

DIVISION 5 - METALS

051200 STRUCTURAL STEEL

A. SEE STRUCTURAL CONSTRUCTION DOCUMENTS FOR STRUCTURAL STEEL SPECIFICATIONS.
B. FINISH:
   1. EXTERIOR FABRICATIONS: ALL STRUCTURAL STEEL EXPOSED TO THE EXTERIOR INCLUDING MASONRY LINTELS SHALL BE GALVANIZED AND FACTORY PRIMED READY FOR FINISH PAINTING, UNLESS NOTED OTHERWISE.
   2. INTERIOR FABRICATIONS: FACTORY PRIMED, UNLESS NOTED OTHERWISE.

055113 METAL STAIRS AND RAILINGS

A. SUBMITTALS:
   1. SHOP DRAWINGS AND CALCULATIONS INDICATING MEMBER SIZES AND LAYOUT, VERTICAL AND HORIZONTAL DIMENSIONS, EDGE CONDITIONS, AND CONNECTION DETAILS SIGNED AND SEALED BY A QUALIFIED STRUCTURAL ENGINEER.

B. DESIGN:
   1. METAL STAIRS AND RAILINGS SHALL BE DESIGNED BY FABRICATOR TO SUPPORT CODE-REQUIRED LOADING AND TO MATCH THE CONFIGURATIONS INDICATED IN THE CONSTRUCTION DOCUMENTS.

C. FABRICATIONS:
   1. FABRICATE ITEMS IN LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE WITH JOINTS TIGHTLY FITTED AND SECURED WITH EXPOSED JOINTS WELDED AND GROUND FLUSH AND SMOOTH.

D. ACCESSORIES:
   1. WALL-MOUNT HANDRAIL BRACKETS: SINGLE HOLE FORMED HANDRAIL BRACKET W/ WALL FILLER AND SNAP-ON COVER (WAGNER 1929, OR SIMILAR)

E. FINISH:
   1. EXTERIOR FABRICATIONS: GALVANIZED AND PRIME PAINTED READY FOR FINISH PAINTING, UNLESS NOTED OTHERWISE.
   2. INTERIOR FABRICATIONS: PRIME PAINTED READY FOR FINISH PAINTING

F. INSTALLATION:
   1. SUPPLY COMPONENTS REQUIRED FOR ANCHORAGE FABRICATED FROM SAME MATERIAL AND FINISH AS FABRICATION UNLESS NOTED OTHERWISE. SHIM AND LEVEL FABRICATIONS AS NECESSARY.
   2. COAT CONCEALED SURFACES OF ALUMINUM FABRICATIONS IN CONTACT WITH CONCRETE, GROUT, MASONRY, WOOD, OR DISSIMILAR METALS WITH BITUMINOUS PAINT.

057313 GLAZED DECORATIVE METAL RAILINGS

A. SUBMITTALS:
   1. PRODUCT DATA
   2. SAMPLES
   3. SHOP DRAWINGS INCLUDING PLANS, SECTIONS, AND DETAILS AT JOINTS AND PERIMETER CONDITIONS, ATTACHMENT, AND INTERFACE WITH WORK BY OTHERS.
   4. STRUCTURAL CALCULATIONS
   5. MANUFACTURER'S STANDARD WARRANTY

B. DELEGATED DESIGN: FOR PRODUCTS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, SEALED DRAWINGS BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF KANSAS.

C. PRODUCTS:
   1. BASIS OF DESIGN: STRUCT-U-RAIL AS MANUFACTURED BY LIVERS BRONZE CO. OR APPROVED EQUAL
   2. MATERIALS:
      A. ALUMINUM: CONFORMING TO ASTM B 2212 ALLOW 6063-T52
      B. STAINLESS STEEL: CONFORMING TO ASTM A666, TYPE 304
   3. COMPONENTS:
      A. GLAZING: FULLY TEMPERED ASTM C 1048 KIND FT, QUALITY Q3, MONOLITHIC TEMPERED THICKNESS 1/2"-3/4" MIN. REQUIRED TO MEET ALL STRUCTURAL REQUIREMENTS. COLOR: CLEAR, POLISHED EDGE
      B. GLASS SUPPORT BASES: STANDARD EXTRUDED ALUMINUM BASE FOR 1/2" GLASS - MODEL 810A, 3/4" GLASS - MODEL 813. TOP MOUNT OR SIDE MOUNT BASE TO 1/2" EMBEDDED STEEL PLATE (BY STEEL FABRICATOR) OR STEEL STRINGER. ALUMINUM BASE IS MOUNTED CONTINUOUS AND IS ANCHORED AT 27" O.C. FOR STEEL AND 9" O.C. FOR CONCRETE.
      C. GLASS INFILL SHALL BE 1/2" TEMPERED OR LAMINATED GLASS, CONFORM TO SAFETY REQUIREMENTS OF ANSI Z97.1. GLASS IS GROUTED INTO ALUMINUM BASE.
      D. FITTINGS: SHALL BE STAINLESS STEEL
      E. HANDRAIL BRACKETS TO BE STAINLESS STELL.

D. FABRICATION: ALL METAL FABRICATION TO BE PERFORMED BY A SIGNLE SOURCE FABRICATOR.

- END DIVISION 5 -

DIVISION 6 - WOOD AND PLASTICS

061000 ROUGH CARPENTRY

SEE STRUCTURAL CONSTRUCTION DOCUMENTS FOR SPECIFICATIONS RELATED TO STRUCTURAL LUMBER, ENGINEERED WOOD PRODUCTS, PANEL PRODUCTS, FASTENERS, AND ACCESSORIES

A. SUBMITTALS:
   1. PRODUCT DATA FOR TREATED WOOD, ENGINEERED WOOD PRODUCTS, FOAM PLASTIC SHEATHING, AND BUILDING WRAP.

B. LUMBER: PROVIDE S4S, 19 PERCENT MAXIMUM MOISTURE CONTENT FOR 2-INCH NOMINAL THICKNESS OR LESS, MARKED WITH GRADE STAMP OF INSPECTION AGENCY OF THE FOLLOWING GRADE:
   1. INTERIOR PARTITION FRAMING: STANDARD, STUD, OR NO. 3 GRADE
   2. EXPOSED FRAMING: NO. 1 OR NO. 2.
   3. MISCELLANEOUS LUMBER FOR NAILERS, BLOCKING, AND SIMILAR CONSTRUCTION: STUD, OR NO. 3 GRADE

C. PANEL PRODUCTS: DOC PS 2. PROVIDE PLYWOOD COMPLYING WITH DOC PS 1 WHERE PLYWOOD IS INDICATED AND AS FOLLOWS:
   1. WALL SHEATHING:
      a. PLYWOOD: EXTERIOR OR EXPOSURE 1, STRUCTURAL I, FIRE RETARDANT-TREATED
      b. ORIENTED STRAND BOARD: EXPOSURE 1, STRUCTURAL I
      c. GLASS-MAT GYPSUM: ASTM C 1177/C 1177M
      d. EXTRUDED POLYSTYRENE FOAM: ASTM C 578, TYPE IV WITH T&G OR SHIPLAP LONG EDGES
      e. POLYISOCYANURATE FOAM: ASTM C 1289, TYPE I, CLASS 2, WITH ALUMINUM FOIL FACINGS. FOAM PLASTIC CORE AND FACINGS SHALL HAVE A FLAME SPREAD OF 25 OR LESS WHEN TESTED INDIVIDUALLY.
   2. ROOF SHEATHING, WHERE INDICATED ON DRAWINGS:
      a. PLYWOOD: EXTERIOR OR EXPOSURE 1, STRUCTURAL I
      b. ORIENTED STRAND BOARD: EXPOSURE 1, STRUCTURAL I
   3. PLYWOOD SUBFLOORING: EXTERIOR OR EXPOSURE 1, STRUCTURAL I
   4. TELEPHONE AND ELECTRICAL EQUIPMENT BACKING BOARDS: PLYWOOD, EXPOSURE 1, C-D PLUGGED, FIRE RETARDANT TREATED, 1/2" THICK.

D. PRESERVATIVE-TREATED MATERIALS: APWA C2 LUMBER AND APWA C9 PLYWOOD, LABELED BY AN INSPECTION AGENCY APPROVED BY ALSC'S BOARD OF REVIEW. AFTER TREATMENT, KILN-DRY LUMBER TO 19 PERCENT MOISTURE CONTENT AND PLYWOOD TO 15 PERCENT. TREAT INDICATED ITEMS AND THE FOLLOWING:
   1. WOOD MEMBERS IN CONNECTION WITH ROOFING, FLASHING, VAPOR BARRIERS, AND WATERPROOFING
   2. CONCEALED MEMBERS IN CONTACT WITH MASONRY OR CONCRETE
   3. WOOD FRAMING LESS THAN 18" ABOVE GRADE
   4. WOOD FLOOR PLATES INSTALLED OVER CONCRETE SLABS DIRECTLY IN CONTACT WITH EARTH.

E. FIRE-RETARDANT TREATED MATERIALS: COMPLY WITH PERFORMANCE REQUIREMENTS IN AWPA C20 FOR LUMBER AND AWPA C27 FOR PLYWOOD LABELED BY TESTING AND INSPECTING AGENCY. USE INTERIOR TYPE A HIGH TEMPERATURE (HT). TREAT INDICATED ITEMS AND THE FOLLOWING:
   1. INTERIOR RATED: TELEPHONE AND ELECTRICAL EQUIPMENT BACKING BOARDS
   2. EXTERIOR RATED: PLYWOOD SHEATHING AS DETAILED AT ROOF SOFFIT.

F. MISCELLANEOUS PRODUCTS:
   1. FASTENERS: SIZE AND TYPE INDICATED, GALVANIZED WHEN EXPOSED TO WEATHER, GROUND CONTACT, OR AREAS OF HIGH HUMIDITY, STAINLESS STEEL WHEN FASTENING PRESERVATIVE-TREATED MATERIALS (CONTRACTOR SHALL CONFIRM COMPATIBILITY OF FASTENER MATERIAL WITH PRESERVATIVE).
   2. METAL FRAMING ANCHORS: HOT-DIP GALVANIZED STEEL OF STRUCTURAL CAPACITY, TYPE, AND SIZE INDICATED.
   3. BUILDING PAPER: ASPHALT SATURATED ORGANIC FELT COMPLYING WITH ASTM D 226, TYPE 1 (NO. 15 ASPHALT FELT), UNPERFORATED.
   4. AIR BARRIERS: AIR-RETARDER SHEETING OR FLUID APPLIED COATING DESIGNED TO PREVENT WATER INSTRUSION FROM EXTERIOR TO INTERIOR BUT TO ALLOW WATER VAPOR TO PASS FROM INTERIOR TO EXTERIOR.
   5. SILL SEALER: GLASS-FIBER INSULATION, 1" THICK, COMPRESSIBLE TO 1/32".
   6. ADHESIVE FOR FIELD GLUING PANELS TO FRAMING: APA AFG-01.

G. INSTALLATION:
   1. SET ROUGH CARPENTRY TO REQUIRED LEVELS AND LINES WITH MEMBERS PLUMB, TRUE TO LINE, CUT AND FITTED. DISCARD PIECES WITH DEFECTS THAT WOULD LOWER STRENGTH OR RESULT IN UNACCEPTABLE APPEARANCE OF EXPOSED MEMBERS.
   2. INSTALL STRUCTURAL MEMBER FULL LENGTH WITHOUT SPLICES UNLESS OTHERWISE SPECIFICALLY DETAILED.
   3. COMPLY WITH MEMBER SIZES, SPACING, CONFIGURATION, AND FASTENER SIZE AND SPACING AS INDICATED ON THE STRUCTURAL DRAWINGS, BUT NOT LESS THAN REQUIRED BY APPLICABLE CODES AND APPA WCD 1 T11.
   4. CONSTRUCT DOUBLE JOIST HEADERS AT FLOOR AND CEILING OPENINGS AND UNDER WALL STUD PARTITIONS THAT ARE PARALLEL TO FLOOR JOISTS.
   5. FRAME OPENINGS WITH TWO OR MORE STUDS AT EACH JAMB AND SUPPORT HEADERS ON CRIPPLE STUDS.
   6. PROVIDE DOUBLE 2x10 HEADERS WITH 1/2" PLYWOOD BETWEEN AND 2x4 BOTTOM PLATE AT ALL EXTERIOR AND WINDOW OPENINGS UNLESS NOTED OTHERWISE.
   7. FURNISH CONCEALED BLOCKING AND NAILERS WHERE INDICATED AND AT ALL LOCATIONS WHERE WALL HUNG ITEMS WILL REQUIRE A SUBSTRATE FOR FASTENING OR SUPPORT.
   8. INSTALL ROOF SHEATHING PERPENDICULAR TO FRAMING MEMBERS WITH ENDS STAGGERED AND SHEET ENDS OVER FIRM BEARING. PROVIDE PANELS CLIPS BETWEEN ROOF FRAMING MEMBERS AND SOLID EDGE BLOCKING BETWEEN SHEETS.
   9. INSTALL WALL SHEATHING PERPENDICULAR TO WALL STUDS WITH ENDS OVER FIRM BEARING AND STAGGERED.
   10. INSTALL FLOOR SHEATHING PERPENDICULAR TO FLOOR JOISTS WITH ENDS OVER FIRM BEARING. GLUE AND NAIL SHEATHING TO EACH JOIST.

064023 INTERIOR ARCHITECTURAL WOODWORK

A. SUBMITTALS:
   1. SAMPLES OF FINISH MATERIALS, CATALOG CUTS OF HARDWARE, AND SHOP DRAWINGS INCLUDING DIMENSIONED PLANS, ELEVATIONS, AND SECTIONS.

B. QUALITY ASSURANCE: ARCHITECTURAL WOODWORK INSTITUTE'S "ARCHITECTURAL WOODWORK QUALITY STANDARDS"

C. MATERIALS:
   1. HARDBOARD: AHA A235.4
   2. MEDIUM DENSITY FIBERBOARD: ANSI A208.2, GRADE MD, MADE WITH BINDER CONTAINING NO UREA FORMALDEHYDE.
   3. PARTICLEBOARD: ANSI A208.1, GRADE M-2
   4. SOFT PLYWOOD: DOC PS 1
   5. HARDWOOD PLYWOOD AND FACE VENEERS: HPVA HP-1, MADE WITH ADHESIVE CONTAINING NO UREA FORMALDEHYDE.
   6. HIGH PRESSURE DECORATIVE LAMINATE: NEMA LD 3
   7. SOLID SURFACE MATERIAL: HOMOGENOUS SOLID SHEETS OF FILLED PLASTIC RESIN COMPLYING WITH ISSFA-2.
   8. HARDWARE: COMPLY WITH BHMA A156
      a. HINGES: CONCEALED (EUROPEAN-TYPE) BHMA A156.9
      b. PULLS: AS SPECIFIED ON DRAWINGS
      c. DRAWER SLIDES: SIDE-MOUNTED, ZINC-PLATED FULL EXTENSION STEEL DRAWER SLIDES WITH STEEL BALL BEARINGS. COMPLYING WITH BHMA A 156.9. GRADE 1 AND RATED AS FOLLOWS: BOX DRAWERS: 100lbf; FILES DRAWERS: 200 lbf, PENCIL DRAWERS: 45 lbf.
      d. DOOR AND DRAWER LOCKS: BHMA A156.11
      e. GROMMETS: MOLDED PLASTIC WITH CAPS; FURNISH IN COLOR AND LOCATIONS AS DIRECTED.
      f. HARDWARE FINISH: SATIN STAINLESS STEEL: BHMA 630

D. INTERIOR WOODWORK:
   1. COMPLETE FABRICATION BEFORE SHIPPING TO PROJECT SITE TO MAXIMUM EXTENT FEASIBLE. DISASSEMBLE ONLY AS NEEDED FOR SHIPPING AND INSTALLING. WHERE NECESSARY FOR FITTING AT PROJECT SITE, PROVIDE FOR SCRIBING AND TRIMMING.
   2. BACKOUT AND GROOVE BACKS OF FLAT MEMBERS, KERF BACKS OF OTHER WIDE, FLAT MEMBERS, EXCEPT WHERE ENDS WILL BE EXPOSED IN FINISHED WORK.

E. INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH: CUSTOM GRADE, SPECIES PER DRAWINGS.

F. WOOD CABINETS FOR TRANSPARENT FINISH:
   1. GRADE: PREMIUM
   2. AWI

DIVISION 7 - THERMAL AND MOISTURE PROTECTION (CONT.)

076200 SHEET METAL FLASHING AND TRIM

A. SUBMITTALS: PRODUCT DATA, COLOR SAMPLES, AND SHOP DRAWINGS INDICATING MATERIAL, DIMENSIONS, JOINT LOCATIONS, EDGE CONDITIONS, AND METHODS OF ANCHORAGE.

B. FABRICATION STANDARD: COMPLY WITH SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL". CONFORM TO DIMENSIONS AND PROFILES SHOWN UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.

C. COORDINATION: COORDINATE INSTALLATION OF SHEET METAL FLASHING AND TRIM WITH INTERFACING AND ADJOINING CONSTRUCTION TO PROVIDE A LEAKPROOF, SECURE, AND NONCORROSIVE INSTALLATION.

D. SHEET METAL:
1. COPPER: ASTM B 370, TEMPER H00 OR H01, COLD ROLLED, NOT LESS THAN 16 OZ/S.F. (0.55 mm THICK).
2. ALUMINUM SHEET: ASTM B 209 (ASTM B 209 M) ALLOY 3003, 3004, 3105, OR 5005, TEMPER SUITABLE FOR FORMING AND STRUCTURAL PERFORMANCE REQUIRED, BUT NOT LESS THAN H14; NOT LESS THAN 0.032 INCH (O.8 mm) THICK, FINISHED WITH MANUFACTURER'S FLUOROPOLYMER 2-COAT SYSTEM WITH TOPCOAT CONTAINING NOT LESS THAN 70% POLYVINYLIDENE FLUORIDE RESIN BY WEIGHT; COMPLYING WITH AAMA 2604.
3. STAINLESS STEEL SHEET: ASTM A 240/A 240M, TYPE 304, WITH NO. 2D FINISH; NOT LESS THAN 0.0156 INCH (0.4 mm) THICK.

E. FLASHING AND TRIM: FABRICATE FLASHING AND TRIM TO COMPLY WITH RECOMMENDATIONS OF SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" THAT APPLY TO THE DESIGN, DIMENSIONS, METAL, AND OTHER CHARACTERISTICS OF THE ITEM INDICATED OR DETAILED ON THE CONSTRUCTION DRAWINGS. FABRICATE WITH CONCEALED FASTENERS EXCEPT WHERE EXPOSED FASTENERS ARE PERMITTED.

F. ACCESSORIES:
1. SOLDER FOR COPPER: ASTM B 32, GRADE Sn50
2. SOLDER FOR STAINLESS STEEL: ASTM B 32, GRADE Sn60, WITH ACID FLUX OF TYPE RECOMMENDED BY STAINLESS STEEL MFR.
3. BUTYL SEALANT: ASTM C 1311, SOLVENT-RELEASE TYPE, FOR EXPANSION JOINTS WITH LIMITED MOVEMENT.
4. ASPHALT MASTIC: SSPC-PAINT 12, ASBESTOS FREE, SOLVENT TYPE.
5. ROOFING CEMENT: ASTM D 4586, TYPE I, ASBESTOS FREE, ASPHALT BASED
6. SLIP SHEET: RESIN-SIZED PAPER, MINIMUM 3 LB/100 S.F. (0.16 kg/sq. m)

G. INSTALLATION:
1. COMPLY WITH SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL." ALLOW FOR THERMAL EXPANSION; SET TRUE TO LINE AND LEVEL. INSTALL WORK WITH LAPS, JOINTS, AND SEAMS PERMANENTLY WATERTIGHT AND WEATHERPROOF; CONCEAL FASTENERS WHERE POSSIBLE.
2. SECURE FLASHINGS AT ROOF EDGES ACCORDING TO FMG LOSS PREVENTION DATA SHEET 1-49 FOR SPECIFIED WIND ZONE.
3. SEALED JOINTS: FORM NON-EXPANSION, BUT MOVABLE, JOINTS IN METAL TO ACCOMMODATE ELASTOMERIC SEALANT TO COMPLY WITH SMACNA STANDARDS USING BAYONET TYPE OR INTERLOCKING HOOKED SEAMS.
4. FABRICATE NONMOVING SEAMS IN SHEET METAL WITH FLAT-LOCK SEAMS. FOR METAL OTHER THAN ALUMINUM, TIN EDGES TO BE SEAMED, FORM SEAMS AND SOLDER. FOR ALUMINUM, FORM SEAMS AND SEAL WITH EPOXY SEAM SEALER. RIVET JOINTS FOR ADDITIONAL STRENGTH.
5. SEPARATION: SEPARATE NON-COMPATIBLE METALS OR CORROSIVE SUBSTRATES WITH A COATING OF ASPHALT MASTIC OR OTHER PERMANENT SEPARATION

077200 ROOF ACCESSORIES

A. SUBMITTALS: PRODUCT DATA, INSTALLATION DETAILS, WARRANTIES

B. ROOF ACCESSORIES:

1. ROOF CURBS AND EQUIPMENT SUPPORTS: SEE MECHANICAL SPECIFICATIONS FOR MORE INFORMATION, INCLUDE MANUFACTURER'S STANDARD RIGID OR SEMIRIGID INSULATION AND PRESERVATIVE-TREATED WOOD NAILERS AT TOPS, PROVIDE UNITS WITH CANT STRIPS AND BASE PROFILE COORDINATED WITH ROOF INSULATION AND ROOF DECK SLOPE.
2. ROOF HATCHES: BASIS OF DESIGN: BILCO E-50TB. THERMALLY BROKEN, INSULATED SINGLE-LEAF, 36" W X 36" D OPENING. FABRICATE FROM METALLIC-COATED STEEL WITH INTEGRAL CURB OF HEIGHT NECESSARY TO EXTEND 8" MIN. ABOVE ROOF SURFACE, DOUBLE WALL CONSTRUCTION WITH 1 1/2" INSULATION, FORMED CANTS AND CAP FLASHING, WITH WELDED MECHANICAL CORNER JOINTS. PROVIDE DOUBLE-WALL COVER (LID) CONSTRUCTION WITH 1" INSULATION CORE. PROVIDE GASKETING AND CORROSION RESISTANT HARDWARE INCLUDING PINTLE HINGES, HOLD-OPEN DEVICES, INTERIOR PADLOCK HASPS, AND BOTH INTERIOR AND EXTERIOR LIFT HANDLES.

C. INSTALLATION: INSTALL ROOF ACCESSORY ITEMS ACCORDING TO CONSTRUCTION DETAILS OF NRCA'S "ROOFING AND WATERPROOFING MANUAL". COORDINATE WITH INSTALLATION OF ROOF DECK, VAPOR BARRIERS, ROOF INSULATION, ROOFING, AND FLASHING TO ENSURE COMBINED ELEMENTS ARE SECURE, WATERPROOF, AND WEATHERTIGHT.

078413 PENETRATION FIRESTOPPING

A. SUBMITTALS: PRODUCT DATA AND PRODUCT CERTIFICATES SIGNED BY MFR. CERTIFYING THAT PRODUCTS COMPLY WITH REQUIREMENTS.

B. RATINGS: PROVIDE FIRESTOPPING SYSTEM WITH FIRE RESISTANCE RATINGS INDICATED BY REFERENCE TO UL DESIGNATIONS AS LISTED IN ITS "FIRE RESISTANCE DIRECTORY", OR TO DESIGNATION OF ANOTHER TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

C. FLAME SPREAD/SMOKE DEVELOPED RATINGS: FOR EXPOSED FIRESTOPPING, PROVIDE PRODUCTS WITH FLAME SPREAD INDEXES OF LESS THAN 25 AND SMOKE-DEVELOPED INDEXES OF LESS THAN 450, AS DETERMINED ACCORDING TO ASTM E 84.

D. FIRESTOP SYSTEMS: USE SYSTEMS AS DESIGNATED ON THE CONSTRUCTION DRAWINGS, OR IF NOT DESIGNATED, ANY SYSTEM THAT IS CLASSIFIED BY UL AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION FOR THE APPLICATION MAY BE USED.

E. INSTALLATION: INSTALL FIRESTOPPING SYSTEMS TO COMPLY WITH REQUIREMENTS LISTED IN TESTING AGENCY'S DIRECTORY FOR INDICATED FIRE-RESISTANCE RATING.

F. IDENTIFICATION: IDENTIFY THROUGH-PENETRATION FIRESTOP SYSTEMS WITH PERMANENT LABELS ATTACHED TO SURFACES ADJACENT TO FIRESTOP SYSTEMS SO THAT LABELS WILL BE VISIBLE TO ANYONE SEEKING TO REMOVE PENETRATING ITEMS OR FIRESTOP SYSTEMS. LABELS SHALL INCLUDE THE FOLLOWING:
1. THE WORDS "WARNING - THROUGH PENETRATION FIRESTOP SYSTEM - DO NOT DISTURB"
2. CLASSIFICATION/LISTING DESIGNATION OF APPLICABLE TESTING AND INSPECTING AGENCY.
3. THROUGH-PENETRATION FIRESTOP SYSTEM MANUFACTURER'S NAME AND PRODUCT NAME.

079200 JOINT SEALANTS

A. SUBMITTALS: PRODUCT DATA, COLOR SAMPLES, AND SCHEDULE OF LOCATIONS FOR EACH TYPE OF SEALANT SUBMITTED.

B. SEALANT COLORS/MOCKUP: MULTIPLE SEALANT COLORS WILL BE REQUIRED TO COORDINATE WITH COLORS OF MATERIALS BEING SEALED. SHALL BE SELECTED FROM MANUFACTURER'S FULL RANGE OF AVAILABLE COLORS, INCLUDING PREMIUM COLORS, AND SHALL BE VERIFIED FROM A 12" LONG FIELD APPLIED SAMPLE OF EACH COLOR PRIOR TO COMPLETE INSTALLATION.

C. ENVIRONMENTAL LIMITATIONS: DO NOT PROCEED WITH INSTALLATION OF JOINT SEALANTS WHEN AMBIENT AND SUBSTRATE TEMPERATURE CONDITIONS ARE OUTSIDE LIMITS PERMITTED BY JOINT SEALANT MANUFACTURER OR ARE BELOW 40 deg F (4.4 deg C).

D. COMPATIBILITY: PROVIDE JOINT SEALANTS, JOINT FILLERS, AND OTHER RELATED MATERIALS THAT ARE COMPATIBLE WITH ONE ANOTHER AND WITH JOINT SUBSTRATES UNDER SERVICE AND APPLICATION CONDITIONS.

E. JOINT SEALANTS:
1. BUILDING EXPANSION JOINTS: SINGLE COMPONENT, NEUTRAL-CURING SILICONE SEALANT, ASTM C 920, TYPE S; GRADE NS; CLASS 25; USES T, M, AND O, WITH THE ADDITIONAL CAPABILITY TO WITHSTAND 50% MOVEMENT IN BOTH EXTENSION AND COMPRESSION FOR A TOTAL OF 100% MOVEMENT.
2. EXTERIOR TRAFFIC BEARING JOINTS WHERE SLOPE PRECLUDES POURABLE SEALANT: SINGLE COMPONENT, NONSAG URETHANE SEALANT, ASTM C920, TYPE S; GRADE NS; CLASS 25; USES T, NT, M, G, A, AND O.
3. EXTERIOR TRAFFIC BEARING JOINTS WHERE SLOPE PERMITS USE OF POURABLE SEALANT: SINGLE COMPONENT, POURABLE URETHANE SEALANT, ASTM C 920, TYPE S; GRADE P; CLASS 25; USES T, M, G, A, AND O.
4. INTERIOR JOINTS IN CERAMIC TILE AND OTHER HARD SURFACES IN KITCHENS, TOILET ROOMS, AND AROUND PLUMBING FIXTURES: SINGLE COMPONENT, MILDEW-RESISTANT SILICONE SEALANT, ASTM C 920, TYPE S; GRADE NS, CLASS 25; USES NT, G, A, AND O; FORMULATED WITH FUNGICIDE.
5. INTERIOR JOINTS AROUND PERIMETERS OF DOORS AND FRAMES: LATEX SEALANT, SINGLE COMPONENT, NONSAG, MILDEW-RESISTANT, PAINTABLE, ACRYLIC EMULSION SEALANT COMPLYING WITH ASTM C 834.
6. ACOUSTICAL SEALANT FOR EXPOSED INTERIOR JOINTS: NONSAG, PAINTABLE, NONSTAINING, LATEX SEALANT COMPLYING WITH ASTM C 834.
7. ACOUSTICAL SEALANT FOR CONCEALED JOINTS: NONDRYING, NONHARDENING, NONSKINNING, NONSTAINING, GUNNABLE, SYNTHETIC-RUBBER SEALANT RECOMMENDED FOR SEALING INTERIOR CONCEALED JOINTS TO REDUCE TRANSMISSION OF AIRBORNE SOUND.

F. JOINT SEALANT BACKING: CYLINDRICAL CLOSED CELL PVC ROD COMPLYING WITH ASTM C330; SIZE 30% TO 50% LARGER THAN JOINT WIDTH. ALL OPEN CELL BACKINGS SUCH AS "DENVER FOAM" ARE PROHIBITED.

G. BOND-BREAKER TAPE: POLYETHYLENE TAPE OR OTHER PLASTIC TAPE RECOMMENDED BY SEALANT MFR. FOR PREVENTING SEALANT FROM ADHERING TO RIGID, INFLEXIBLE JOINT-FILLER MATERIALS OR JOINT SURFACES AT BACK OF JOINT.

H. INSTALLATION: COMPLY WITH ASTM C 1193; ASTM C 919 FOR ACOUSTICAL JOINTS; AND AS FOLLOWS:
1. REMOVE ALL LOOSE MATERIAL, CLEAN AND PRIME JOINTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, AND PROTECT ADJACENT SURFACES.
2. INSTALL BOND-BREAKER TAPE WHERE JOINT BACKINGS ARE NOT USED.
3. INSTALL SEALANT TOOLED CONCAVE, FREE OF AIR POCKETS, FOREIGN EMBEDDED MATTER, RIDGES, AND SAGS, AND PROTECT UNTIL FULLY CURED. SEALANT WITH DUST AND DEBRIS EMBEDDED IN SURFACE SHALL BE CAUSE FOR REJECTION.

- END DIVISION 7 -

DIVISION 8 - DOOR AND WINDOWS

081213 HOLLOW METAL FRAMES

A. SUBMITTALS: PRODUCT DATA AND FRAME SCHEDULE INDICATING OPENING AND FRAME SIZES CORRESPONDING TO THOSE USED IN CONSTRUCTION DOCUMENTS.

B. MATERIALS:
1. HOT-ROLLED STEEL SHEETS: ASTM A1011/A 1011M
2. COLD-ROLLED STEEL SHEETS: ASTM A 1008/A 1008M OR ASTM A 620/A 620M
3. GALVANIZED STEEL SHEETS: ASTM A 653/A 653M, A40 OR G40 (ZF120 OR Z120) COATING

C. STEEL FRAMES: FULLY WELDED, ANSI A 250.8, CONCEALED FASTENING, PREPARED FOR MORTISED AND CONCEALED HARDWARE ACCORDING TO ANSI A 250.6 AND ANSI A 115 SERIES STANDARDS AND REINFORCED TO RECEIVE SURFACE-APPLIED HARDWARE.
1. STEEL SHEET THICKNESS FOR INTERIOR FRAMES: PER DOOR SCHEDULE
2. STEEL SHEET THICKNESS FOR EXTERIOR FRAMES: PER DOOR SCHEDULE

D. ACCESSORIES:
1. SUPPORTS AND ANCHORS: MIN. .042" THICK GALVANIZED STEEL SHEET
2. PRIMER: MANUFACTURER'S STANDARD FACTORY APPLIED COAT OF RUST-INHIBITIVE PRIMER COMPLYING WITH ANSI A250.10.

E. INSTALLATION:
1. FRAMES: COMPLY WITH SDI 105 AND INSTALL FIRE-RATED FRAMES PER NFPA 80.

081416 FLUSH WOOD DOORS

A. SUBMITTALS: PRODUCT DATA, PREFINISHED DOOR SKIN SAMPLES, AND DOOR SCHEDULE INDICATING DOOR AND FRAME SIZES. TYPES, ELEVATIONS, DETAILS, AND HARDWARE WITH DOOR AND HARDWARE NUMBERING CORRESPONDING TO THOSE USED IN CONSTRUCTION DOCUMENTS.

B. DOORS: SIZES, SPECIES, AND DESIGNS AS INDICATED COMPLYING WITH WDMA I.S.1-A
1. GRADE: PREMIUM
2. VENEER MATCHING: BOOK AND RUNNING
3. PAIR MATCHING AND SET MATCHING
4. CONSTRUCTION:
   a. INTERIOR VENEER: FIVE OR SEVEN PLY, STRUCTURAL COMPOSITE LUMBER CORES
   b. INTERIOR PLASTIC LAMINATE: THREE-PLY, STRUCTURAL COMPOSITE LUMBER CORE
   c. FIRE-RATED DOORS: CORE TO PROVIDE FIRE RATING INDICATED WITH FACES AND GRADE TO MATCH NON-RATED DOORS.
5. FABRICATION AND FINISHING:
   1. FACTORY FIT DOORS TO SUIT FRAME OPENINGS TO COMPLY WITH REFERENCED STANDARD. COMPLY WITH NFPA 80 FOR FIRE-RESISTANCE RATED DOORS.
   2. FACTORY MACHINE DOORS FOR HARDWARE THAT IS NOT SURFACE APPLIED.
   3. CUT AND TRIM OPENINGS TO COMPLY WITH REFERENCED STANDARDS.
   4. LITE KITS: [MATCHING WOOD STOPS] [STEEL STOPS]
   5. FACTORY FINISH DOORS FOR TRANSPARENT FINISH WITH STAIN AND MANUFACTURER'S STANDARD FINISH COMPARABLE TO AWI, SYSTEM TR-4, CONVERSION VARNISH OR AWI SYSTEM TR-6, CATALYZED POLYURETHANE.

C. INSTALLATION: COMPLY WITH WDMA'S "HOW TO STORE, HANDLE, FINISH, INSTALL, AND MAINTAIN WOOD DOORS" ALIGNED AND FITTED IN FRAMES WITH UNIFORM CLEARANCES AND BEVELS.
1. INSTALL FIRE RATED DOORS PER NFPA 80.

083113 ACCESS DOORS AND FRAMES

A. SUBMITTALS: PRODUCT DATA

B. PRODUCTS: PRIME-PAINTED FLUSH, UNINSULATED ACCESS DOORS FOR WALLS AND CEILINGS WITH TRIMLESS FRAME AND SCREWDRIVER OPERATED LOCK FLUSH WITH FINISHED SURFACE. FIRE-RATED, SELF-LATCHING. AUTOMATIC CLOSING AT FIRE-RATED WALLS OR CEILINGS

C. INSTALLATION: INSTALL FLUSH OF FINISHED DRYWALL SURFACE WITH FRAME TAPED AND SANDED FLUSH WITH WALL OR CEILING SURFACE AND FINISH TO MATCH ADJACENT SURFACE.

084113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

A. SUBMITTALS:
1. INSTALLER QUALIFICATIONS, FABRICATOR QUALIFICATIONS, SOURCE LIMITATIONS
2. PRODUCT DATA FOR EACH SYSTEM SPECIFIED, INCLUDING ACCESSORIES,SEALANTS, AND PRODUCTS TO BE SUPPLIED FOR A COMPLETE INSTALLATION.
3. SAMPLES: FULL RANGE OF MANUFACTURERS STANDARD COLOR, FINISH AND OTHER OPTIONS REQUIRED FOR SELECTION.
4. SHOP DRAWINGS STAMPED AND SIGNED BY LICENSED ENGINEER: INCLUDING DETAILS AT JOINTS AND PERIMETER CONDITIONS,FLASHINGS, CONNECTION AND INTERFACE WITH WORK BY OTHERS, EXPANSION AND CONTRACTION JOINT, ANY FIELD WELDING REQUIREMENTS, HARDWARE SCHEDULE.
5. CALCULATIONS STAMPED AND SIGNED BY LICENSED ENGINEER: DESIGN LOADS, SYSTEM DIMENSIONS, TOLERANCES, DETAILS AT JOINTS, PERIMETER CONDITIONS, FLASHING, CONNECTIONS TO WORK BY OTHERS, EXPANSION AND CONTRACTION JOINT LOCATIONS, AND ANY FIELD WELDING. FOR ENTRANCES, INCLUDE HARDWARE SCHEDULE.
6. SAMPLE WARRANTIES
7. MOCK-UP: ON SITE, INCLUDING HEAD, JAMB AND SILL CONDITIONS AND INTERFACE WITH OTHER WORK.

B. DELEGATED DESIGN: DESIGN GLAZED ALUMINUM CURTAIN WALLS AND GLAZED ALUMINUM WINDOW WALLS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

C. QUALITY ASSURANCE:
1. FABRICATOR: COMPANY SPECIALIZING IN MANUFACTURING ALUMINUM GLAZING SYSTEMS WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE
2. INSTALLER: COMPANY SPECIALIZING IN INSTALLING ALUMINUM GLAZING SYSTEMS WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE
3. MANUFACTURER'S WARRANTY: 2 YEARS

D. MATERIALS:
1. ALUMINUM SHEET: ASTM B 209 (ASTM B 209M), ALLOY AND TEMPER RECOMMENDED BY MANUFACTURER FOR TYPE OF USE AND FINISH INDICATED.
2. ALUMINUM EXTRUSIONS: ASTM B 221 (ASTM B221M), ALLOY AND TEMPER RECOMMENDED BY MANUFACTURER FOR TYPE OF USE AND FINISH INDICATED.

E. ALUMINUM FRAMED STOREFRONTS: AT INTERIOR LOCATIONS, PROVIDE MANUFACTURER'S STANDARD NON-THERMALLY BROKEN STOREFRONT SYSTEM MATCHING THE EXTERIOR SYSTEM. AT EXTERIOR LOCATIONS, PROVIDE MANUFACTURER'S STANDARD THERMALLY BROKEN, EXTRUDED ALUMINUM STOREFRONT SYSTEM CONSISTING OF FRAMING MEMBERS OF THICKNESS REQUIRED AND REINFORCED AS REQUIRED TO SUPPORT IMPOSED LOADS AND TO FIT THE DIMENSIONS AND DEPTHS INDICATED ON THE CONSTRUCTION DOCUMENTS AND COMPLYING WITH THE FOLLOWING:
1. STRUCTURAL PERFORMANCE: PROVIDE SYSTEMS, INCLUDING ANCHORAGE, CAPABLE OF WITHSTANDING THE FOLLOWING LOADS:
   a. MAIN FRAMING MEMBER DEFLECTION: LIMITED TO 1/175 OF CLEAR SPAN OR 3/4" WHICHEVER IS SMALLER.
   b. STRUCTURAL TESTING: SYSTEMS WHEN TESTED ACCORDING TO ASTM E 330 AT 150 PERCENT OF INWARD AND OUTWARD WIND-LOAD DESIGN-PRESSURE (DO NOT EVIDENCE MATERIAL FAILURES, STRUCTURAL DISTRESS, DEFLECTION FAILURES, OR PERMANENT DEFORMATION OF MAIN FRAMING MEMBERS ECEEDING 0.2 PERCENT OF CLEAR SPAN.
2. AIR INFILTRATION: LIMITED TO 0.06 CFM/SQ. FT. (0.03 L/s PER SQ. IN.) OF SYSTEM SURFACE AREA WHEN TESTED ACCORDING TO ASTM E 283 AT A STATIC-AIR-PRESSURE DIFFERENCE OF 1.57 lbf/sq. ft. (75 Pa)
3. WATER PENETRATION: SYSTEMS DO NOT EVIDENCE WATER LEAKAGE WHEN TESTED ACCORDING TO ASTM E 331 AT MINIMUM DIFFERENTIAL PRESSURE OF 20 PERCENT OF POSITIVE WIND-LOAD DESIGN PRESSURE, BUT NOT LESS THAN 0.24 lbf/sq. ft. (300 Pa).
4. AVERAGE U-FACTOR: NOT MORE THAN 0.69 Btu/sq. ft. x h x deg. f (3.92 W/sq. m x K) PER AAMA 1503.
5. DOORS: 1-3/4" THICK GLAZED DOORS WITH MINIMUM 0.125" THICK EXTRUDED TUBULAR RAIL AND STILE MEMBERS. MECHANICALLY FASTENED CORNERS WITH REINFORCED BRACKETS THAT ARE DEEP PENETRATION AND FILLET WELDED OR THAT INCORPORATE CONCEALED TIE-RODS, SNAP-ON EXTRUDED ALUMINUM GLAZING STOPS, AND PREFORMED GASKETS.
   a. INTERIOR DOORS: GLAZE WITH 1/4" CLEAR TEMPERED GLASS. PROVIDE ANSI/BHMA A156.16 SILENCERS. THREE ON STRIKE JAMB OF SINGLE DOOR FRAMES AND TWO ON HEAD OF DOUBLE DOOR FRAMES.
   b. EXTERIOR DOORS: GLAZE WITH INSULATED TEMPERED GLASS UNITS MATCHING STOREFRONT GLASS OR CLEAR INSULATED GLASS PER CONSTRUCTION DRAWINGS. PROVIDE COMPRESSION WEATHERSTRIPPING AT FIXED STOPS. AT OTHER LOCATIONS, PROVIDE SLIDING WEATHERSTRIPPING RETAINED IN ADJUSTABLE STRIP MORTISED INTO DOOR EDGE.
   c. HARDWARE: PER DOOR SCHEDULE
6. FASTENERS AND ACCESSORIES: COMPATIBLE WITH ADJACENT MATERIALS. CORROSION-RESISTANT, NONSTAINING, AND NONBLEEDING. USE CONCEALED FASTENERS EXCEPT FOR APPLICATION OF DOOR HARDWARE.
7. FABRICATION: FABRICATE FRAMING IN PROFILES INDICATED. PROVIDE SUBFRAMES AND REINFORCING AS REQUIRED FOR A COMPLETE SYSTEM. FACTORY ASSEMBLE COMPONENTS TO GREATEST EXTENT POSSIBLE. DISASSEMBLE COMPONENTS ONLY AS NECESSARY FOR SHIPMENT AND INSTALLATION.
   a. DOORS FRAMING: REINFORCE TO SUPPORT IMPOSED LOADS. FACTORY ASSEMBLE DOOR AND FRAME UNITS AND FACTORY INSTALL HARDWARE TO GREATEST EXTENT POSSIBLE. REINFORCE DOOR AND FRAME UNITS FOR HARDWARE INDICATED. CUT, DRILL, AND TAP FOR FACTORY-INSTALLED HARDWARE BEFORE FINISHING COMPONENTS.
8. ALUMINUM FINISH: COMPLY WITH NAAMM'S "METAL FINISHES MANUAL FOR ARCHITECTURAL AND METAL PRODUCTS" *FLUOROPOLYMER, 2-COAT SYSTEM, COMPLYING WITH AAMA 2604*
   a. COLOR: CUSTOM COLOR

F. INSTALLATION:
1. ISOLATE METAL SURFACES IN CONTACT WITH INCOMPATIBLE MATERIALS, INCLUDING WOOD, BY PAINTING CONTACT SURFACES WITH BITUMINUOUS COATING OR PRIMER, OR BY APPLYING SEALANT TAPE RECOMMENDED BY MANUFACTURER.
2. INSTALL FRAMING COMPONENTS TO PROVIDE A WEATHERPROOF SYSTEM AND TRUE IN ALIGNMENT WITH ESTABLISHED LINES AND GRADES TO THE FOLLOWING TOLERANCES:
   a. VARIATION FROM PLANE: LIMIT TO 1/8" IN 12 FEET; 1/4" OVER TOTAL LENGTH
   b. ALIGNMENT: FOR SURFACES ABUTTING LINE, LIMIT OFFSET TO 1/16". FOR SURFACES MEETING AT CORNERS, LIMIT OFFSET TO 1/32".
   c. DIAGONAL MEASUREMENTS: LIMIT DIFFERENCE BETWEEN DIAGONAL MEASUREMENTS TO 1/8"
   d. PERIMETER JOINTS: 1/2" MAXIMUM.
3. INSTALL DOORS WITHOUT WARP OR RACK. ADJUST DOORS AND HARDWARE TO PROVIDE TIGHT FIT AT CONTACT POINTS AND SMOOTH OPERATION.

087100 DOOR HARDWARE

A. SUBMITTALS: PRODUCT DATA AND HARDWARE SCHEDULE INDICATING HARDWARE ITEM, FINISH, AND QUANTITY LOCATED ON EACH DOOR WITH DOOR AND HARDWARE SET NUMBERING CORRESPONDING TO THOSE USED IN CONSTRUCTION DOCUMENTS.

B. HARDWARE: FURNISH PRODUCTS AS SPECIFIED IN THE HARDWARE SETS CONTAINED IN THE CONSTRUCTION DOCUMENTS AND AS FOLLOWS:
1. HINGES:
   a. QUANTITY: 3 HINGES FOR DOORS 90" OR LESS IN HEIGHT; 4 HINGES FOR DOORS MORE THAN 90" IN HEIGHT.
   b. BEARING: BALL BEARING HINGES AT ALL LOCATIONS.
   c. MATERIAL: STAINLESS STEEL OR BRASS/BRONZE HINGS WITH STAINLESS STEEL PINS FOR EXTERIOR.
   d. PINS: NONREMOVABLE PINS FOR EXTERIOR AND PUBLIC INTERIOR EXPOSURE; NON-RISING ELSEWHERE.
2. LOCKSETS AND LATCHSETS:
   a. BORED LOCKS AND LATCHES: BHMA A156.2, SERIES 4000, GRADE 1
   b. EXIT DEVICES: BHMA A156.3, GRADE 1
   c. AUXILIARY LOCKS: BHMA A156.5, GRADE 1
   d. INTERCONNECTED LOCKS AND LATCHES: BHMA A156.12, SERIES 5000, GRADE 1
   e. MORTISE LOCKS AND LATCHES: BHMA A156.13, SERIES 1000, GRADE 1
   f. TRIM: LEVER HANDLE STYLE PER CONSTRUCTION DOCUMENTS OR IF NOT SPECIFIED, MATCH BUILDING STANDARD. IF NOT SPECIFIED AND NO STANDARD EXISTS, MATCH SCHLAGE "OMEGA"; TRIM ON EXIT DEVICES SHALL MATCH LOCKSETS.
   g. KEYING: PROVIDE CONSTRUCTION KEYING AND COORDINATE FINAL KEYING WITH OWNER'S MASTER-KEY SYSTEM. FURNISH KEY CONTROL SYSTEM, INCLUDING CABINET.
3. CLOSERS:
   a. LOCATION: MOUNT CLOSERS ON INTERIOR (ROOM SIDE) OF DOOR OPENING. PROVIDE REGULAR-ARM, PARALLEL-ARM, OR TOP-JAMB-MOUNTED CLOSERS AS NECESSARY.
   b. OPTIONS: FURNISH ADJUSTABLE DELAYED OPENING (ADA ACCESSIBLE) FEATURE ON ALL CLOSERS.
4. STOPS: FURNISH AND INSTALL WALL OR FLOOR STOPS AS APPROPRIATE FOR ALL DOORS WHETHER INDICATED OR NOT.
5. WEATHERSTRIPPING: AT ALL EXTERIOR DOORS AND AS SCHEDULED, PROVIDE WEATHERSTRIPPING ON HEAD AND JAMBS AND DRIP-SWEEP AT SILL.
6. SMOKE GASKETING: PROVIDE SMOKE GASKETING AT ALL FIRE-RATED DOORS.
7. THRESHOLDS: PROVIDE THRESHOLDS AT ALL EXTERIOR DOORS AND AS SCHEDULED.

C. INSTALLATION: MOUNT HARDWARE IN LOCATIONS RECOMMENDED BY THE DOOR AND HARDWARE INSTITUTE, UNLESS OTHERWISE INDICATED.

08800 GLAZING

A. SUBMITTALS: PRODUCT DATA AND (2) 12" SQUARE SAMPLES OF EACH TYPE OF GLASS SPECIFIED.

B. QUALITY STANDARDS:
1. FIRE RESISTANCE-RATED ASSEMBLIES: PRODUCTS IDENTICAL TO THOSE TESTED PER NFPA 252 FOR DOORS AND NFPA 257 FOR WINDOW ASSEMBLIES; BOTH LABELED AND LISTED BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
2. SAFETY GLASS: CATEGORY II MATERIALS COMPLYING WITH TESTING REQUIREMENTS IN 16 CFR 1201 AND ANSI Z97.1.
3. GLAZING PUBLICATIONS: WHERE APPLICABLE, COMPLY WITH WITH THE PUBLISHED RECOMMENDATIONS OF THE FOLLOWING:
   a. GANA PUBLICATIONS: "GLAZING MANUAL" AND "LAMINATED GLASS DESIGN GUIDE".
   b. AAMA PUBLICATIONS: AAMA GDSG-1, "GLASS DESIGN FOR SLOPED GLAZING", AND AAMA TIR-A7 "SLOPED GLAZING GUIDELINES".
   c. SIGMA PUBLICATIONS: SIGMA TM-3000, "VERTICAL GLAZING GUIDELINES" AND SIGMA TB-3001, "SLOPED GLAZING GUIDELINES".

C. GLASS
1. FLOAT GLASS: ASTM C 1036, TYPE I, QUALITY q3
2. HEAT-TREATED FLOAT GLASS: ASTM C 1048, TYPE I, QUALITY q3, HEAT STRENGTHENED OR FULLY TEMPERED WHERE INDICATED AND WHERE REQUIRED BY CODE OR INSTALLATION CONDITIONS.
3. COATED GLASS: ASTM C 1048. CONDITION C, TYPE I, QUALITY q3, HEAT STRENGTHENED OR FULLY TEMPERED WHERE INDICATED AND WHERE REQUIRES BY CODE OR INSTALLATION CONDITIONS.
4. WIRED GLASS: TYPE II, CLASS I, QUALITY q8, FORM 1 POLISHED, WITH m2 SQUARE MESH, .25" THICK.
5. PATTERNED GLASS: ASTM C 1036, TYPE II, CLASS 1 , FORM 3, QUALITY q8, FINISH F1, PATTERN PER CONSTRUCTION DRAWINGS.
6. TEMPERED PATTERNED GLASS: ASTM C 1048, TYPE II, CLASS 1, FORM 3, QUALITY q8, FINISH F1, PATTERN PER CONSTRUCTION DRAWINGS.
7. MIRRORS GLASS: ASTM C 1036, TYPE I, CLASS 1, QUALITY q1, SILVER COATED PER FS DDM411C, 6.0mm THICK, WITH EDGES FLAT POLISHED.

D. FABRICATED GLASS PRODUCTS:
1. SEALED INSULATING-GLASS UNITS: PREASSEMBLED UNITS COMPLYING WITH ASTM E 774 FOR CLASS CBA UNITS WITH TWO SHEETS OF GLASS SEPARATED BY A 1/2-INCH DEHYDRATED SPACE FILLED WITH AIR.
   a. VISION GLASS: (**GL-1**) PPG SOLARBAN 70XL SOLAR CONTROL LOW-E GLASS OR APPROVED EQUAL
      - 1/4" CLEAR, 1/2" AIR SPACE, 1/4" CLEAR - PROVIDE LOW-E COATING ON 2ND SURFACE.
      - VISIBLE LIGHT TRANSMITTANCE: 64%
      - SOLAR HEAD GAIN COEFFICIENT: 0.27
   b. SPANDREL GLASS: (**SP-1**) TO MATCH VISION GLASS WITH OPACIFIER APPLIED TO FOURTH SURFACE.
   c. WARRANTY: 10 YEAR WARRANTY TO INCLUDE REPLACEMENT OF SEALED UNITS EXHIBITING SEAL FAILURE, INTERPANE DUSTING OR MISTING.

E. INSTALLATION:
1. COMPLY WITH COMBINED RECOMMENDATIONS OF MANUFACTURERS OF GLASS, SEALANTS, GASKETS, AND OTHER GLAZING MATERIALS, UNLESS MORE STRINGENT REQUIREMENTS ARE CONTAINED IN ZANOS "GLAZING MANUAL"
2. SET GLASS LITES IN EACH SERIES WITH UNIFORM PATTERN, DRAW, BOW, AND SIMILAR CHARACTERISTICS.
3. AFTER GLASS INSTALLATION IS COMPLETE, REMOVE GLAZING MATERIALS AND LABELS FROM FINISHED SURFACES, AND THOROUGHLY CLEAN GLASS AND ADJACENT FRAMING AND SURFACES. REPEAT AS NECESSARY PRIOR TO FINAL WALK-THROUGH.

- END DIVISION 8 -

DIVISION 9 - FINISHES

092216 NON-STRUCTURAL METAL FRAMING

A. STEEL FRAMING MEMBERS: COMPLY WITH ASTM C754 IN DEPTHS AND GAGES AS INDICATED IN THE CONSTRUCTION DRAWINGS AND AS FOLLOWS:
1. STEEL SHEET COMPONENTS: COMPLY WITH ASTM C645 WITH MANUFACTURER'S STANDARD CORROSION-RESISTANT ZINC-COATING.
2. TIE WIRE: ASTM A 641/A 641M, CLASS 1 ZINC COATING, SOFT TEMPER. .0625" DIAMETER OR DOUBLE STRAND OF .0475" DIAMTER WIRE.
3. WIRE HANGERS: ASTM A 641/A 641M, CLASS 1 ZINC COATING, SOFT TEMPER. .0162" DIAMETER.

092900 GYPSUM BOARD

A. PANEL PRODUCTS

DIVISION 12 - FURNISHINGS

122413 ROLLER WINDOW SHADES

A. SUBMITTALS:
1. PRODUCT DATA FOR EACH PRODUCT TYPE
2. MATERIAL SAMPLES FOR SHADE FABRIC OPTIONS AND FASCIA OPTIONS REPRESENTING MANUFACTURER'S FULL RANGE OF AVAILABLE PATTERNS AND COLORS.
3. SHOP DRAWINGS SHOWING FABRICATION AND INSTALLATION DETAILS
4. OPERATION AND MAINTENANCE DATA

B. WARRANTIES: ROLLER SHADE HARDWARE, CHAIN, AND SHADECLOTH: 10 YEARS

C. ACCEPTABLE MANUFACTURERS: MECHOSHADE SYSTEMS, INC., HUNTER-DOUGLAS CONTRACT, WT SHADE, OR APPROVED EQUAL. MUST OBTAIN ROLLER SHADES FROM SINGLE SOURCE FROM SINGLE MANUFACTURER.

D. PRODUCTS:
1. BASIS OF DESIGN: MANUAL ROLLER SHADE "H100 SOLOMOUNT" BY WT SHADE OR APPROVED EQUAL. PROVIDE WITH FRONT FACSIA (WHITE) OR CLOSURE MOUNT WITH TILE SUPPORT AND REMOVABLE CLOSURE TRIM (WHITE) AS INDICATED IN THE DRAWINGS.
2. CONFIGURATION: ONE-PIECE UNITS EXTENDING FROM WINDOW HEAD TO SILL, UNLESS NOTED OTHERWISE. SEE CONSTRUCTION DRAWINGS FOR MOUNTING LOCATION.
3. TYPE: MANUALLY OPERATED, CHAIN DRIVEN, SUNSCREEN ROLLER SHADES.
4. SHADE CLOTH: VISUALLY TRANSPARENT SINGLE THICKNESS, NON-RAVELING, ANTI-STATIC, FADE AND STAIN RESISTANT FABRIC CONTAINING PVC, POLYESTER, OR VINYL RANGING FROM 6.00 OZ/SQ. YD - 20.70 OZ. SQ. YD. IN PATTERNS AND COLORS TO BE SELECTED FOM MANUFACTURER'S FULL AVAILABLE RANGE.
   a. ECOFABRIX: 253-89 (GRAY BLACK)
   b. OPENNESS FACTOR: 1%
   c. FIRE-TEST RESPONSE CHARACTERISTICS: COMPLY WITH NFPA 701-99
5. ACCESSORIES:
   a. FASCIA: FURNISH CONTINUOUS REMOVABLE EXTRUDED ALUMINUM FASCIA TO FULLY CONCEAL BRACKETS, SHADE ROLLER, AND FABRIC ON THE TUBE THAT ATTACHES TO SHADE MOUNTING BRACKETS WITHOUT THE USE OF ADHESIVES, MAGNETIC STRIPS OR EXPOSED FASTENERS. PROVIDE END CAPS WHERE WHERE MOUNTING CONDITIONS EXPOSE OUTSIDE OF ROLLER SHADE BRACKETS.
   b. SHADE POCKET: WHERE INDICATED, FURNISH EXTRUDED ALUMINUM SHADE POCKETS WITH EXPOSED EXTRUDED ALUMINUM CLOSURE MOUNT, TILE SUPPORT, AND REMOVABLE CLOSURE PANEL TO PROVIDE ACCESS TO SHADES.

E. INSTALLATION: FURNISH AND INSTALL SHADES ON ALL EXTERIOR GLASS EXCEPT LOBBY AND VESTIBULE GLASS, UNLESS NOTED OTHERWISE.
1. INSTALL SHADES AFTER FINISH WORK IS COMPLETE AND AMBIENT TEMPERATURE AND HUMIDITY ARE AT LEVELS INTENDED FOR OCCUPANCY.
2. ADJUST AND BALANCE SHADES TO OPERATE SMOOTHLY, EASILY, SAFELY, AND FREE FROM BINDING THROUGH ENTIRE OPERATIONAL RANGE. FABRIC SHALL HANG STRAIGHT WITHOUT CURLING OR RAVELING AND SHALL NOT SHIFT MORE THAN 1/8" IN EITHER DIRECTION PER 8' OF SHADE HEIGHT DUE TO WARP DISTORTION OR WEAVE DESIGN.
3. CLEAN SURFACES JUST PRIOR TO OCCUPANCY.

- END DIVISION 12 -

DIVISION 10 - SPECIALTIES

102800 TOILET AND BATH ACCESSORIES:

REFERENCE CONSTRUCTION DRAWINGS FOR TYPE, QUANTITY, AND LOCATIONS OF TOILET AND BATH ACCESSORIES.

- END DIVISION 10 -

DIVISION 14 - CONVEYING SYSTEMS

14123.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS

A. SUBMITTALS:
1. SHOP DRAWINGS INCLUDING PLANS, ELEVATIONS, SECTIONS AND DETAILS OF ASSEMBLY, ERECTION, ANCHORAGE, RAIL BRACKETS, INSERTS, BLOCK-OUTS, CUTOUTS AND EQUIPMENT IN MACHINE ROOM, AND CABS WITHIN HOSITWAY. INDICATE DETAILED ELECTRICAL REQUIREMENTS AND LOADS IMPOSED ON THE STRUCTURE.
2. PRODUCT DATA INDICATING COMPLIANCE WITH REQUIREMENTS.
3. FINISH SAMPLES
4. INSPECTION AND ACCEPTANCE CERTIFICATES AND OPERATING PERMITS AS REQUIRED BY AUTHORITIES HAVING JURISDICTION
5. WARRANTY: MANUFACTURER'S STANDARD WRITTEN WARRANTY AGREEING TO REPAIR, RESTORE, OR REPLACE DEFECTS IN ELEVATOR WORK FOR A PERIOD OF (12) MONTHS FROM TEH DATE OF SUBSTANTIAL COMPLETION. FURNISH MAINTENANCE AND CALL BACK SERVCIE FOR A PERIOD OF 12 MONTHS FROM THE DATE OF SUBSTANTIAL COMPLETION.

B. ELEVATORS: BASIS OF DESIGN: KONE MACHINE ROOM-LESS, ECOSPACE
PROVIDE ELEVATOR(S) COMPLYING WITH ASME A17.1, SECTION 4.10 OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES, SECTION 407 OF ICC ANSI A117.1, AND THE FOLLOWING:
1. ELEVATOR #1 AND 2 (PASSENGER):
   a. RATED LOAD: 2500 LB
   b. RATED SPEED: 110 FPM
   c. CAB HEIGHT: 10'-0"
   d. DOOR HEIGHT: 8'-0"
   e. ACCOMODATE PORCELAIN FLOOR TILE IN WEIGHT CAPACITY

C. CAR ENCLOSURES AND ENTRANCES:
1. DOOR, FRAME, AND FRONT WALL INCLUDING CONTROL PANEL: ASTM A666, TYPE 304, STAINLESS STEEL, WITH NO. 4 SATIN FINISH, BOTH FACES. DOOR FRAME SHALL HAVE 11/2-2" WIDE FACES.
2. REAR AND SIDE WALLS:
   a. REINFORCED ENAMELED STEEL CAB WALLS PREPARED FOR CUSTOM APPLIED FINISHES AND WITH SOUND DEADENING MATERIAL APPLIED TO THE EXTERIOR OF THE CAB WALLS.
   b. REINFORCED ENAMELED STEEL CAB WALLS WITH REMOVABLE PLASTIC LAMINATE PANELS AND WITH SOUND DEADENING MATERIAL APPLIED TO THE EXTERIOR OF THE CAB WALLS.
3. CEILING: REFERENCE FINISH SCHEDULE AND NOTES
4. FLOOR: SUBFLOOR DESIGNED TO RECEIVE PORCELAIN TILE, REFERENCE FINISH SCHEDULE AND NOTES.
5. HANDRAILS: MANUFACTURER'S STANDARD SATIN STAINLESS STEEL PIPE RAIL ON REAR WALL.
6. SILL: EXTRUDED ALUMINUM WITH GROOVED SURFACE, 1/4" THICKNESS.
7. PROTECTION PADS: FURNISH ONE (1) SET OF STUDS AND PROTECTION PADS PER ELEVATOR.

D. OPERATING SYSTEM: AS DEFINED IN ASME A17.1
1. SIMPLEX

E. SIGNAL EQUIPMENT:
1. ILLUMINATED HALL-CALL AND CAR-CALL BUTTONS: SATIN STAINLESS STEEL LOCATED BESIDE (NOT IN) DOOR FRAME.
2. CONTROL STATION: RECESSED NO. 4 SATIN STAINLESS STEEL
3. EMERGENCY COMMUNICATION SYSTEM: COMPLY WITH ASME A17.1 AND THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.
4. CAR POSITION INDICATOR: LOCATED IN CAB ABOVE CAR DOOR OR CAR CONTROL STATION. ALSO INCLUDE AUDIBLE SIGNAL TO INDICATE CAR IS EITHER STOPPING OR PASSING A FLOOR; INCLUDE DIRECTION ARROWS.
5. HALL LANTERNS WITH ILLUMINATED ARROWS: MATCH FINISH OF HALL PUSH BUTTON STATIONS. MOUNT ABOVE DOOR FRAME.
6. HALL POSITION INDICATOR: MATCH FINISH OF HALL PUSH BUTTON STATIONS. MOUNT ABOVE EACH HOISTWAY ENTRANCE AT GROUND FLOOR.
7. DOOR REOPENING DEVICES, INFRARED ARRAY: UNIFORM ARRAY OF 36 OR MORE MICROPROCRESSOR-CONTROLLED INFRARED LIGHT BEAMS PROJECTING ACROSS CAR ENTRANCE. INTERRUPTION OF ONE OR MORE OF THE LIGHT BEAMS CAUSES DOORS TO STOP AND REOPEN.

F. INSTALLATION:
1. DRILL HOLES AND INSTALL CYLINDER IN PROTECTIVE CASING WITHIN WELL HOLES OR CASINGS AFTER REMOVING WATER AND DEBRIS.
2. ALIGN CYLINDER, ANCHOR SECURELY IN PLACE AT PIT FLOOR, AND FILL VOIDS WITH FINE SAND.
3. SEAL BETWEEN WELL CASING, PROTECTIVE CASING OR CYLINDER AND PIT FLOOR WITH 4" OF NONSHRINK, NONMETALLIC GROUT.
4. ADJUST ELEVATOR FOR 1/4" LEVELING TOLERANCE.
5. SET SILLS FLUSH WITH FINISH FLOOR AND FILL SPACE UNDER SILLS SOLID WITH NONSHRINK, NONMETALLIC GROUT.
6. RESTORE ANY STAINLLESS STEEL FINISHES DAMAGED DURING CONSTRUCTION.

- END DIVISION 14 -

DIVISION 15 - MECHANICAL

SEE MECHANICAL PLANS AND SPECIFICATIONS

DIVISION 16 - ELECTRICAL

SEE ELECTRICAL PLANS AND SPECIFICATIONS

DIVISION 21 - FIRE SUPPRESSION

283100 FIRE ALARM

A. SEE ELECTRICAL PLANS FOR SPECIFICATION OF FIRE ALARM SYSTEMS.
B. HORN/STROBE DEVICES: HORN/STROBE DEVICES SHALL BE "WHITE" AND SHALL BE CEILING MOUNTED TO MAXIMUM EXTENT FEASIBLE; WALL-MOUNTED WHERE NECESSARY.

210500 FIRE SUPPRESSION SYSTEMS

A. SEE MECHANICALPLANS FOR SPECIFICATIONS OF FIRE SUPPRESSION SYSTEMS
B. SUBMITTALS: SHOP DRAWINGS INDICATING LAYOUT AND PROPOSED HEIGHTS OF PIPING AND HEADS, AND PRODUCT DATA FOR VALVES, HEADS, AND ALARMS, INCLUDING CALCULATIONS. SUBMIT REQUIRED NUMBER OF SETS TO AUTHORITIES HAVING JURISDICTION FOR REVIEW, COMMENT, AND APPROVAL.
C. SPRINKLER HEADS AND ESCUTCHEONS: IN SUSPENDED ACOUSTICAL TILE CEILINGS, SPRINKLER HEADS SHALL BE PENDANT SEMI-RECESSED CHROME PLATED WITH CHROME PLATED ESCUTCHEONS. IN GYPSUM BOARD CEILINGS SPRINKLER HEADS SHALL BE CONCEALED WITH WHITE ENAMEL COVERS.
D. LAYOUT: SPRINKLER HEADS SHALL BE LAID OUT TO FALL IN "CENTER-OF-TILE" WHEN INSTALLED IN SUSPENDED ACOUSTICAL TILE CEILINGS AND SHALL BE LAID OUT SYMMETRICALLY IN GYPSUM BOARD CEILINGS.

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PARAGON STAR

LOT 20 - HUB BUILDING

2151 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
DAVID ALAN WILLIAMS
NUMBER A-5540
REGISTERED ARCHITECT

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

FINKLE + WILLIAMS
ARCHITECTURE
8787 RENNER BLVD., SUITE 100
LENEXA, KANSAS 66219
913 .498.1550
www.finklewilliams.com

SHEET TITLE

PROJECT SPECIFICATIONS

SHEET NUMBER

A11.12

Governing Building Code: 2018 IBC

Design Specifications:

- ASCE 7-16
- ACI 318-14
- ACI 530-16
- AISC 360-15
- AISI S100-16

Design Loads:

Roof Loads:
- Dead Load: 20 psf
- Solar Dead Load: 10 psf
- Live Load: 20 psf

Wind Loads:
- Occupancy: II
- Velocity: 109 mph
- Exposure: C
- Iw: 1.0

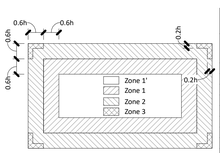
Snow Loads:
- Pg, Prn: 20 psf
- Pf: 14 psf
- Ce: 1.0
- Is: 1.0
- Ct: 1.0

Drift Load: Per Plan

Seismic Loads:
- Ie: 1.0
- Ss: 0.099 g
- S1: 0.068 g
- Site Class: D
- Sds: 0.105 g
- Sd1: 0.109 g
- Seismic Design Category: B
- Seismic Force- Resisting System: L.F.S.W
- Design Base Shear: CsW
- Cs: 0.053
- R: 2
- Analysis Procedure Used: E.L.F.P.

Design Loading Notes:

1. Dead load shown includes collateral load of 3 psf.
2. See components and cladding table for design wind pressures.



Components & Cladding Wind Zone Diagram

COMPONENTS & CLADDING WIND PRESSURES

Zone	Effective Wind Area (sq ft)	Max. +VE Pressure (psf)	Max. -VE Pressure (psf)
1 - Roof Interior	10	16.0	-40.1
1 - Roof Interior	20	16.0	-37.5
1 - Roof Interior	50	16.0	-34.0
1 - Roof Interior	≥ 100	16.0	-31.3
1' - Roof Interior	10	16.0	-23.0
1' - Roof Interior	20	16.0	-23.0
1' - Roof Interior	50	16.0	-23.0
1' - Roof Interior	≥ 100	16.0	-23.0
2 - Roof Edge	10	23.0	-52.9
2 - Roof Edge	20	22.0	-49.5
2 - Roof Edge	50	20.7	-45.0
2 - Roof Edge	≥ 100	19.7	-41.6
3 - Roof Corner	10	23.0	-52.9
3 - Roof Corner	20	22.0	-49.5
3 - Roof Corner	50	20.7	-45.0
3 - Roof Corner	≥ 100	19.7	-41.6
4 - Wall Interior	10	23.0	-25.0
4 - Wall Interior	20	22.0	-23.9
4 - Wall Interior	50	20.7	-22.6
4 - Wall Interior	≥ 100	19.7	-21.6
5 - Wall Edge	10	23.0	-30.7
5 - Wall Edge	20	22.0	-28.7
5 - Wall Edge	50	20.7	-26.0
5 - Wall Edge	≥ 100	19.7	-23.9

General:

1. The structural systems shown on these documents have been designed for the final, in place usage of the structure based on the intended occupancy and code requirements. While general constructability has been considered, the structural systems have not been designed to accommodate specific construction means and methods that might be utilized by the Contractor.

2. The Contractor shall field verify all existing dimensions prior to fabrication.

3. The Contractor shall notify the Engineer of any observed discrepancies in dimensions, detailing, or other items as shown on the plans or specified prior to proceeding with work relating to said discrepancies.

4. The Contractor shall not alter or modify work shown on the structural drawings without receiving written approval from the Engineer.

5. The Contractor shall be responsible for supplying shop drawings for structural steel, metal deck, reinforcing steel, concrete masonry units and accessories, plan and elevation views of concrete masonry wall elevations including control joint and expansion joint locations, mortar and grout, and concrete mix designs. Shop drawings must be reviewed for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of the Contractor, and shall be stamped "approved" by the Contractor prior to submittal. Shop drawings submitted without the Contractor's stamped approval will be returned "rejected". All shop drawings shall be reviewed by the Structural Engineer prior to construction.

6. See architectural, mechanical, and electrical drawings for other pertinent information related to the structural work and coordinate as required. These structural drawings are intended to be included in a complete set of construction documents, including but not limited to, architectural drawings, civil drawings, and mechanical/electrical/plumbing drawings. Contractor shall verify coordination of these drawings with contents of above drawing sets specified and only proceed with bidding and construction after such has taken place.

7. The building and the independent structural components shown in these documents are not structurally stable until all connections, framing, shear walls, diaphragms, permanent bracing, metal decking, interior and exterior concrete slabs on grade, and exterior or interior load-bearing walls are complete and have achieved their design strength. Contractor is solely responsible for maintaining structural stability during erection and construction. Temporary bracing systems shall remain in place until all structural work is complete.

8. The Contractor is responsible for verifying all existing dimensions and conditions of the existing building and reporting discrepancies from the assumed conditions shown on the structural drawings to the Engineer of record prior to fabrication and erection of any member.

9. The Contractor shall coordinate the roof drainage system with the Architect as required to ensure that no more than 3 1/2" of water can accumulate before entering an overflow drainage system.

Structural Engineer Site Observations:

1. The contract structural drawings & specifications represent the finished structure, and, except where specifically shown, do not indicate the method or means of construction. The Contractor shall supervise and direct the work and shall be solely responsible for all construction means, methods, procedures, techniques, and sequence.

2. The Engineer shall not have control nor charge of and shall not be responsible for, construction means, methods, techniques, sequences, or procedures, for safety precautions & programs in connection with the work, for the acts or omission of the Contractor, subcontractor, or any other persons performing any of the work, or for the failure of any of them to carry out the work in accordance with the contract documents.

3. Periodic site observation by field representatives of BSE Structural Engineers LLC. is solely for the purpose of determining if the work of the Contractor is proceeding in general accordance with the structural contract documents. This limited site observation should not be construed as exhaustive or continuous to check the quality or quantity of work, but rather periodic in an effort to guard the Client against defects or deficiencies in the work of the Contractor.

Slab On Grade:

1. Welded wire fabric shall be supplied in sheets only. Rolls will not be permitted. (As required on construction documents.)

2. Welded wire fabric shall be supported on chairs or blocks prior to concrete placement. Mesh shall not be hooked and pulled up during concrete placement. (As required on construction documents.)

3. Welded wire fabric shall have end and edge laps of one full mesh plus 2" between cross wires. Wire all laps securely together.

4. Welded wire fabric shall conform to ASTM A1064.

5. Floor finish requirements: Slab-on-grade shall be finished to overall floor flatness, overall floor levelness, local floor flatness, and local floor levelness requirements as defined by the Owner. Coordinate requirements as required with G.C. prior to slab-on-grade placement. Floor finish requirements to be determined in accordance with ASTM E 1155.

Foundations:

1. Foundations for this project have been designed in accordance with requirements set forth in a geotechnical report prepared by Terracon Consultants (Project #02215001) dated July 21, 2021. Continuous and individual footings have been designed for an allowable soil bearing value of 1500 psf. The Contractor shall refer to the Geotechnical Report for all requirements and recommendations pertinent to this project.

2. Anchor rods shall conform to ASTM F1554 Gr. 36 (U.N.O.) and shall be located by means of a template. Provide a nut above and below template to assure proper vertical alignment.

3. All foundations shall be square and level.

4. Grout shall be dry and stiff to prevent shrinkage, with a minimum compressive strength of 4000 psi. Grout below column base plates and precast panels as required. Thoroughly compact grout beneath base plates.

Concrete and Reinforcing Steel:

1. Concrete mix designs shall meet the following requirements:

Location	Minimum Compressive Strength (psi)	Max. Aggregate Size	Max. Water/Cement Ratio	Slump (in.)	Air Entrainment (%)
Interior Slabs	4000	3/4"	0.50	4 ± 1	0
Exterior Slabs	4500	3/4"	0.45	4 ± 1	6 ± 1
Interior Foundations	3500	1"	0.50	4 ± 1	0
Perimeter Foundations	3500	1"	0.50	4 ± 1	6 ± 1

2. Fly ash shall not be used unless approved in writing by the Engineer. Fly ash, if approved, shall conform to ASTM C618 and ACI 232.2R-96. Fly ash shall be limited to types C & F and shall not exceed 15% of the total cement mass.

3. The use of admixtures to increase the slump shall not be used unless approved in writing by the Engineer.

4. All concrete is reinforced unless specifically called out as unreinforced. Reinforce all concrete not otherwise shown with same steel as in similar sections or areas.

5. Construction joints in grade beams shall be at midspan unless noted otherwise. Reinforcing steel shall be continuous through construction joints unless noted otherwise.

6. No aluminum items shall be embedded in any concrete or placed in contact with concrete.

7. Reinforcing bars #4 and larger (except ties and stirrups) shall meet ASTM A615 with Supplementary Requirements (S1), Grade 60. Smaller bars shall be Grade 40.

8. Concrete coverage of reinforcement shall have the following clear distances unless noted otherwise on the drawings:

   Cast against earth: 3"

   Formed concrete exposed to earth or weather: 2"

   Not exposed to earth or weather: 1" Slabs, 1 1/2" Beams and columns

9. Embedded and all reinforcing bars marked continuous shall be embedded to develop the full tensile capacity of the bar. Laps shall be Class B tension laps unless specified otherwise on the drawings. Unless shown otherwise, splice top bars near midspan and splice bottom bars over supports.

10. Supply corner bars 4'-0" long (min. 2'-0" in each direction) in outside face of wall at corners of all walls and grade beams, matching size and spacing of horizontal bars. Where there are no vertical bars in outside face of wall, supply three (3) - #4 vertical support bars for corner bars.

11. All bars are to be supported in forms and spaced with wire bar supports per ACI "Manual of Standard Practice for Detailing Concrete Structures" (latest edition). Bars shall be securely wired per the latest edition of CRSI's "Recommended Practice for Placing Reinforcing Bars." Accessories for exposed concrete shall be plastic or shall have plastic-tipped feet.

12. Concrete placed during cold weather shall conform to the requirements of the most recent version of ACI 306R. Cold weather is defined as a period when, for more than 3 successive days, the mean daily temperature drops below 40°F.

13. Concrete placed during hot weather shall conform to the requirements of the most recent version of ACI 305R. Hot weather is defined as that combination of air temperature, concrete temperature, relative humidity and wind speed that will cause a rate of evaporation of 0.2 lb/sq.ft./hr. or more as defined by Figure 2.1.5 of ACI 305R.

14. Do not add water to concrete during delivery, at Project Site, or during placement, unless approved by the Engineer.

15. Provide 3/4" chamfer on all exposed corners unless noted otherwise on architectural or structural construction documents.

16. All cold joints shall be roughened and cleaned unless noted otherwise.

17. Vertical control joints in walls shall be placed at 30'-0" maximum spacing unless noted otherwise. Locate joints beside piers monolithic with walls, near corners, and in concealed locations where possible. Construction joints may be placed in lieu of control joints at contractors discretion. Coordinate location of control joints with Architect.

18. Refer to architectural drawings for foundation insulation requirements.

Post-Installed Anchors:

1. Post-Installed anchors shall only be used where specified in the construction documents or approved by the engineer.

2. The Contractor shall obtain written approval from the Engineer prior to installing post-installed anchors for misplaced-placed anchors.

3. Care shall be taken with placing post-installed anchors to avoid damaging existing reinforcement.

4. The holes shall be drilled and cleaned in accordance with the manufacturer's specifications.

5. Post-installed anchors shall meet ACI 318 Appendix D criteria. The following are acceptable post-installed anchors:

   All adhesive anchoring systems referred to in these drawings shall be one of the following:
   a. Hilti HIT HY 200
   b. Powers AC100+ Gold
   c. Simpson Strong-Tie SET-3G
   d. Or Approved Equivalent

   All screw anchors referred to in these drawings shall be one of the following:
   a. Hilti KH-EZ
   b. Powers Wedge Bolt+
   c. Simpson Strong-Tie Titan HD
   d. Or Approved Equivalent

Masonry:

1. Mortar shall be Type S for all masonry work and must achieve a minimum compressive strength of 1800 psi at the 28-day test. Masonry units shall have a minimum strength of f'm = 2000 psi.

2. Masonry grout shall be a coarse-type grout and must achieve a minimum compressive strength of 2000 psi at the 28-day test. Slump shall range from 8" minimum to 10" maximum. Grout materials and proportions shall conform to ASTM C476.

3. All masonry shall be reinforced with horizontal 9 gauge truss type reinforcement at 16" o.c. vertical or as shown on the drawings.

4. Vertical reinforcing shall be installed as noted on the drawings. Reinforcing bars shall be lapped as specified on the design drawings. If no lap length is shown, contact the Engineer.

5. Vertical control joints in masonry shall be 3/8" wide, full height of wall at locations shown on the Architectural drawings. Joints shall be spaced at a maximum of 25'-0" apart and coordinated with the Architect. All horizontal joint reinforcing shall be discontinuous at masonry control joints. Refer to typical details for additional information

6. Lintels over openings shall be installed as indicated on the drawings. If no lintels are indicated, notify the Engineer.

7. Provide at least (1) vertical rebar at each end of each wall, side of control joints, jambs, corner, and intersection of all reinforced masonry walls. Size of rebar to match the size of typical vertical reinforcing shown.

8. Provide (1) corner bar at each horizontal bond beam. Size of rebar to match typical bond beam reinforcing shown.

9. Submit shop drawings including plan and elevation views of reinforced masonry walls including bond beams, control joints, expansion joints, and lintels.

10. All steel beams bearing on masonry shall have (3) cores minimum grouted full directly below the bearing locations unless noted otherwise.

11. All bond beam reinforcing shall continue through control joints.

12. All cells containing reinforcement, bolts, or other metal anchors shall be grouted solid. Any cells below grade shall be grouted solid whether reinforced or not.

Structural Steel:

1. All structural steel shall conform to the following (U.N.O.):

Structural Steel Wide Flanges:	ASTM A992
Miscellaneous Steel:	ASTM A36
Structural Tubing:	ASTM A500, Grade B (Fy = 46 ksi)
Steel Pipe:	ASTM A53, Type E or S, Grade B

2. Bolts shall be as follows (U.N.O.):

Connection Bolts:	ASTM A325
Anchor Rods:	ASTM F1554, Grade 36
Shear Studs:	ASTM A108, Grade 1015 through 1020

3. Welding shall conform to the latest publication of applicable codes set forth by the American Welding Society. Welding electrodes shall be E70XX.

4. All exterior steel exposed to weather shall be hot-dipped galvanized and/or painted per Architect unless noted other wise.

5. All openings in the roof shall be framed with a 4 x 4 x 1/4 angle minimum, unless noted otherwise. Mechanical units shall be supported with structural steel frames as required. If framing is not shown for mechanical units, notify the Engineer.

Light Gauge Metal Framing:

1. All light gauge structural studs, track and accessories shall be designed in accordance with the latest edition of the American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," and shall be of type, size, gauge and spacing shown on the drawings.

2. All 16 gauge and heavier studs and joists shall be formed from corrosion-resistant steel corresponding to the requirements of ASTM A446, with a minimum yield strength of 50 ksi. All 18 gauge and lighter studs, joists, track and accessories shall be formed from corrosion-resistant steel corresponding to the requirements of ASTM A446, with a minimum yield strength of 33 ksi.

3. Prior to fabrication of framing, the Contractor shall submit fabrication and erection drawings to the Architect/Engineer for approval.

4. Prefabricated panels shall be square, with components attached in a manner to prevent racking and minimize distortion while lifting. The Contractor shall provide temporary bracing where required.

5. All framing components shall be cut squarely for attachment to perpendicular members, or as required, for angular fit against abutting members. Splicing of axial loaded members is not permitted.

6. Axially loaded studs shall be installed in a manner which will assure that their ends are positioned against the inside of the track web prior to fastening. Studs shall be securely fastened to both flanges of the top and bottom track.

7. Fastening of components shall be with self-drilling screws or welding. Wire tying of components shall not be permitted. Screws shall be of sufficient size to ensure the strength of connection. All connections shall be made with a minimum of (2) #10 screws or 1/8" fillet weld two inches long. All welds shall be touched up with a zinc-rich paint.

8. Tracks shall be securely anchored to the supporting structure as shown on the drawings. Abutting lengths of tracks shall be securely anchored to a common structural element, butt-welded or spliced together.

9. Wall stud bridging shall be attached in a manner to prevent stud rotation. Bridging rows shall be spaced according to manufacturer's specifications or recommendations. 4'-0" maximum spacing between rows of bridging.

10. Provision for structure vertical movement shall be provided where indicated on the drawings.

11. Minimum thickness values of framing specified in gauge values on drawings are as follows:

Minimum Design Thickness (mil)	Design Thickness (in.)	Inside Corner Radius (in.)	Gauge No. (Reference Only)
18	0.0188	0.0843	25
27	0.0283	0.0796	22
30	0.0312	0.0781	20 - Drywall
33	0.0346	0.0764	20 - Structural
43	0.0451	0.0712	18
54	0.0566	0.0849	16
68	0.0713	0.1069	14
97	0.1017	0.1525	12

NOTE: Minimum Thickness represents 95% of the design thickness and is the minimum acceptable thickness delivered to the job site based on Section A3.4 of the 1996 AISI Specification.

Special Inspector:

1. The following items require special inspection in accordance with the building code.
   a. Reinforced masonry construction - level 1 inspection
   b. Concrete & masonry grout design mix
   c. Placing of concrete & reinforcing steel
   d. Bolts & anchors embedded in concrete & masonry
   e. Concrete formwork
   f. Structural steel fabrication
   g. Structural steel bolting & welding
   h. Inspection of roof & deck attachment
   i. Post installed anchors in masonry & concrete
   j. In-situ soils, excavations, filling & compaction

2. The Contractor shall request special inspection of the items listed above prior to those items becoming inaccessible & unobservable due to progression of the work.

3. The Special Inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for inspection of the particular type of construction or operation requiring special inspection.

4. The Special Inspector shall observe the work assigned for conformance with the approved design drawings and specifications.

5. The Special Inspector shall furnish inspection reports to the Building Official, the Engineer and Architect of record, and other designated persons. All discrepancies shall be brought to the immediate attention of the Contractor for correction, then if uncorrected, to the proper design authority and to the Building Official.

6. The Special Inspector shall submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable workmanship provisions of the governing building codes.

Earthwork:

1. The Inspector must verify that the preparation of the natural ground and the placement of engineered fill is performed in accordance with the GEOTECHNICAL engineer's recommendations as stated in the GEOTECHNICAL report.

2. The Inspector must monitor the placement of all fill to determine whether the type of material, moisture content, and degree of compaction are within the recommended limits contained in the GEOTECHNICAL report. Proceed with subsequent earthwork only after test results for previously completed work comply with recommended limits contained in the GEOTECHNICAL report.

3. All Subgrade supporting footings and slabs must be inspected immediately prior to the placement of reinforced concrete.

4. Paved and building slab areas shall be tested at Subgrade and at each compacted fill and backfill layer, at least once for every 2000 sq. ft. or less of paved or building slab areas, but in no case fewer than 3 tests.

5. Foundation wall backfill shall be tested at each compacted initial and final backfill layer, at least once for each 100 ft. or less of wall length, but no fewer than 2 tests.

6. Trench backfill shall be tested at each compacted initial and final backfill layer, at least once for each 150 ft. or less of trench length, but no fewer than 2 tests.

7. Test compaction of soils-in-place in accordance with ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

8. Test Reporting: Test results must be reported to BSE and the general contractor in writing within 24 hours after testing, via fax. Reports must contain the project name, the date of the test and the location of the test.

Concrete:

1. Strength test cylinders shall be prepared for each day's pour of each concrete mix and at a minimum frequency of every 50 cu. yd. on all concrete placed. Conform to ASTM C39.

2. Four (4) test cylinders are to be made and cured on site for the first 24 hours. Test one of the specimens at 7 days and two at 28 days. Hold the fourth specimen in reserve for later testing if needed.

3. Slump, air content and temperature tests shall be conducted at a minimum when strength specimens are made and at any other times as specified by the Engineer.

4. Perform slump tests on a representative concrete sample at the point of discharge. Perform additional tests when concrete consistency seems to have changed. The maximum allowable field slump is 5 inches. Conform to ASTM C143.

5. Perform air content tests on all concrete specified to be air-entrained. Conform to ASTM C231.

6. Perform a temperature test every hour when air temperature is 40°F and below, or when air temperature is 80°F and above. Conform to ASTM C 1064.

7. Prior to the closing of forms or the delivery of concrete to the job site, the inspector shall verify that the reinforcing steel is in conformance with the city-approved plans, specifications and shop drawings. The inspector shall confirm that the reinforcing steel is of the correct size and grade and ensure that the proper spacing, clearances, splice lengths and embedded items have been provided. All reinforcing steel shall be in place prior to the placement of concrete and be secured against displacement.

8. The Inspector shall verify that the bolt size, location and embedment length of all anchor bolts are in conformance with the city-approved plans, specifications and shop drawings.

9. Anchor rods 3/4"Ø or smaller may be floated in place following concrete placement, provided that anchor bolts are worked easily by hand into the fresh concrete to allow for full contact with the shank of the bolt. Bolts shall be placed by means of a template and shall be worked into concrete in vertical alignment.

10. Test Reporting: Test results must be reported to BSE and the General Contractor in writing within 24 hours after testing, via fax or email. Reports of compressive strength tests must contain the project name, the date of concrete placement, the location of concrete placement within the structure and the concrete mix design being used.

Structural Steel:

1. Bolts: Bolts that are not identified as being slip-critical nor in direct tension need not be inspected other than to verify that the plies of connected elements are brought into snug-tight condition in properly-aligned holes.

2. Field Welding: Inspection is required for single-pass fillet welds, multi-pass fillet welds, complete- and partial-penetration groove welds, floor and roof deck welding, and stairs and railing systems. Prior to the start of the work, materials, qualifications of welding procedures and welder qualifications shall be verified. Provide continuous or periodic inspection of the structural welding as indicated in Table 1704.3 of the referenced IBC. Inspections may occur periodically, as defined below. A visual inspection to ensure proper type, size, length and quality of all field welds is required prior to work being concealed by other materials.

3. Periodic inspection: "Periodic" is defined as generally once a week at a minimum, and more often as needed to observe work requiring inspections, as outlined above, prior to being covered by subsequent construction.

4. Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding. Shear connector stud welds shall be visually inspected. Bend tests shall be performed if visual inspections reveal less than a 360-degree flash or welding repairs to any shear connector stud.

5. Structural steel bar joists and metal buildings fabricated on the premises of a facility/plant not certified by a nationally recognized organization, shall have in-plant special inspections. AISC, ICBO, CWB and SJI are certified fabricators.

6. Test Reporting: Test results must be reported to BSE and the General Contractor in writing within 24 hours of testing, via fax or email. Reports must contain the project name, the date of the test and the location of the test.

Masonry:

1. Mortar properties, grout, brick, concrete masonry unit and prism tests and evaluations are to be performed during construction for each 5,000 sq. ft. of wall area or portion thereof.

2. Mortar properties are to be tested per ASTM C 780.

3. Grout will be sampled and tested for compressive strength per ASTM C 1019.

4. Brick tests for each type and grade of brick indicated are to be performed according to ASTM C 67.

5. Concrete masonry unit tests for each type of concrete masonry unit indicated are to be performed per ASTM C 140.

6. Masonry prisms are to be tested per ASTM C 1314. Prepare one (1) set of prisms for testing at 7 days and one (1) set for testing at 28 days.

7. Special inspection of masonry construction is required during preparation and taking of any required prisms or test specimens, placing of all masonry units, placement of reinforcement and inspection of grout space immediately prior to closing cleanouts, and during all grouting operations.

8. Test Reporting: Test results must be reported to BS and the general contractor in writing within 24 hours of testing, via fax. Reports must contain the project name, the date of the test and the location of the test.

Required Verification and Inspection of Steel Construction Other Than Structural Steel Per IBC Table 1705.2.2

Type	Continuous Special Inspection	Periodic Special Inspection	Referenced Standard
1. Material verification of cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	-	X	Applicable ASTM material standards
b. Manufacturer's certified test reports.	-	X	
2. Inspection of welding and attachment:			
a. Cold-formed steel deck:			
1. Floor and roof deck welds and other means of attachment.	-	X	AWS D1.3
b. Reinforcing steel:			
1. Verification of edibility of reinforcing steel other than ASTM A 706.	-	X	AWS D1.4 ACI 318: Section 3.5.2
2. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X X	- -	
3. Shear reinforcement.	-	X	
4. Other reinforcing steel.	-	X	

a. Where applicable, see also Section 1705.11 Special inspections for seismic resistance.

Required Special Inspections and Tests of Concrete Construction Per IBC Table 1705.3

Type	Continuous Special Inspection	Periodic Special Inspection	Referenced Standard
1. Inspect reinforcement, including prestressing tendons, and verify placement.	-	X	ACI 318 Chp. 20, 25.2, 25.3, 26.6.1-26.6.3.
2. Reinforcing bar welding:			
a. Verify weldability of reinforcing bars other than ASTM A706	-	X	AWS D1.4 ACI 318: 26.6.4
b. Inspect single-pass fillet welds, maximum 5/16"; and	-	X	
c. Inspect all other welds.	X	-	
3. Inspect anchors cast in concrete.	-	X	ACI 318: 17.8.2
4. Inspect anchors post-installed in hardened concrete members			
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads,	X	-	ACI 318: 17.8.2.4
b. Mechanical anchor and adhesive anchors not defined in 4.a.	-	X	ACI 318: 17.8.2.
5. Verify use of required design mix.	-	X	ACI 318: Chp. 19, 26.4.3, 26.4.4
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X	-	ASTM C172 ASTM C31 ACI 318: 26.4, 26.12
7. Inspect concrete and shotcrete placement for proper application techniques.	X	-	ACI 318: 26.5
8. Verify maintenance of specified curing temperatures and techniques.	-	X	ACI 318: 26.5.3-26.5.5
9. Inspect prestressed concrete for:			
a. Application of prestressing forces; and	X	-	ACI 318: 26.10
b. Grouting of bonded prestressing tendons.	X	-	
10. Inspect erection of precast concrete members.	-	X	ACI 318: Chp. 26.8
11. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	-	X	ACI 318: 26.11.2
12. Inspect framework for shape, location and dimensions of the concrete member being formed.	-	X	ACI 318: 26.11.1.2(B)

a. Where applicable, see also Section 1705.12, Special inspections for seismic resistance.
b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.

Required Special Inspections and Tests of Soils Per IBC Table 1705.6

Type	Continuous Special Inspection	Periodic Special Inspection
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of compacted fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	-
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	-	X

Required Special Inspections and Tests of Driven Deep Foundation Elements Per IBC Table 1705.7

Type	Continuous Special Inspection	Periodic Special Inspection
1. Verify element materials, sizes and lengths comply with the requirements.	X	-
2. Determine capacities of test elements and conduct additional load tests, as required.	X	-
3. Inspect driving operations and maintain complete and accurate records for each element.	X	-
4. Verify placement locations and plumbness, confirm type size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X	-
5. For steel elements, perform additional special inspections in accordance with Section 1705.2.	-	-
6. For concrete elements and concrete-filled elements, perform tests and additional special inspections in accordance with Section 1705.3.	-	-
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	-	-

Required Special Inspections and Tests of Cast-In-Place Deep Foundation Elements Per IBC Table 1705.8

Type	Continuous Special Inspection	Periodic Special Inspection
1. Inspect drilling operations and maintain complete and accurate records for each element.	X	-
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	X	-
3. For concrete elements, perform tests and additional special inspections in accordance with Section 1705.3.	-	-

Required Quality Control Inspections (GCI) & Quality Assurance Inspections (QAI) of Steel Construction Per AISC 360, Specification Chapter M & N

Type	Frequency of Inspections	Referenced Standard
1. The fabricator's QCI shall inspect the following as a minimum, as applicable:		AISC 360 Chp. M & N TABLE N5.4-1
a. Shop welding, high strength bolting and details in accordance with AISC 360, Section N5.	Per AISC	TABLE N5.4-2 TABLE N5.4-3
b. Shop cut and finished surfaces in accordance with AISC 360, section M2.	Per AISC	TABLE N5.6-1 TABLE N5.6-2
c. Shop heating for straightening, cambering and curving in accordance with AISC 360, Section M2.1.	Per AISC	TABLE N5.6-3 TABLE N6.1
d. Tolerances for shop fabrication in accordance with the Code of Standard Practice, Section 6.	Per AISC	Code of Standard Practice Sec. 6
2. The erector's QCI shall inspect the following as a minimum, as applicable:		
a. Field welding, high strength bolting and details in accordance with AISC 360, Section N5.	Per AISC	AISC 360 Chp. M&N TABLE N5.4-1
b. Steel deck and headed steel stud anchor placement and attachment in accordance with AISC 360, Section N6.	Per AISC	TABLE N5.4-2 TABLE N5.4-3
c. Field cut surfaces in accordance with AISC 360, Section M2.2.	Per AISC	TABLE N5.6-1 TABLE N5.6-2
d. Field heating for straightening in accordance with AISC 360, Section M2.1.	Per AISC	TABLE N5.6-3 TABLE N6.1
e. Tolerances for field erection in accordance with the Code of Standard Practice, Section 7.13.	Per AISC	Code of Standard Practice Sec. 6
3. QAI shall be performed by others. All required inspection and non-destructive testing, as applicable, shall be in accordance with AISC 360	Per AISC & IBC	AISC 360 Chp. M&N

ABBREVIATIONS LIST

&	AND		
@	AT		
°	DEGREES		
=	EQUALS		
'	FEET		
>	GREATER THAN		
≥	GREATER THAN OR EQUAL TO		
"	INCHES		
<	LESS THAN		
≤	LESS THAN OR EQUAL TO		
-	MINUS, NEGATIVE		
+	PLUS		
±	PLUS OR MINUS		
A.F.F	ABOVE FINISHED FLOOR		
ALT.	ALTERNATE		
ARCH.	ARCHITECT		
BLDG.	BUILDING		
BM.	BEAM		
B.O.S.	BOTTOM OF STEEL		
BOTT.	BOTTOM		
C.J.	CONTROL/CONSTRUCTION JOINT		
CL	CENTER LINE		
C.M.U.	CONCRETE MASONRY UNIT		
CLG.	CEILING		
CLR.	CLEAR		
COL.	COLUMN		
CONC.	CONCRETE		
CONT.	CONTINUOUS		
COORD.	COORDINATE		
CTR.	CENTER		
DIA.	DIAMETER		
DN.	DOWN		
DWG.	DRAWING		
E.J.	EXPANSION JOINT		
E.O.R.	ENGINEER OF RECORD		
EA.	EACH		
EL.	ELEVATION		
ELEV.	ELEVATION		
ENG.	ENGINEER		
EQ.	EQUAL		
EQUIP.	EQUIPMENT		
ETC.	ET CETERA		
EXIST.	EXISTING		
EXT.	EXTERIOR		
F.A.	FACE		
F.B.E.	FOOTING BEARING ELEVATION		
F.F.E.	FINISHED FLOOR ELEVATION		
F.S.	FAR SIDE		
FT.	FOOT/FEET		
FTG.	FOOTING/FOUNDATION		
G.C.	GENERAL CONTRACTOR		
GALV.	GALVANIZED		
GYP.	GYPSUM		
HORIZ.	HORIZONTAL		
IN	INCHES		
J.B.E.	JOIST BEARING ELEVATION		
JT.	JOINT		
KSI	KIPS PER SQUARE INCH		
K	KIPS		
L.F.	LINEAR FEET		
LB.	POUND		
LLH	LONG LEG HORIZONTAL		
LLV	LONG LEG VERTICAL		
M.B.M.	METAL BUILDING MANUFACTURER		
M.E.P.	MECHANICAL ELECTRICAL PLUMBING		
MAX.	MAXIMUM		
MIN.	MINIMUM		
MISC.	MISCELLANEOUS		
N.A.	NOT APPLICABLE		
N.S.	NEAR SIDE		
N.T.S.	NOT TO SCALE		
Ø	DIAMETER		
P.E.M.B.	PRE-ENGINEERED METAL BUILDING		
PL.	PLATE		
PSF	POUNDS PER SQUARE FOOT		
PSI	POUNDS PER SQUARE INCH		
R	RADIUS		
REINF.	REINFORCED		
REQ'D.	REQUIRED		
SF	SQUARE FEET		
SIM.	SIMILAR		
SPA.	SPACING		
SPEC.	SPECIFICATION		
SQ.	SQUARE		
T.O.C.	TOP OF CONCRETE		
T.O.F.	TOP OF FOOTING		
T.O.S.	TOP OF STEEL		
T.O.W.	TOP OF WALL		
THRU.	THROUGH		
TYP.	TYPICAL		
U.N.O.	UNLESS NOTED OTHERWISE		
VERT.	VERTICAL		
W.W.F.	WELDED WIRE FABRIC		
WT.	WEIGHT		
W/	WITH		
W/O	WITHOUT		

SHEET LIST

Sheet Number	Sheet Name
S0.0	GENERAL NOTES
S0.1	ISOMETRIC
S1.1	FOUNDATION PLAN
S2.1	ROOF FRAMING PLAN
S3.1	TYPICAL FOUNDATION DETAILS
S3.2	FOUNDATION DETAILS
S4.1	TYPICAL FRAMING DETAILS
S4.2	TYPICAL FRAMING DETAILS
S4.3	FRAMING DETAILS

MATERIALS LEGEND

ALUMINUM
CONCRETE
EARTH
GRAVEL
GROUT
GYPSUM
INSULATION - RIGID
MASONRY - BRICK
MASONRY - CMU
PLYWOOD
STEEL
TILT / PRE-CAST

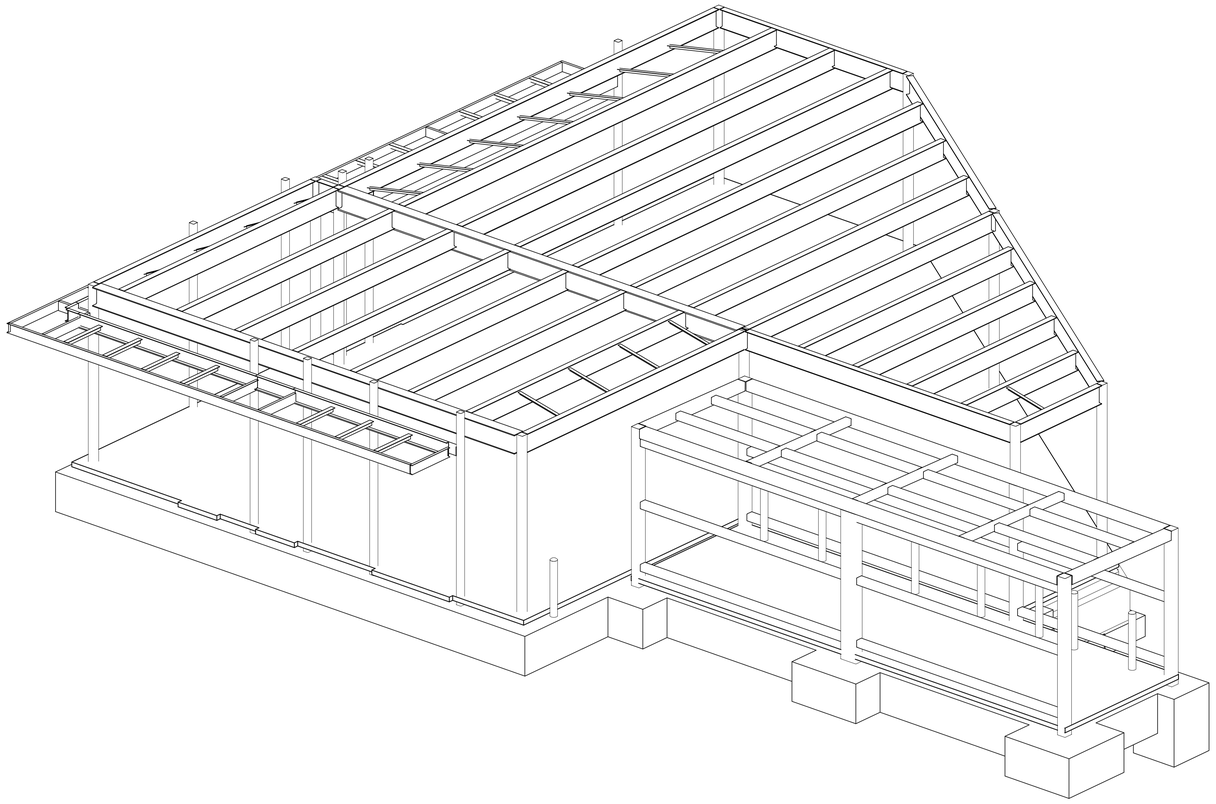
SYMBOLS LEGEND

DETAIL
01 — DRAWING NUMBER
S1.0 — SHEET NUMBER
AREA OF DETAIL

ELEVATION
01 — DRAWING NUMBER
S1.0 — SHEET NUMBER

SECTION
01 — DRAWING NUMBER
S1.0 — SHEET NUMBER
TYP.

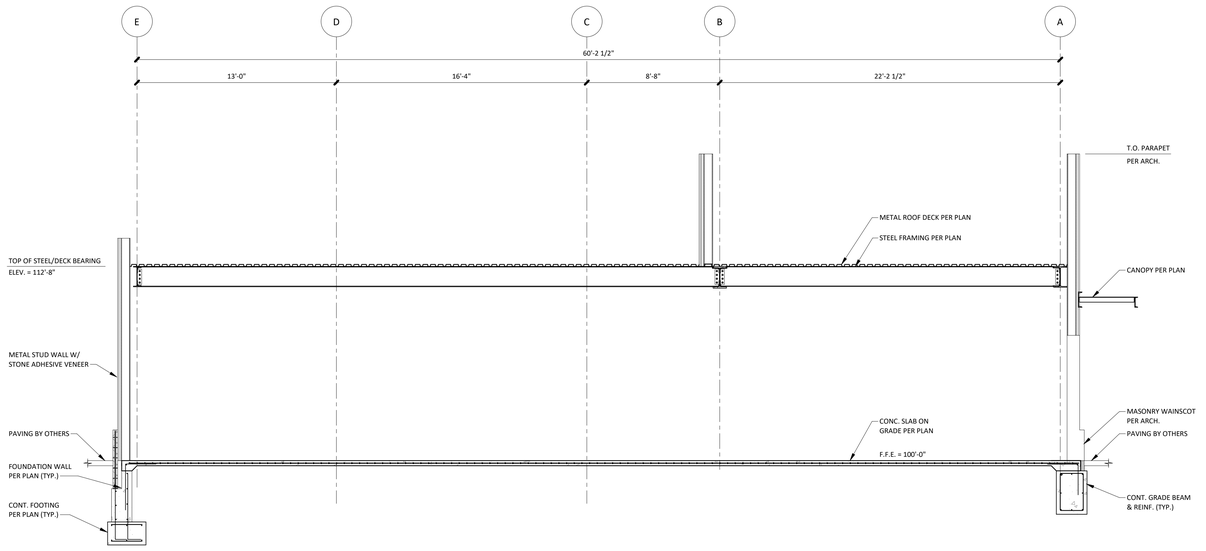
W16x26(12)c=3/4 — BEAM DESIGNATION
CAMB



NOTES:

1.) ISOMETRIC VIEWS ARE SHOWN FOR SCHEMATIC PURPOSES ONLY. ACTUAL CONSTRUCTION TO MATCH CONSTRUCTION DOCUMENTS. REFERENCE ARCHITECTURAL, MECHANICAL, CIVIL, & STRUCTURAL DOCUMENTS.

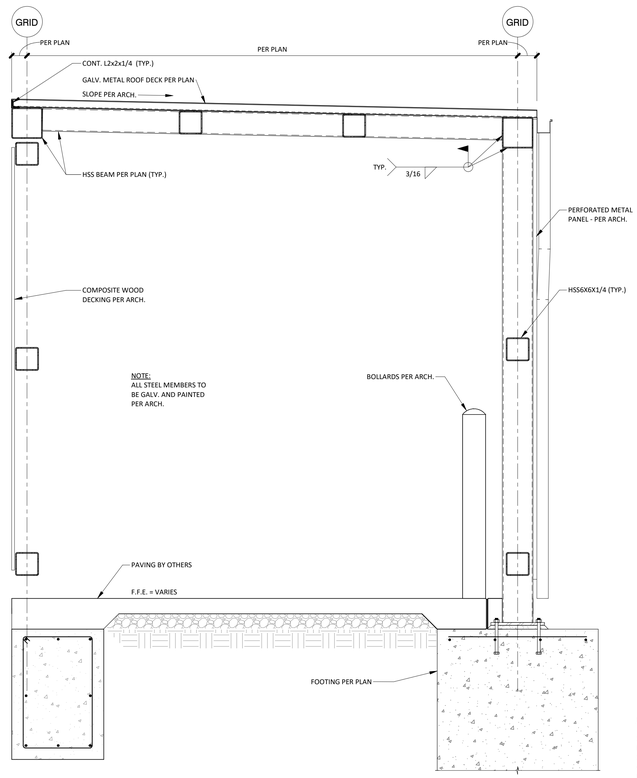
ISOMETRIC | 01
S0.1



NOTES:

1.) BUILDING SECTIONS ARE SHOWN FOR SCHEMATIC PURPOSES ONLY. ACTUAL CONSTRUCTION TO MATCH CONSTRUCTION DOCUMENTS. REFERENCE ARCHITECTURAL, MECHANICAL, CIVIL, & STRUCTURAL DOCUMENTS.

BUILDING SECTION | 02
1/4" = 1'-0" | S0.1



NOTES:

1.) BUILDING SECTIONS ARE SHOWN FOR SCHEMATIC PURPOSES ONLY. ACTUAL CONSTRUCTION TO MATCH CONSTRUCTION DOCUMENTS. REFERENCE ARCHITECTURAL, MECHANICAL, CIVIL, & STRUCTURAL DOCUMENTS.

BUILDING SECTION | 03
3/4" = 1'-0" | S0.1

C:\Users\Daniel Nagatt\Documents\Revit Local\21-036 Paragon Star HUB Building - Lee's Summit, MO_dnagatt.rvt

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.: 19050.01
Date: 08/06/21
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
STEVEN N. RUSEY
NUMBER E-25462
PROFESSIONAL ENGINEER

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

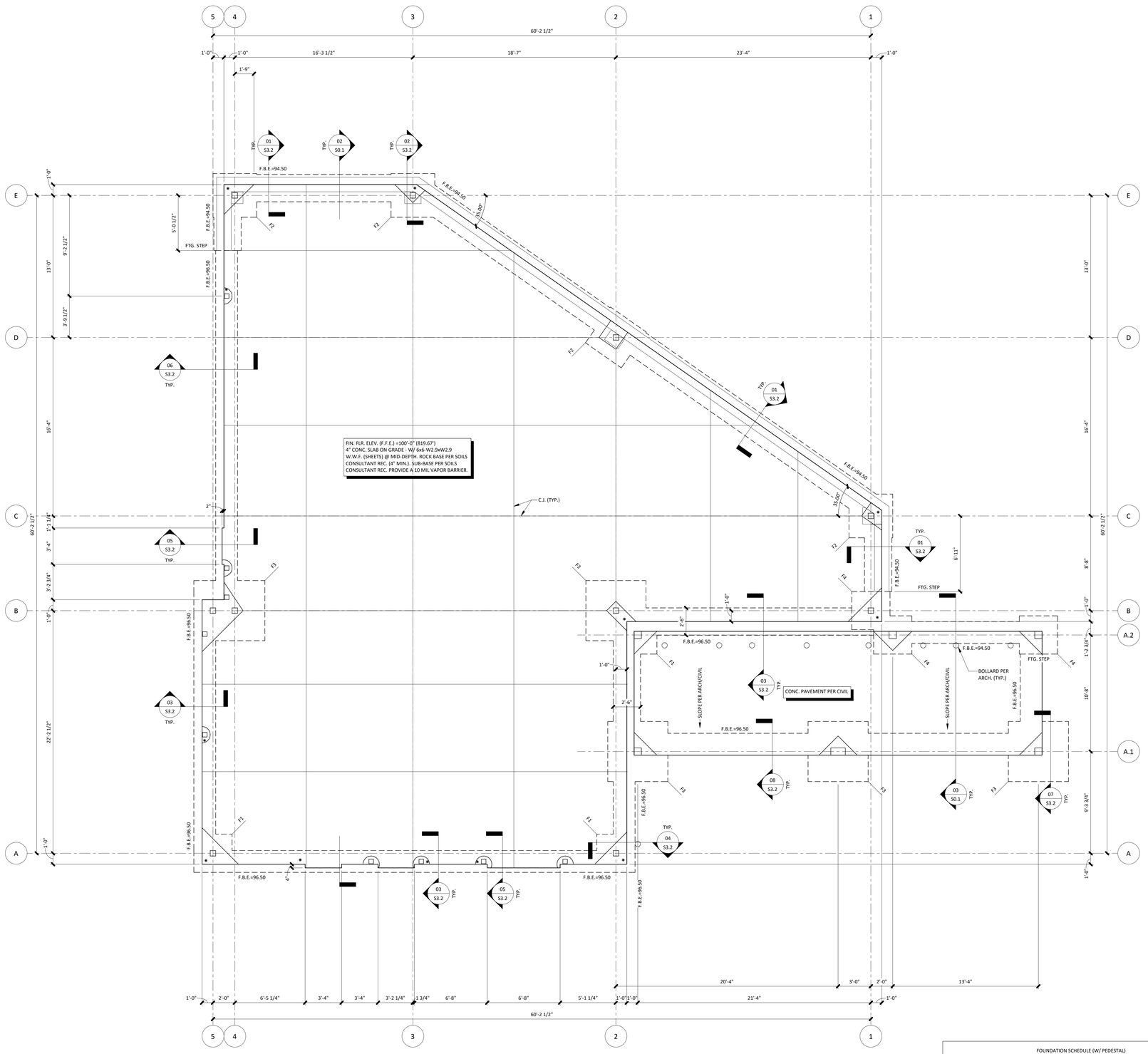
BSE STRUCTURAL ENGINEERS
1132 West 79th Street
Lenexa, Kansas 66214
Phone 913.492.7400
www.BSEstructural.com
Project Number 21-036

SHEET TITLE

ISOMETRIC

SHEET NUMBER

S0.1



FOUNDATION SCHEDULE (W/ PEDESTAL)						
MARK	DIMENSIONS	REINFORCEMENT	F.B.E.	PEDESTAL DIMENSIONS	PEDESTAL REINFORCEMENT	COMMENTS
F1	3'-6" x 3'-6" x 2'-10"	#5 @ 11" SPA. EA. WAY TOP & BOTT.	96.50			
F2	4'-0" x 4'-0" x 1'-6"	#5 @ 12" SPA. EA. WAY TOP & BOTT.	94.50	18" x 18"	(4) #6 VERT. W/ #3 TIES @ 12" SPA.	
F3	5'-6" x 5'-6" x 2'-10"	#5 @ 11" SPA. EA. WAY TOP & BOTT.	96.50			
F4	3'-6" x 3'-6" x 4'-10"	#5 @ 6" SPA. EA. WAY TOP & BOTT.	94.50			

NOTES:

1.) SEE DRAWING S0.0 FOR GENERAL NOTES, SYMBOLS LEGEND, MATERIALS LEGEND, & ABBREVIATION LIST.

2.) REFERENCE DRAWING S3.1 FOR TYPICAL FOUNDATION DETAILS INCLUDING ANCHOR ROD DETAILS, FOOTING STEP DETAILS, CONTROL JOINT & CONSTRUCTION JOINT DETAILS, REINF. LAP LENGTH TABLE, ETC.

3.) SEE DRAWING S0.1 FOR ISOMETRIC VIEW & FULL BUILDING SECTIONS.

4.) MASONRY WALLS ARE 4" U.N.O.

FOUNDATION PLAN | 01 | S1.1

1/4" = 1'-0"

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.: 19050.01
Date: 08/06/21
Issued For: PERMIT SET

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STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

BSE STRUCTURAL ENGINEERS
1132 West 79th Street
Lenexa, Kansas 66214
Phone 913.492.7400
www.BSEstructural.com
Project Number 21-036

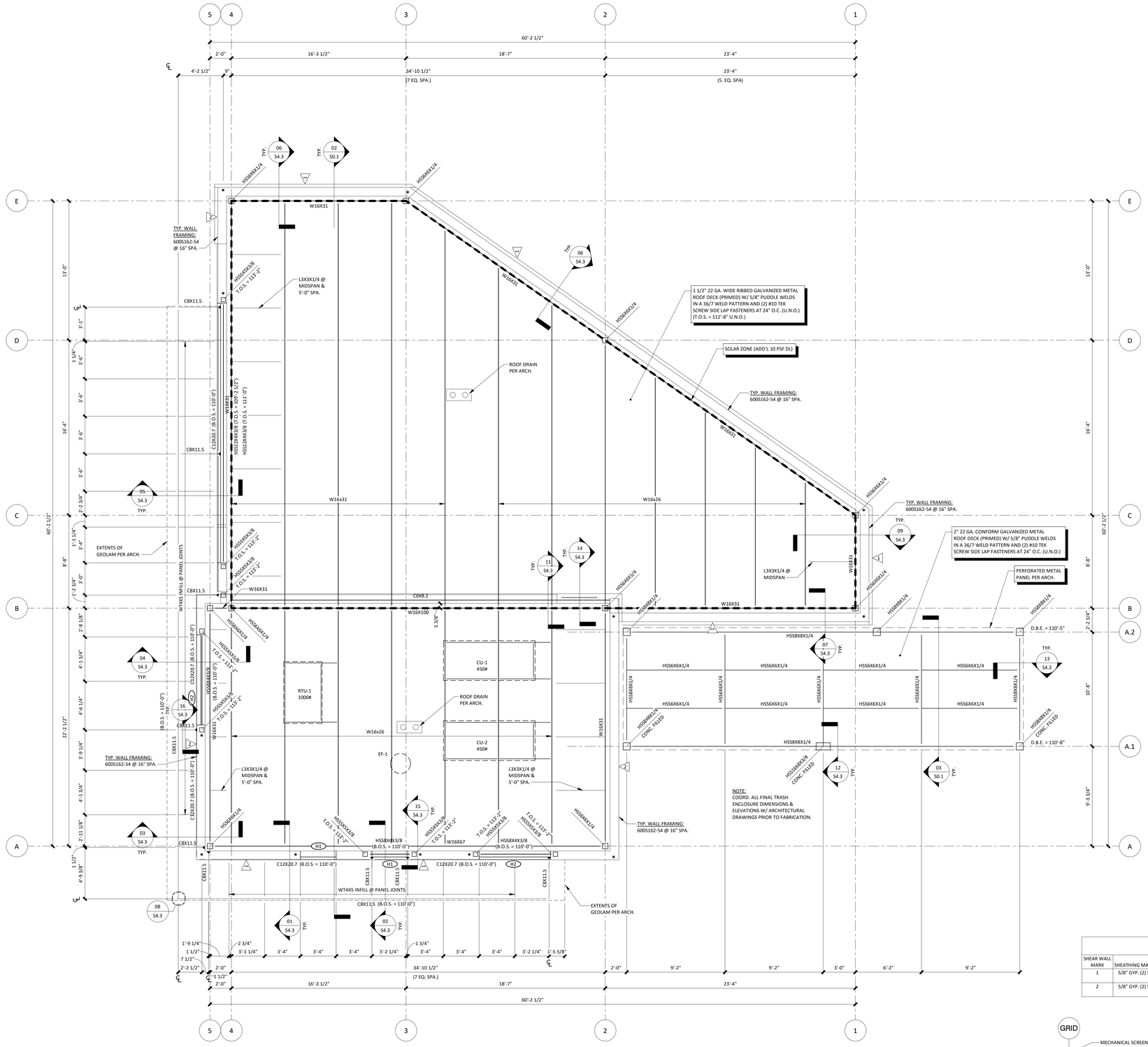
SHEET TITLE

FOUNDATION PLAN

SHEET NUMBER

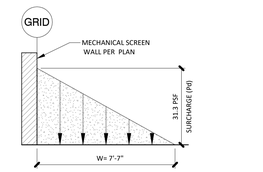
S1.1

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HEADER/BEARING STUD SCHEDULE			
MARK	HEADER	KING STUDS	BEARING STUDS
H1	(2) 600S162-54 W/ CONT. 54 MIL TRACK TOP & BOTT.	(1) 600S162-54	(1) 600S162-54
H2	(2) 800S200-54 W/ CONT. 54 MIL TRACK TOP & BOTT.	(2) 600S162-54	(2) 600S162-54

SHEAR WALL SCHEDULE					
SHEAR WALL MARK	SHEATHING MATERIAL	FASTENING	HOLD DOWN AT FOUNDATION	HOLD DOWN ANCHORS	CHORD MEMBERS
1	5/8" GYP. (2) SIDES	#10 SCREWS @ 7" SPA. IN FIELD & @ PANEL EDGE	S/HDU4	5/8" DIA. ANCHOR W/ (6) #14 SCREWS TO END STUDS	(2)600S162-54
2	5/8" GYP. (2) SIDES	#10 SCREWS @ 4" SPA. IN FIELD & @ PANEL EDGE	S/HDU6	5/8" DIA. ANCHOR W/ (12) #14 SCREWS TO END STUDS	(2)600S162-54



*SNOW DRIFT LOADS SHALL BE SUPERIMPOSED ONTO THE FLAT ROOF SNOW LOADS

SNOW DRIFT DIAGRAM
3/8" = 1'-0"

NOTES:

1.) SEE DRAWING S0.0 FOR GENERAL NOTES, SYMBOLS LEGEND, MATERIALS LEGEND, & ABBREVIATION LIST.

2.) REFERENCE DRAWING S4.1 FOR TYPICAL FRAMING DETAILS.

3.) SEE DRAWING S0.1 FOR ISOMETRIC VIEW & FULL BUILDING SECTIONS.

4.) REFERENCE ARCHITECTURAL DRAWINGS TO VERIFY SIZE & LOCATIONS OF ALL ROOF & WALL OPENINGS.

ROOF FRAMING PLAN | 01
1/4" = 1'-0" | S2.1

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.: 19050.01
Date: 08/06/21
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
STEVEN N. RUSEY
NUMBER E-25462
PROFESSIONAL ENGINEER

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

BSE STRUCTURAL ENGINEERS
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SHEET TITLE

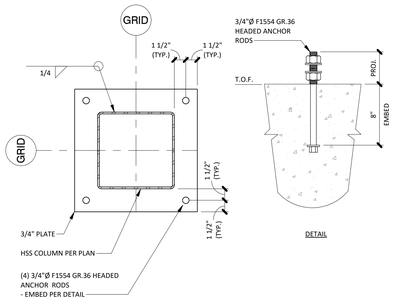
ROOF FRAMING PLAN

SHEET NUMBER

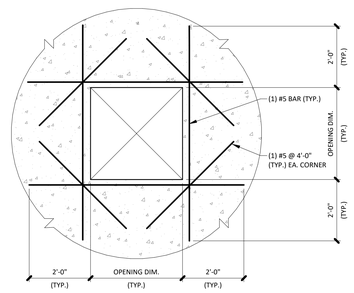
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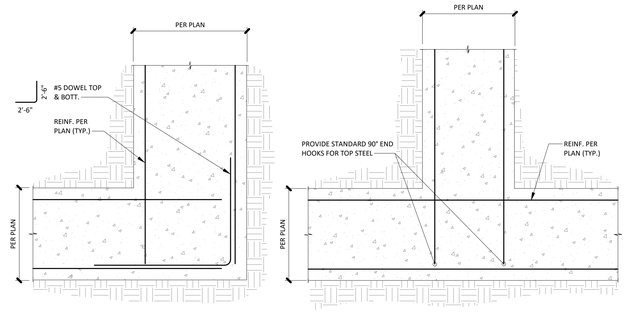
NOTES:
1.) FOR STANDARD SIZE HOLES, PROVIDE ASTM F844 (USS STANDARD) WASHERS. FOR HOLES THAT ARE MORE THAN 5/16" LARGER THAN ANCHOR ROD DIAMETER, PROVIDE PLATE WASHERS BETWEEN NUT & PLATE PER TABLE 14-2 IN AISC STANDARD.
2.) FOR ANCHORS RODS 1" DIAMETER AND LARGER, PROVIDE PLATE WASHERS BETWEEN NUT & PLATE PER TABLE 14-2 IN AISC STANDARD.
WELD WASHER TO TOP OF BASE PLATE WITH 3/16" FILLET WELD.



TYP. ANCHOR ROD & BASE PLATE DETAIL | 01
1 1/2" = 1'-0" | S3.1



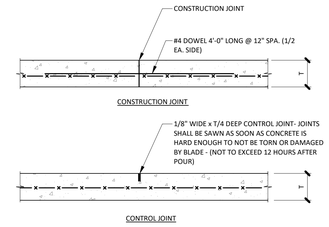
TYP. SLAB OPENING DETAIL | 02
1/2" = 1'-0" | S3.1



NOTE:
GRADE BEAMS SHALL BE POURED MONOLITHICALLY AROUND CORNERS.

NOTE:
GRADE BEAMS SHALL BE POURED MONOLITHICALLY AT INTERSECTIONS.

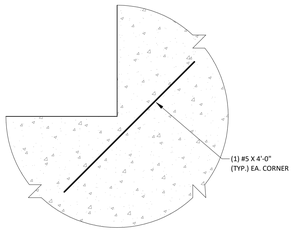
TYP. GRADE BEAM DETAILS | 03
3/4" = 1'-0" | S3.1



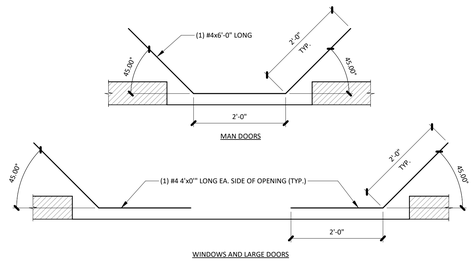
TYP. CONTROL & CONST. JOINT DETAIL | 04
3/4" = 1'-0" | S3.1

STANDARD HOOK TABLE	
BAR SIZE	HOOK
#4	8 in.
#5	10 in.
#6	12 in.
#7	14 in.
#8	16 in.

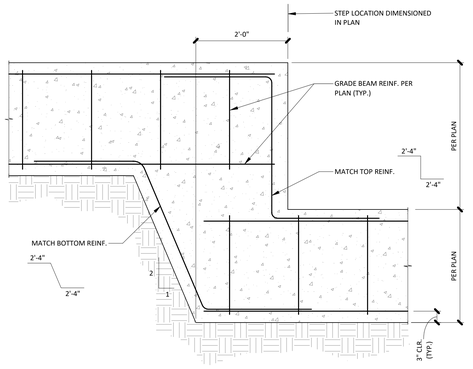
STANDARD 90° HOOK TABLE | 05
12" = 1'-0" | S3.1



TYP. RE-ENTRANT CORNER REINF. DETAIL | 06
3/4" = 1'-0" | S3.1



TYP. SLAB REINF. @ DOOR DETAIL | 07
3/4" = 1'-0" | S3.1



TYP. FOOTING STEP DETAIL | 08
3/4" = 1'-0" | S3.1

TENSION LAP SPLICE LENGTHS (in) GRADE 60 UNCOATED BARS f'c=3000 psi					
BAR SIZE	LAP CLASS	TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2
#3	A	22	32	17	25
	B	28	42	22	32
#4	A	29	43	22	33
	B	37	56	29	43
#5	A	36	54	28	41
	B	47	70	36	54
#6	A	43	64	33	50
	B	56	84	43	64
#7	A	63	94	48	72
	B	81	122	63	94
#8	A	72	107	55	82
	B	93	139	72	107
#9	A	81	121	62	93
	B	105	157	81	121
#10	A	91	136	70	105
	B	118	177	91	136
#11	A	101	151	78	116
	B	131	196	101	151

NOTES:

1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL-WEIGHT CONCRETE.

2. TENSION DEVELOPMENT LENGTHS AND TENSION LAP SPLICE LENGTHS ARE BASED ON ACI 318, SECTIONS 12.2.2 AND 12.15, RESPECTIVELY.

3. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MINIMUM CODE REQUIREMENTS. LENGTHS ARE IN INCHES.

4. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND THE CENTER-TO-CENTER SPACING OF THE BARS ARE DEFINED AS:

   BEAMS OR COLUMNS:
   CASE 1: COVER AT LEAST (1) BAR DIAMETER AND C.-C. SPACING AT LEAST (2) BAR DIAMETERS

   CASE 2: COVER LESS THAN (1) BAR DIAMETER AND C.-C. SPACING LESS THAN (2) BAR DIAMETERS

   ALL OTHERS:
   CASE 1: COVER AT LEAST (1) BAR DIAMETER AND C.-C. SPACING AT LEAST (3) BAR DIAMETERS

   CASE 2: COVER LESS THAN (1) BAR DIAMETER AND C.-C. SPACING LESS THAN (3) BAR DIAMETERS

5. LAP CLASS A VALUES ARE THE REQUIRED TENSION DEVELOPMENT LENGTHS, ld; LAP SPLICE LENGTHS ARE MULTIPLES OF TENSION DEVELOPMENT LENGTHS; CLASS A - 1.0ld AND CLASS B = 1.3ld (ACI 318, SECTION 12.15.1)

6. LAP CLASS B SHALL BE USED FOR ALL CASES UNLESS APPROVED BY E.O.R

7. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.

8.) LENGTHS SHOWN ARE FOR UNCOATED BARS. LENGTHS SHOWN SHALL BE MULTIPLIED BY 1.2 FOR ALL EXPOXY COATED BARS (ACI 318 SECTION 12.2.4)

9.) WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, THE SPLICE LENGTH FOR THE LARGER BAR SHALL BE USED.

LAP SPLICE LENGTHS f'c=3000 psi | 09
1/2" = 1'-0" | S3.1

COMPRESSION DEVELOPMENT AND LAP SPLICE LENGTHS GRADE 60 REINFORCEMENT, NORMAL WEIGHT CONCRETE						
BAR SIZE	CONCRETE COMPRESSIVE STRENGTH					
	3000 PSI		4000 PSI		5000 PSI	
	DEV	SPLICE	DEV	SPLICE	DEV	SPLICE
#3	9	12	8	12	7	12
#4	11	15	10	15	9	15
#5	14	19	12	19	12	19
#6	17	23	15	23	14	23
#7	20	27	17	27	16	27
#8	22	30	19	30	18	30
#9	25	34	22	34	21	34
#10	28	39	25	39	23	39
#11	31	43	27	43	26	43

NOTES:
1.) TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONCRETE.
2.) COMPRESSION DEVELOPMENT LENGTHS AND COMPRESSION SPLICE LENGTHS ARE BASED ON ACI 318, SECTIONS 12.3 AND 12.16, RESPECTIVELY.
3.) ALL VALUES ARE SHOWN IN INCHES
4.) COMPRESSION SPLICE PERMISSIBLE ONLY WHERE SPECIFICALLY NOTED
5.) TABLE IS NOT APPLICABLE FOR EPOXY-COATED REINFORCEMENT.
6.) "SIDE LAP" ALL LAP SPLICES TO MAINTAIN SPECIFIED CONCRETE COVER.
7.) WHEN BARS OF A DIFFERENT SIZE ARE LAP SPLICED, THE SPLICE LENGTH SHALL BE THE LARGER OF THE DEVELOPMENT LENGTH OF THE LARGER BAR, OR THE SPLICE LENGTH OF THE SMALLER BAR.

COMPRESSION DEVEL. & LAP SPLICE TABLE | 10
1/2" = 1'-0" | S3.1

TENSION LAP SPLICE LENGTHS (in) GRADE 60 UNCOATED BARS f'c=4000 psi					
BAR SIZE	LAP CLASS	TOP BARS		OTHER BARS	
		CASE 1	CASE 2	CASE 1	CASE 2
#3	A	19	28	15	22
	B	24	36	19	28
#4	A	25	37	19	29
	B	32	48	25	37
#5	A	31	47	24	36
	B	40	60	31	47
#6	A	37	56	29	43
	B	48	72	37	56
#7	A	54	81	42	63
	B	70	106	54	81
#8	A	62	93	48	72
	B	80	121	62	93
#9	A	70	105	54	81
	B	91	136	70	105
#10	A	79	118	61	91
	B	102	153	79	118
#11	A	87	131	67	101
	B	113	170	87	131

NOTES:

1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL-WEIGHT CONCRETE.

2. TENSION DEVELOPMENT LENGTHS AND TENSION LAP SPLICE LENGTHS ARE BASED ON ACI 318, SECTIONS 12.2.2 AND 12.15, RESPECTIVELY.

3. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MINIMUM CODE REQUIREMENTS. LENGTHS ARE IN INCHES.

4. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND THE CENTER-TO-CENTER SPACING OF THE BARS ARE DEFINED AS:

   BEAMS OR COLUMNS:
   CASE 1: COVER AT LEAST (1) BAR DIAMETER AND C.-C. SPACING AT LEAST (2) BAR DIAMETERS

   CASE 2: COVER LESS THAN (1) BAR DIAMETER AND C.-C. SPACING LESS THAN (2) BAR DIAMETERS

   ALL OTHERS:
   CASE 1: COVER AT LEAST (1) BAR DIAMETER AND C.-C. SPACING AT LEAST (3) BAR DIAMETERS

   CASE 2: COVER LESS THAN (1) BAR DIAMETER AND C.-C. SPACING LESS THAN (3) BAR DIAMETERS

5. LAP CLASS A VALUES ARE THE REQUIRED TENSION DEVELOPMENT LENGTHS, ld; LAP SPLICE LENGTHS ARE MULTIPLES OF TENSION DEVELOPMENT LENGTHS; CLASS A - 1.0*ld* AND CLASS B = 1.3ld (ACI 318, SECTION 12.15.1)

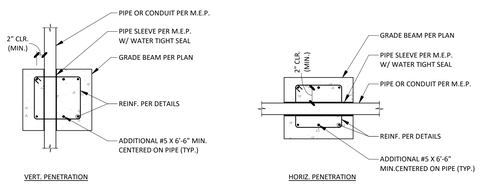
6. LAP CLASS B SHALL BE USED FOR ALL CASES UNLESS APPROVED BY E.O.R

7. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.

8.) LENGTHS SHOWN ARE FOR UNCOATED BARS. LENGTHS SHOWN SHALL BE MULTIPLIED BY 1.2 FOR ALL EXPOXY COATED BARS (ACI 318 SECTION 12.2.4)

9.) WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, THE SPLICE LENGTH FOR THE LARGER BAR SHALL BE USED.

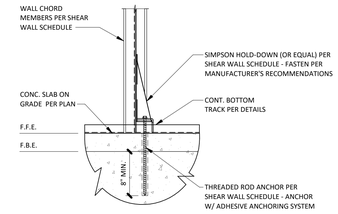
LAP SPLICE LENGTHS f'c=4000 psi | 11
1/2" = 1'-0" | S3.1



NOTE:
1.) CENTER BAR IN GRADE BEAM ALLOWED TO BE MOVED TO PROVIDE 2" CLEAR BY PIPING. ADD #5 ON OPPOSITE SIDE OF PIPING EXTENDING 3'-0" EACH SIDE OF PIPE.

2.) COORDINATE LOCATION OF PIPING WITH M.E.P. ACCEPTABLE TO TURN PIPE IN THE MIDDLE THIRD OF GRADE BEAM AND EXIT THROUGH THE SIDE OF THE GRADE BEAM. ADDITIONAL #5 BAR SHOWN ONLY REQUIRED WHEN PIPING PASSES THROUGH TOP OR BOTTOM OF GRADE BEAM.

TYPICAL GRADE BEAM PENETRATION DETAILS | 12
3/4" = 1'-0" | S3.1



TYP. HOLD-DOWN DETAIL | 13
3/4" = 1'-0" | S3.1

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

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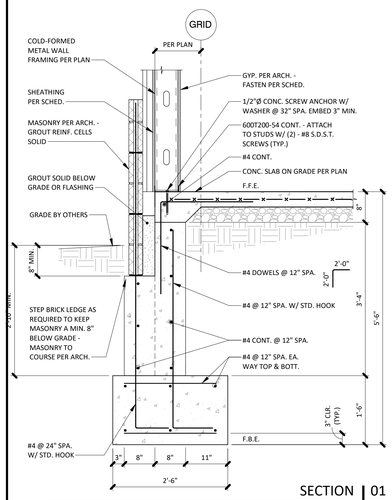
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TYPICAL FOUNDATION DETAILS

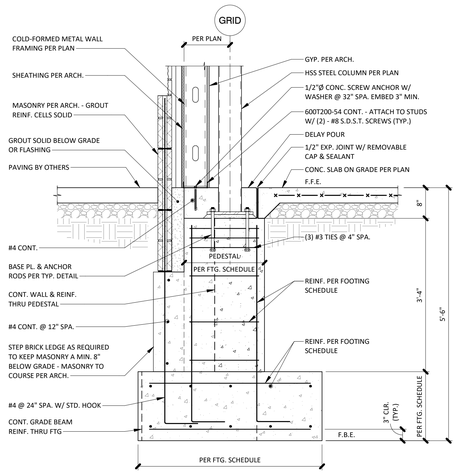
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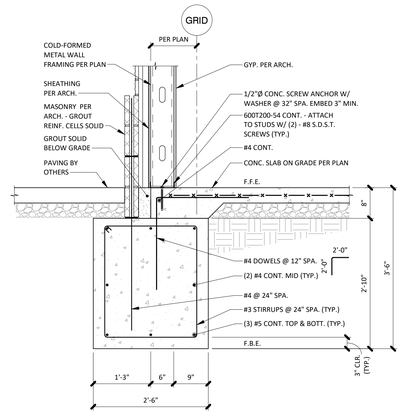
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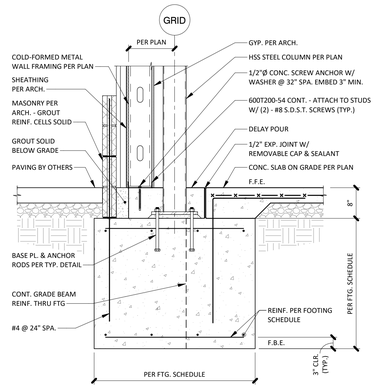
SECTION | 01
3/4" = 1'-0" | S3.2



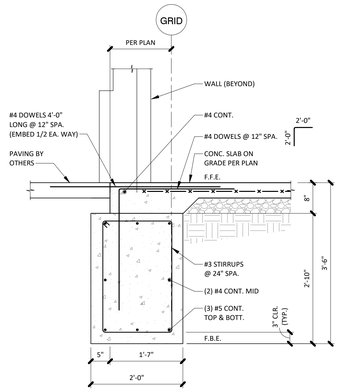
SECTION | 02
3/4" = 1'-0" | S3.2



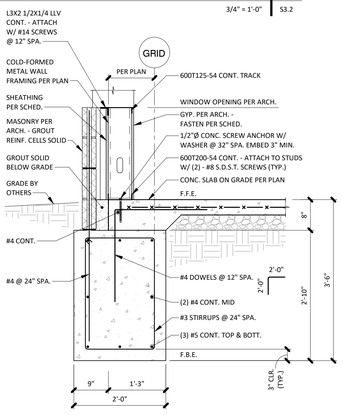
SECTION | 03
3/4" = 1'-0" | S3.2



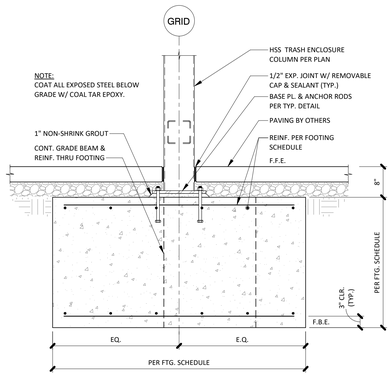
SECTION | 04
3/4" = 1'-0" | S3.2



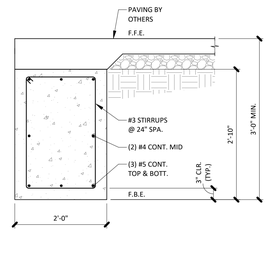
SECTION | 05
3/4" = 1'-0" | S3.2



SECTION | 06
3/4" = 1'-0" | S3.2



SECTION | 07
3/4" = 1'-0" | S3.2



SECTION | 08
3/4" = 1'-0" | S3.2

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

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PROFESSIONAL ENGINEER
6-30-22

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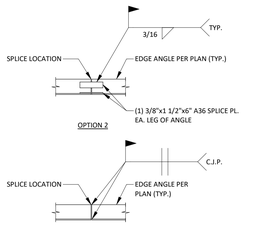
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FOUNDATION DETAILS

SHEET NUMBER

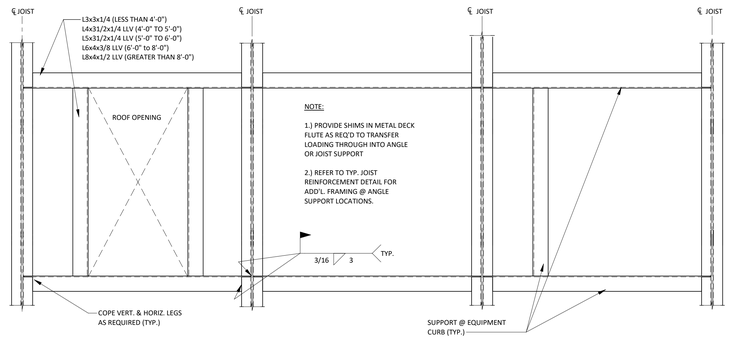
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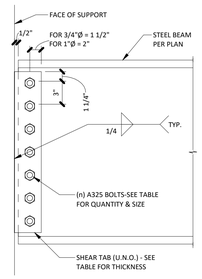
EDGE ANGLE SPLICE DETAIL | 01

3/4" = 1'-0" | S4.1



TYP. ROOF OPENING & EQUIP. SUPPORT FRAMING DETAIL | 02

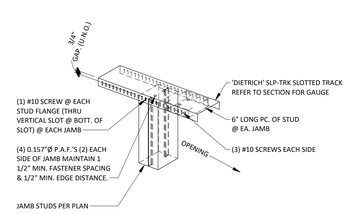
3/4" = 1'-0" | S4.1



BEAM DEPTH	# OF (n) A325 BOLTS	BOLT Ø	SHEAR TAB THICKNESS
12"	3	3/4"	3/8"
14"	3	3/4"	3/8"
16"	4	3/4"	3/8"
18"	5	3/4"	3/8"
21"	6	1"	7/16"
24"	7	1"	7/16"
27"	8	1"	7/16"
30"	9	1"	7/16"
34"	10	1"	7/16"
36"	11	1"	7/16"

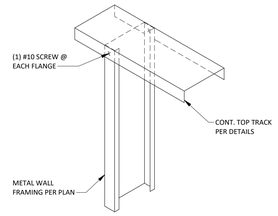
TYP. SHEAR TAB CONNECTION DETAIL | 03

1 1/2" = 1'-0" | S4.1



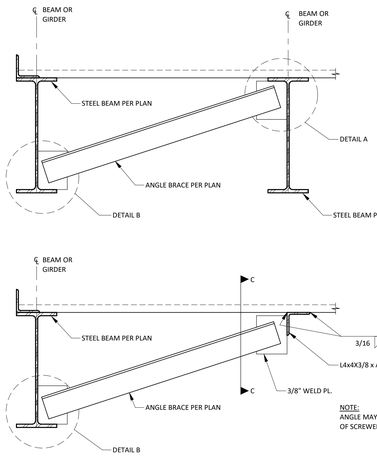
SLOTTED TRACK REINFORCING | 04

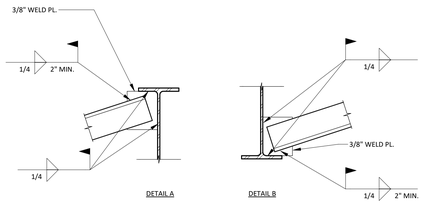
3/4" = 1'-0" | S4.1

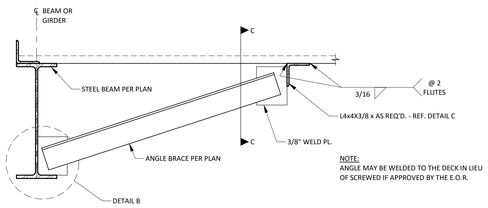


STUD TO TRACK CONNECTION (TOP) | 05

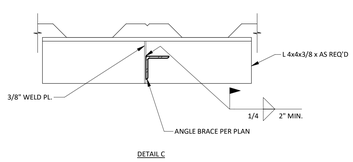
3/4" = 1'-0" | S4.1







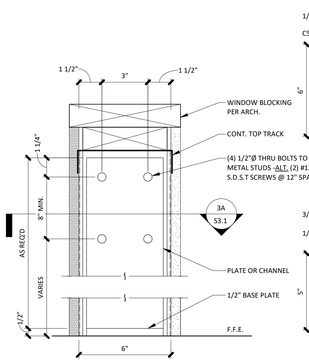
NOTE:
ANGLE MAY BE WELDED TO THE DECK IN LIEU OF SCREWED IF APPROVED BY THE E.O.R.



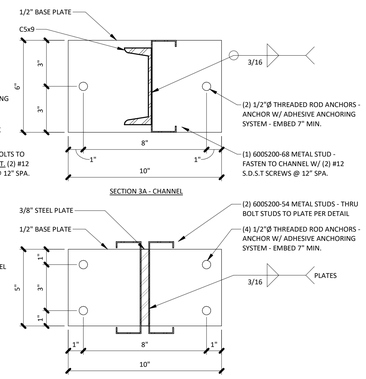
DETAIL C

TYP. BEAM BOTTOM FLANGE BRACE DETAIL | 06

3/4" = 1'-0" | S4.1



NOTE:
REFER TO PLANS & DETAILS FOR REQ'D SPACING (4'-0" MAX IF NOT LISTED) & LOCATIONS



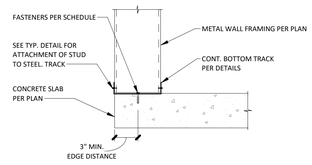
TYP. LOW WALL REINF. DETAIL | 07

3" = 1'-0" | S4.1

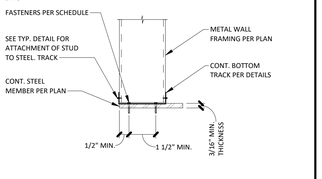
FASTENERS @ CONCRETE	
LOCATION	NUMBER OF FASTENERS REQUIRED
TYPICAL FRAMING	(1) 0.157"Ø P.D.F @ 8" O.C.
JAMB STUDS	(2) 0.157"Ø P.D.F @ EACH JAMB (SEE NOTE #3)

FASTENERS @ STEEL	
LOCATION	NUMBER OF FASTENERS REQUIRED
TYPICAL FRAMING	(2) 0.157"Ø P.D.F @ 8" O.C.
JAMB STUDS	(4) 0.157"Ø P.D.F @ EACH JAMB

NOTE:
1) 1" MIN. EMBED REQ'D FOR ALL P.D.F'S
2) MAINTAIN 4" MIN. FASTENER SPACING FOR ALL FASTENERS
3) FOR OPENINGS > 6'-0" PROVIDE TSN CL CLIP (OR EQ.)
4) REFER TO DETAILS FOR ADD'L BOTT. TRACK-TO-STRUCTURE FASTENER REQUIREMENTS



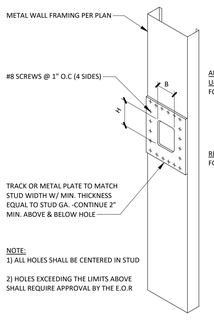
BASE DETAIL @ CONCRETE



BASE DETAIL @ STRUCTURAL STEEL

TYP. BASE DETAILS | 08

3/4" = 1'-0" | S4.1



ALLOWABLE HOLE SIZES:
UNREINFORCED HOLES:
FOR STUD DEPTHS UP TO 6"
-MAX. WIDTH = 1.5"
-MAX. HEIGHT = 4"
-MIN. SPACING = 2'-0" O.C (INCLUDES DISTANCE TO NEAREST PUNCHOUT)
-MIN. CLEAR DISTANCE FROM STUD END = 10"

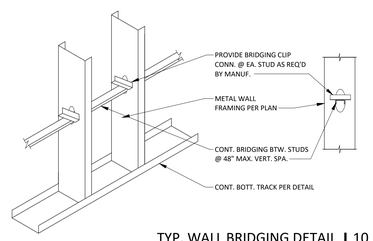
REINFORCED HOLES:
FOR STUD DEPTH UP TO 6"
-MAX. WIDTH = 0.5 x STUD DEPTH
-MAX. HEIGHT = 4"
-MIN. SPACING = 1'-4" O.C (INCLUDES DISTANCE TO NEAREST PUNCHOUT)
-MIN. CLEAR DISTANCE FROM STUD END = 10"

NOTE:
1) ALL HOLES SHALL BE CENTERED IN STUD

2) HOLES EXCEEDING THE LIMITS ABOVE SHALL REQUIRE APPROVAL BY THE E.O.R

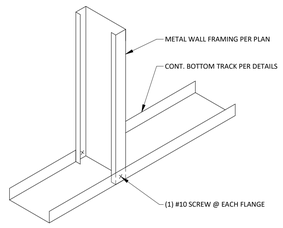
WEB REINFORCING DETAIL | 09

3/4" = 1'-0" | S4.1



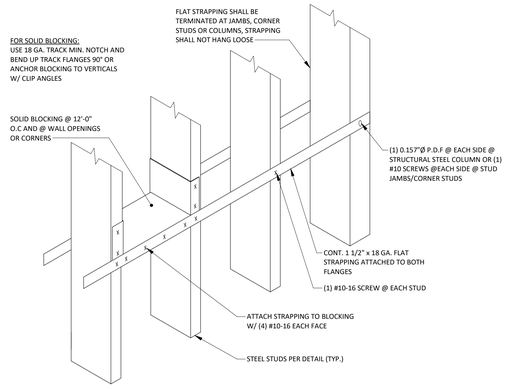
TYP. WALL BRIDGING DETAIL | 10

1/2" = 1'-0" | S4.1



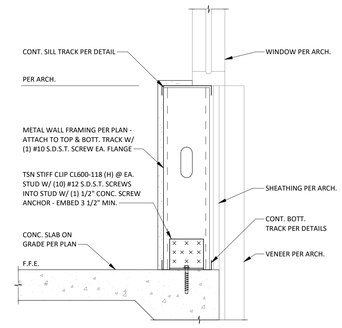
STUD TO TRACK CONNECTION (BOTTOM) | 11

3/4" = 1'-0" | S4.1



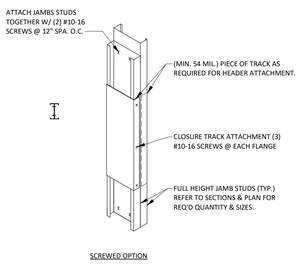
TYP. STRAP AND BLOCK BRIDGE FRAMING | 12

3/4" = 1'-0" | S4.1

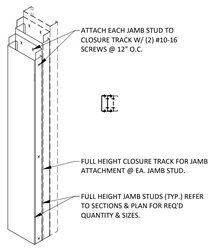


TYP. LOW WALL CLIP DETAIL | 13

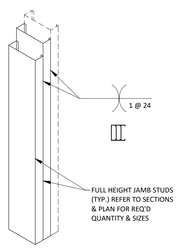
1 1/2" = 1'-0" | S4.1



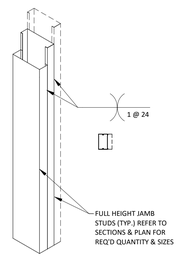
SCREWED OPTION



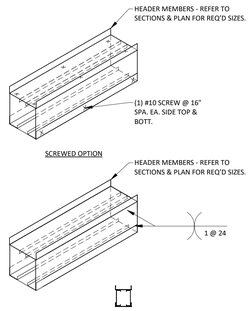
SCREWED OPTION



WELDED OPTION



WELDED OPTION



WELDED OPTION

BUILT-UP MEMBER DETAIL | 14

1/2" = 1'-0" | S4.1

C:\Users\Daniel Nagel\Documents\Revit Local\21-036 Paragon Star HUB Building - Lee's Summit, MO_dnagel.rvt

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.: 19050.01
Date: 08/06/21
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
STEVEN N. RUSEY
NUMBER E-25462
PROFESSIONAL ENGINEER

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

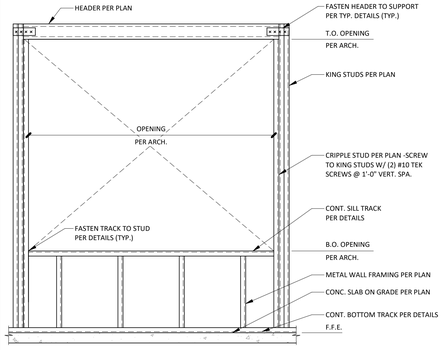
BSE STRUCTURAL ENGINEERS
1132 West 79th Street
Lenexa, Kansas 66214
Phone 913.492.7400
www.BSEstructural.com
Project Number 21-036

SHEET TITLE

TYPICAL FRAMING DETAILS

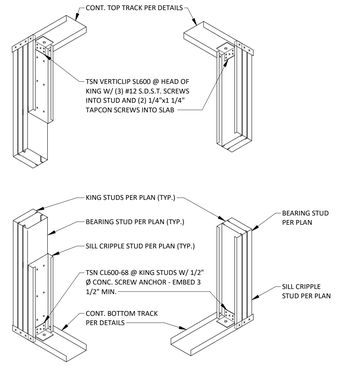
SHEET NUMBER

S4.1



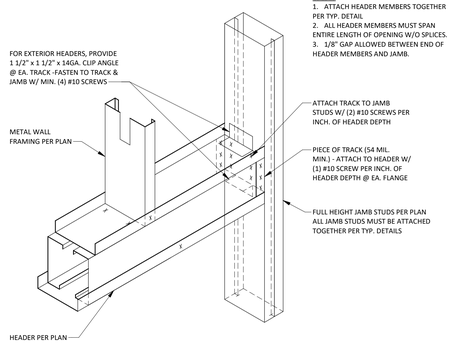
TYP. HEADER/WALL OPENING DETAIL | 01

1/2" = 1'-0" | S4.2



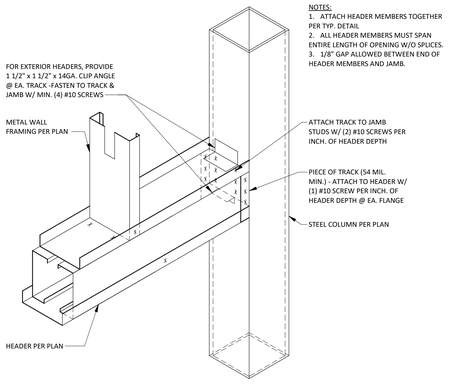
BUILT UP JAMB DETAIL | 02

3/8" = 1'-0" | S4.2



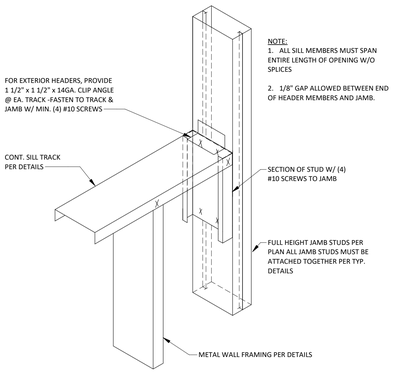
HEADER - JAMB DETAIL | 03

3/4" = 1'-0" | S4.2



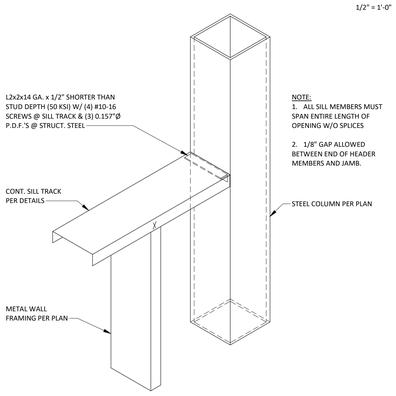
HEADED JAMB DETAIL - STRUCTURAL STEEL TUBE | 04

3/4" = 1'-0" | S4.2



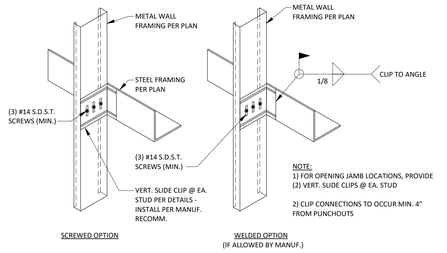
SILL - JAMB DETAIL | 05

3/4" = 1'-0" | S4.2



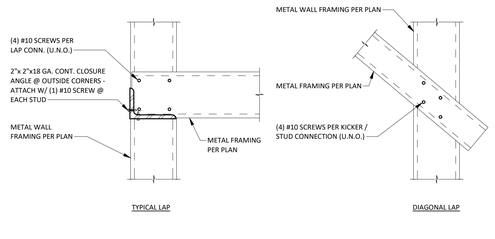
SILL - JAMB DETAIL - STRUCTURAL STEEL TUBE | 06

3/4" = 1'-0" | S4.2



TYP. SLIDE CLIP CONNECTION DETAIL | 07

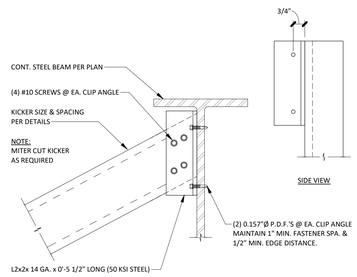
1/2" = 1'-0" | S4.2



LAP CONNECTIONS | 08

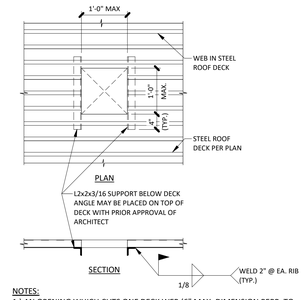
1 1/2" = 1'-0" | S4.2

NOTE:
REFER TO PLAN FOR SPLICE LOCATIONS. IF LOCATIONS ARE NOT NOTED, CONTACT E.O.R. PRIOR TO FABRICATION & CONSTRUCTION.



KICKER / BEAM CONNECTION | 09

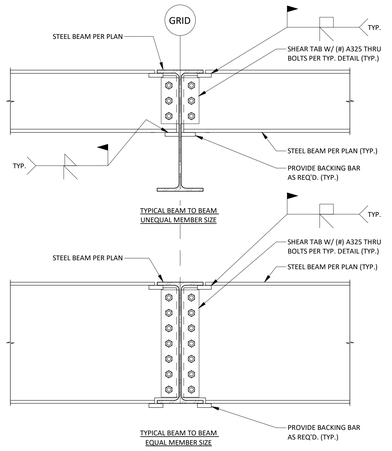
3" = 1'-0" | S4.2



NOTES:
1.) AN OPENING WHICH CUTS ONE DECK WEB (6" MAX, DIMENSION PERP. TO RIBS) MAY BE CUT IN DECK WITHOUT ANY SPECIAL REINFORCING.
2.) AN OPENING WHICH CUTS TWO DECK WEBS (12" MAX DIMENSION PERP. TO RIBS) , WILL REQUIRE ANGLE SUPPORT SHOWN ABOVE.
3.) ANY OPENING WHICH CUTS MORE THAN TWO DECK WEBS, FRAME OPENING WITH TYPICAL ANGLE SUPPORT FRAME.

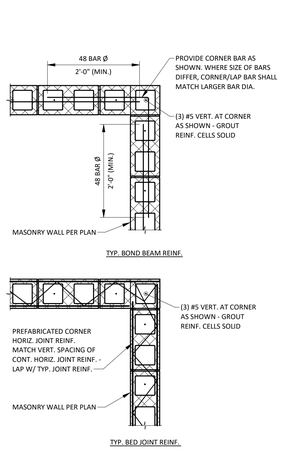
TYP. SMALL OPENING IN STEEL ROOF DECK | 10

3/4" = 1'-0" | S4.2



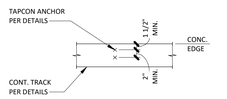
TYP. BEAM TO BEAM MOMENT CONNECTION | 11

1" = 1'-0" | S4.2



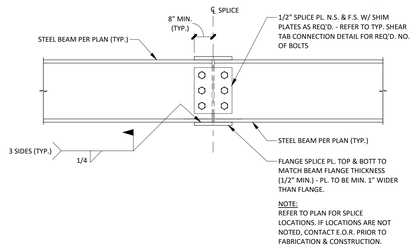
CORNER HORIZ. JOINT REINF. | 12

3/4" = 1'-0" | S4.2



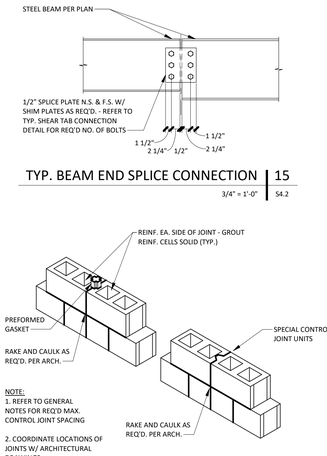
TYP. TAPCON LAYOUT DETAIL | 13

3/4" = 1'-0" | S4.2



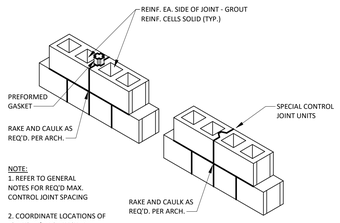
TYP. BEAM MOMENT SPLICE CONN. DETAIL | 14

1" = 1'-0" | S4.2



TYP. BEAM END SPLICE CONNECTION | 15

3/4" = 1'-0" | S4.2



MASONRY JOINT DETAILS | 16

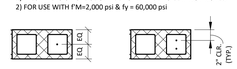
3/4" = 1'-0" | S4.2

TYPICAL SPLICE LENGTHS FOR MASONRY BLOCK - STRENGTH DESIGN

BLOCK WIDTH	CASE A - BARS CENTERED						CASE B - (2) BARS					
	VERTICAL BAR SIZE						VERTICAL BAR SIZE					
	#3	#4	#5	#6	#7	#8	#9	#3	#4	#5	#6	#7	#8	#9
6" BLOCK	14"	18"	28"	53"	-	-	-	-	-	-	-	-	-	-
8" BLOCK	14"	18"	22"	38"	52"	72"	*	15"	25"	39"	54"	63"	-	-
10" BLOCK	14"	18"	22"	35"	40"	61"	*	15"	25"	39"	54"	63"	72"	*
12" BLOCK	14"	18"	22"	35"	40"	61"	*	14"	22"	35"	54"	63"	72"	*

SYMBOLS:
- - REINFORCING CONFIGURATION NOT PERMISSIBLE
- * MECHANICAL TENSION SPLICE REQ'D

NOTES:
1) MECH. TENSION SPLICE CAN BE FOR ANY BAR SIZE IF NOT NOTED.
2) FOR USE WITH FM=2,000 psi & fy = 60,000 psi



MASONRY SPLICE TABLE | 17

3/4" = 1'-0" | S4.2

PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.: 19050.01
Date: 08/06/21
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
STEVEN N. RUSEY
NUMBER E-25462
PROFESSIONAL ENGINEER

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

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1132 West 79th Street
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Phone 913.492.7400
www.BSEstructural.com
Project Number 21-036

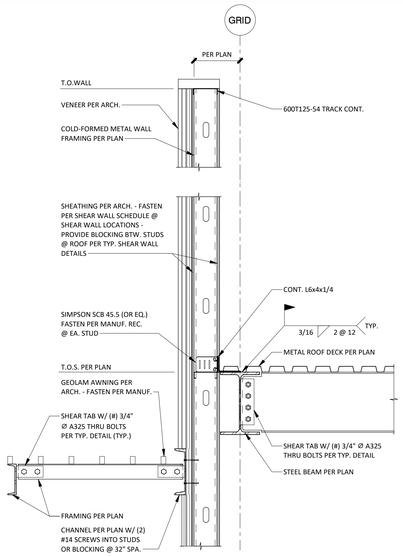
SHEET TITLE

TYPICAL FRAMING DETAILS

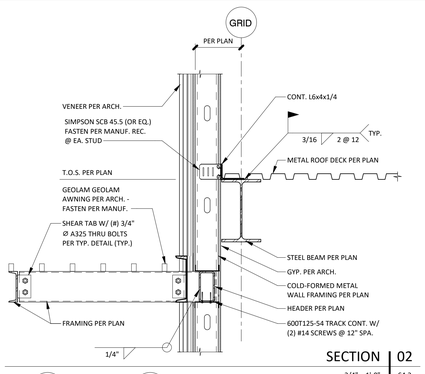
SHEET NUMBER

S4.2

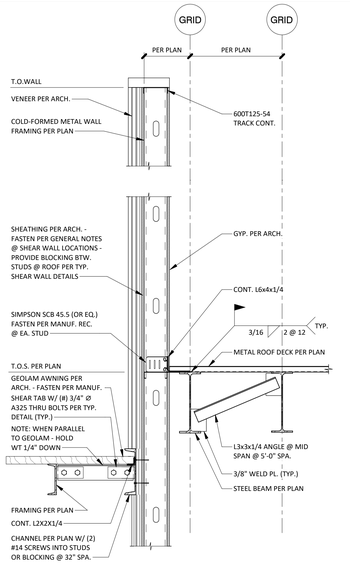
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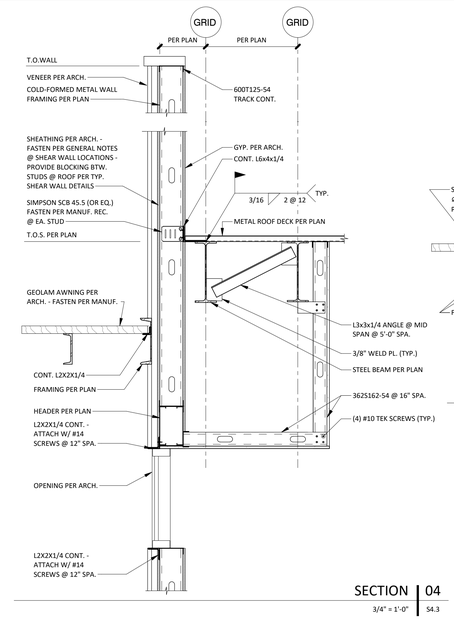
SECTION 01
3/4" = 1'-0" | S4.3



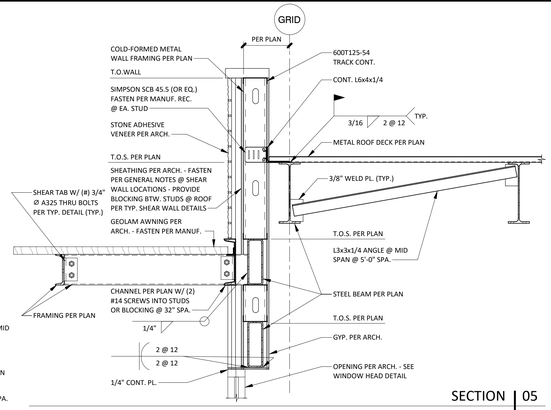
SECTION 02
3/4" = 1'-0" | S4.3



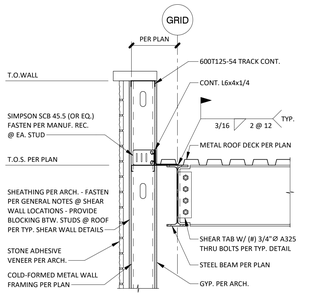
SECTION 03
3/4" = 1'-0" | S4.3



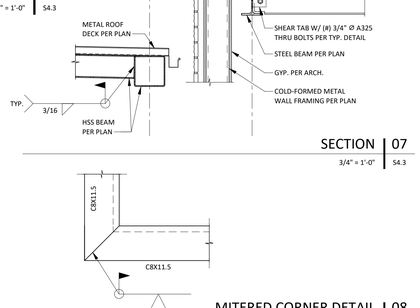
SECTION 04
3/4" = 1'-0" | S4.3



SECTION 05
3/4" = 1'-0" | S4.3

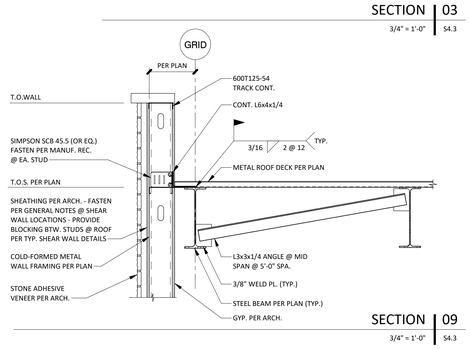


SECTION 06
3/4" = 1'-0" | S4.3

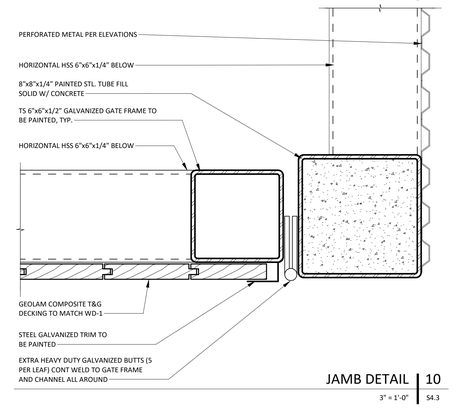


SECTION 07
3/4" = 1'-0" | S4.3

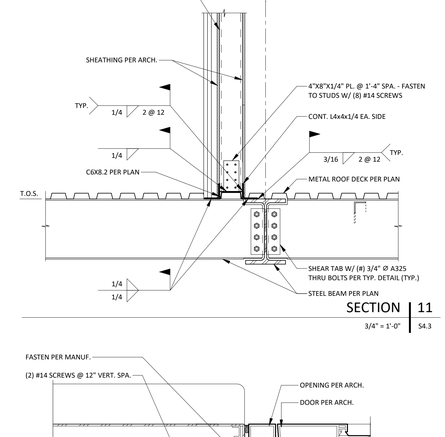
MITERED CORNER DETAIL 08
3" = 1'-0" | S4.3



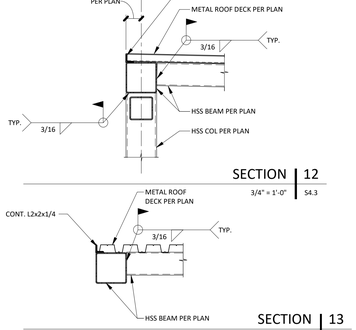
SECTION 09
3/4" = 1'-0" | S4.3



JAMB DETAIL 10
3" = 1'-0" | S4.3

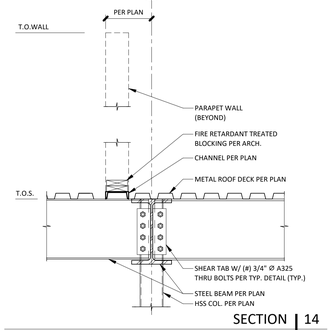


SECTION 11
3/4" = 1'-0" | S4.3

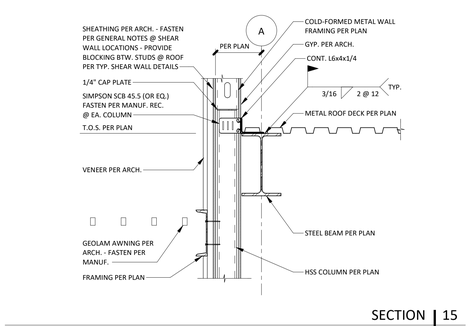


SECTION 12
3/4" = 1'-0" | S4.3

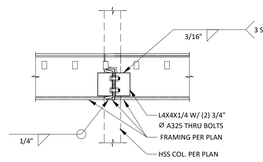
SECTION 13
3/4" = 1'-0" | S4.3



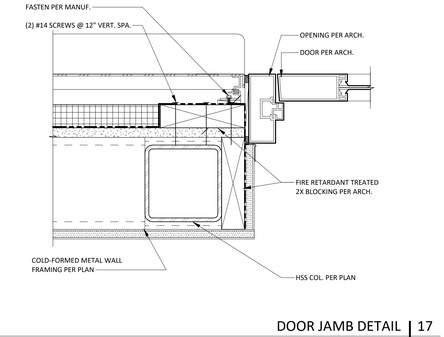
SECTION 14
3/4" = 1'-0" | S4.3



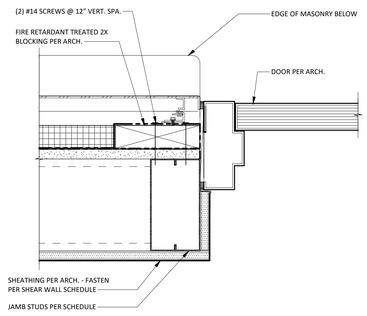
SECTION 15
3/4" = 1'-0" | S4.3



SECTION 16
3/4" = 1'-0" | S4.3



DOOR JAMB DETAIL 17
3" = 1'-0" | S4.3



DOOR JAMB DETAIL 18
3" = 1'-0" | S4.3

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PARAGON STAR

LOT 20 - HUB BUILDING

LENEXA KS

Project No.:	19050.01
Date:	08/06/21
Issued For:	PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
STEVEN N. RUSEY
NUMBER E-25462
PROFESSIONAL ENGINEER

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	FIRE PROTECTION
CONTRACTOR	FOGEL ANDERSON

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1132 West 79th Street
Lenexa, Kansas 66214
Phone 913.492.7400
www.BSEstructural.com
Project Number 21-036

SHEET TITLE

FRAMING DETAILS

SHEET NUMBER

S4.3

ELECTRICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V3.00

STANDARD MOUNTING HEIGHTS

AUDIBLE APPLIANCES (CENTERLINE)	84"
ALARMS	48"
ANNUNCIATOR PANELS (DISPLAY)	60"
CONTROLS (TOP OF DEVICE)	48"
FIRE ALARM ANNUNCIATOR PANEL (DISPLAY)	60"
FIRE ALARM BELL (EXTERIOR) (CENTERLINE)	120"
FIRE ALARM CONTROL PANEL/UNIT (DISPLAY)	60"
INTERCOM (AFEA ONLY)	36"
INTERCOMS (TOP OF DEVICE)	48"
PULL STATIONS (TOP OF DEVICE)	48"
PHOTOCELLS	144"
RECEPTACLES	16"
RECEPTACLES (EXTERIOR)	24"
RECEPTACLES (GARAGES)	24"
RECEPTACLES (POOLS)	27"
RECEPTACLES (ABOVE COUNTER) +6" ABOVE BACKSPLASH/COUNTER, 40" MAX	
RECEPTACLES IN EQUIPMENT ROOMS	44"
REMOTE INDICATING LIGHT (EQUIPMENT ROOMS)	48"
REMOTE INDICATING LIGHT (FINISHED AREAS)	CEILING
SAFETY SWITCHES (TOP OF DEVICE)	48"
STARTERS (TOP OF DEVICE)	48"
SWITCHES (TOP OF DEVICE)	44"
TELEPHONE, DATA OUTLETS	SAME AS ADJACENT DEVICE, UNO
TELEPHONE TERMINAL BOARD (BOTTOM)	6"
TELEVISION OUTLETS	REFER TO ARCH DRAWINGS
VISIBLE APPLIANCES (CENTERLINE)	84"

INSTALL OUTLET BOXES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF OR AFG TO BOTTOM OF OUTLET BOX, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ABBREVIATIONS

AF	AMPERE FUSE SIZE	MCC	MOTOR CONTROL CENTER
AFC	ABOVE FINISHED CEILING	MFR	MANUFACTURER
AFF	ABOVE FINISHED FLOOR	MIN	MINIMUM
AFG	ABOVE FINISHED GRADE	MLO	MAIN LUGS ONLY
AHJ	AUTHORITY HAVING JURISDICTION	MLV	MAGNETIC LOW-VOLTAGE
AHU	AIR HANDLING UNIT	MOCP	MAXIMUM OVERCURRENT PROTECTION
AIC	AMPERE INTERRUPTING CAPACITY	MTD	MOUNTED
AS	AMPERE SWITCH SIZE	N/A	NOT APPLICABLE
AT	AMPERE TRIP SETTING	NF	NON-FUSED
ATS	AUTOMATIC TRANSFER SWITCH	NL	NIGHT LIGHT (24HR ON)
AV	AUDIO VISUAL	NRTL	NATIONALLY RECOGNIZED TESTING LABORATORY (CSA, ETL, NSF, UL)
BAS	BUILDING AUTOMATION SYSTEM	NTS	NOT TO SCALE
BKR	BREAKER	OS	OCCUPANCY SENSOR
C	CONDUIT	P	POLE
CAT	CATEGORY	PART	PARTIAL CIRCUIT
CATV	CABLE TELEVISION SYSTEM	PH/Ø	PHASE
CCTV	CLOSED CIRCUIT TELEVISION	PNL	PANEL
CD	CANDELA	PNLBD	PANELBOARD
CKT	CIRCUIT	PROVIDE	FURNISH AND INSTALL
CODE	APPLICABLE CODE	PT	POTENTIAL TRANSFORMER
CT	CURRENT TRANSFORMER	QTY	QUANTITY
CTR	CENTER	R/REL	RELOCATE
CVD	CUMULATIVE VOLTAGE DROP	RCPT	RECEPTACLE
D/DEMO	DEMOLITION	RLA	RUNNING LOAD AMPS
DPDT	DOUBLE-POLE, DOUBLE-THROW	RTU	ROOFTOP UNIT
DPST	DOUBLE-POLE, SINGLE-THROW	SCCR	SHORT-CIRCUIT CURRENT RATING
E/ETR/EX	EXISTING TO REMAIN	SD	SMOKE DUCT DETECTOR
EC	ELECTRICAL CONTRACTOR	SF	SQUARE FEET
EF	EXHAUST FAN	SPDT	SINGLE-POLE, DOUBLE-THROW
EM	EMERGENCY	SPST	SINGLE-POLE, SINGLE-THROW
EMS	ENERGY MANAGEMENT SYSTEM	SSBJ	SUPPLY-SIDE BONDING JUMPER
ELV	ELECTRONIC LOW-VOLTAGE	ST	SHUNT TRIP
EWC	ELECTRIC WATER COOLER	SWBD	SWITCHBOARD
FAAP	FIRE ALARM ANNUNCIATOR PANEL	SWGR	SWITCHGEAR
FACP	FIRE ALARM CONTROL PANEL	TBB	TELECOMMUNICATIONS BONDING BACKBONE
FCA	FAULT CURRENT AMPS AVAILABLE	TBD	TO BE DETERMINED
FCU	FAN COIL UNIT	TGB	TELECOMMUNICATIONS GROUND BUS BAR
FF	FINISHED FLOOR	TL	TWISTLOCK
FLA	FULL LOAD AMPS	TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
FLR	FLOOR	TX/XFMR	TRANSFORMER
GC	GENERAL CONTRACTOR	TYP	TYPICAL
GEC	GROUNDING ELECTRODE CONDUCTOR	U/F	UNDERFLOOR
GES	GROUNDING ELECTRODE SYSTEM	U/G	UNDERGROUND
GFR	GROUND FAULT RELAY	U/S	UNDERSLAB
G	GROUND	UH	UNIT HEATER
IG	ISOLATED GROUND	UNO	UNLESS NOTED OTHERWISE
ISC	SHORT CIRCUIT CURRENT	UPS	UNINTERRUPTIBLE POWER SUPPLY
JBU-BOX	JUNCTION BOX	VD	VOLTAGE DROP
LF	LINEAR FEET	VFD	VARIABLE FREQUENCY DRIVE
LRA	LOCKED ROTOR AMPS	VS	VACANCY SENSOR
LTG/LTS	LIGHTING/LIGHTS	W	WIRE
MAU	MAKE-UP AIR UNIT	W/	WITH
MAX	MAXIMUM	WP	WEATHER PROOF
MCA	MINIMUM CIRCUIT AMPACITY	WR	WEATHER RESISTANT
MCB	MAIN CIRCUIT BREAKER	WT	WATERTIGHT
		XP	EXPLOSION PROOF

ANNOTATION

- (1) MECHANICAL OR FIRE PROTECTION PLAN NOTE CALLOUT
- (1) PLUMBING PLAN NOTE CALLOUT
- [1] ELECTRICAL OR FIRE ALARM PLAN NOTE CALLOUT
- (1) TECHNOLOGY PLAN CALLOUT
- (1) PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES
- [1] EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CU 1 MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 E1 DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 E1 SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

CIRCUITING & WIRING

- 7 5 3 OR P1-3,5,7 | P1 HOMERUN TO PANELBOARD. INFORMATION AT ARROWS ARE CIRCUIT NUMBERS AND PANELBOARD FOR TERMINATION. REFER TO PANELBOARD SCHEDULES FOR BRANCH CIRCUIT CONDUCTOR SIZES.
- INDICATES RELAY NUMBER
- CIRCUIT CONTINUATION OR PARTIAL CIRCUIT
- CONDUIT CONCEALED
- EM CONDUIT CONCEALED (EMERGENCY)
- CONDUIT IN/UNDER FLOOR/GROUND CONSTRUCTION
- EXPOSED CONDUIT
- EM EXPOSED CONDUIT (EMERGENCY)
- FLEXIBLE CONDUIT
- LOW VOLTAGE CABLE (NOT ROUTED IN CONDUIT)
- CONDUIT TURNING DOWN
- CONDUIT TURNING UP
- CONNECTION POINT OR EQUIPMENT TERMINATION
- EQUIPMENT TERMINATION

BRANCH CIRCUIT CONDUCTOR TABLE

WHERE TICK MARKS ARE NOT SHOWN, THE FOLLOWING SHALL GOVERN:

# OF POLES	HOT (PHASE)*	NEUTRAL (GROUNDED)**	GROUNDING***
1P	(1)	(1) UNO	(1)
2P	(2)	(1) UNO	(1)
3P	(3)	(1) UNO	(1)

* PROVIDE ADDITIONAL CONDUCTORS THROUGH ENTIRE CIRCUIT (SWITCHED, UNSWITCHED/EM, ETC.) AS INDICATED THROUGHOUT CONSTRUCTION DOCUMENTS AND AS REQUIRED FOR A COMPLETE AND WORKING SYSTEM.

** REFER TO SPECIFICATIONS FOR LIMITATIONS ON SHARING NEUTRAL (GROUNDED) CONDUCTORS. DO NOT CIRCUIT AS A MULTI-WIRE BRANCH CIRCUIT, UNO.

*** PROVIDE ADDITIONAL ISOLATED GROUNDING CONDUCTORS WHERE INDICATED.

REFER TO SPECIFICATIONS, PLANS, NOTES, WIRING AND CONTROL DIAGRAMS FOR ADDITIONAL CIRCUITING REQUIREMENTS.

LIGHTING

- A a LIGHT FIXTURE
- a = LOWER CASE LETTER IS SWITCH IDENTIFIER
- A = UPPER CASE LETTER INDICATES LIGHT FIXTURE TYPE
- = WALL MOUNT
- = ARROW INDICATED AIMING DIRECTION
- LIGHT FIXTURE CIRCUITED AS A NIGHT LIGHT (NL)
- EMERGENCY LIGHT FIXTURE WITH EMERGENCY LIGHTING BATTERY PACK OR CONNECTED TO EMERGENCY SOURCE
- NIGHT LIGHT/EMERGENCY LIGHT FIXTURE WITH EMERGENCY BATTERY PACK OR CONNECTED TO EMERGENCY SOURCE
- LIGHT FIXTURE WITH DUAL BALLASTS CIRCUITED SEPARATELY (SHADING IMPLIES EMERGENCY LIGHT FIXTURE)
- [#] LIGHTING TRACK (# INDICATES RELAY NUMBER)
- MIRROR LIGHTS
- EXTERIOR PARKING LOT LIGHT FIXTURE
- EXTERIOR PEDESTRIAN POST TOP LIGHT FIXTURE
- EXTERIOR LIT BOLLARD LIGHT
- EXIT SIGN - CEILING / WALL MOUNTED, ARROWS AS INDICATED, FACE HATCHED
- EMERGENCY LIGHTING UNIT EQUIPMENT WITH BATTERY PACK - CEILING/WALL MOUNTED
- AFEA (AREA FOR EVACUATION ASSISTANCE) SIGN - CEILING/WALL MOUNTED, ARROWS AS INDICATED

REFER TO LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION

POWER EQUIPMENT & DEVICES

- ELECTRICAL PANELBOARD (SURFACE OR FLUSH MOUNT)
- ELECTRICAL CABINET (SURFACE OR FLUSH MOUNT), TYPE AS NOTED
- PLYWOOD TERMINAL BOARD FOR TELEPHONE SYSTEM, UNO. SIZE AS NOTED
- SWITCHBOARD OR MOTOR CONTROL CENTER ON HOUSEKEEPING PAD
- ELECTRICAL DISTRIBUTION PANELBOARD
- TRANSFORMER
- 200/3/150/3R DISCONNECT SWITCH - "200/3/150/3R" DENOTES AMPERES/POLE/FUSE/NEMA ENCLOSURE RATING, NF= NON-FUSED, CB= CIRCUIT BREAKER (200/3/CB), NO VALUE (200/3/150) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 RATING
- 30/3/15/1/3R COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER "30/3/15/1/3R" DENOTES AMPERES/POLE/FUSE/NEMA STARTER SIZE/NEMA ENCLOSURE RATING. NF= NON-FUSED, CB= CIRCUIT BREAKER (30/3/CB/1), NO VALUE (200/3/150/1) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 ENCLOSURE RATING
- 2 MAGNETIC MOTOR STARTER, NEMA SIZE AS NOTED. 3-POLE, UNO
- VFD VARIABLE FREQUENCY DRIVE
- INDICATING LIGHT
- EMERGENCY POWER OFF BUTTON
- STOP-START PUSH BUTTON CONTROL STATION
- HAND-OFF-AUTO PUSH BUTTON CONTROL STATION
- MUSHROOM-TYPE PUSH BUTTON
- OVERHEAD PADDLE FAN

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	ARTICLE 700 OR LIFE SAFETY
DEMOLISH	ARTICLE 701 OR CRITICAL / EQUIPMENT BRANCH
NEW	
FUTURE	ARTICLE 702 OR OPTIONAL

BOXES, LIGHTING CONTROL & WIRING DEVICES

SWITCH LETTER DESIGNATIONS AS FOLLOWS:
BLANK = SINGLE
2 = TWO POLE
3 = THREE-WAY
4 = FOUR-WAY
D = DIMMER
F = FAN SPEED CONTROL
FH = FRACTIONAL HORSEPOWER MANUAL CONTROLLER
IH = INTEGRAL HORSEPOWER MANUAL CONTROLLER
K = KEYED
LV# = LOW VOLTAGE / DIGITAL
M = MANUAL MOTOR STARTER DISCONNECT
OS# = OCCUPANCY SENSOR
P = SPST PILOT LIGHT
WP = WEATHER PROOF
= REFER TO LIGHTING CONTROL DEVICE SCHEDULE

- $^{\#}$ SWITCH
- ALC AUTOMATIC LOAD CONTROL RELAY
- BTS BRANCH CIRCUIT TRANSFER SWITCH
- CEILING / WALL MOUNTED OCCUPANCY SENSOR (# INDICATES TYPE PER SCHEDULE)
  - CORNER 90 DEGREE SENSING
  - ONE-DIRECTION SENSING, CEILING/WALL MOUNT
  - CEILING MOUNT, TWO DIRECTION SENSING
  - CEILING MOUNT, FOUR DIRECTION SENSING
- C# CONTACTOR (SIZE, COIL VOLTAGE AND NUMBER OF POLES AS INDICATED)
- CL## TRACK-MOUNTED CURRENT LIMITER (## INDICATES AMPERAGE)
- DR DAYLIGHT SENSOR (# INDICATES TYPE PER SCHEDULE)
- LC LIGHTING CONTROLS PROCESSOR AND/OR EQUIPMENT
- PR POWER PACK (# INDICATES TYPE PER SCHEDULE)
- PS# PHOTOELECTRIC SWITCH
- R## ROOM CONTROLLER (# INDICATES TYPE PER SCHEDULE)
- TS# TIME SWITCH
- SIMPLEX RECEPTACLE - NEMA 5-20R, UNO
- DUPLEX RECEPTACLE - NEMA 5-20R, UNO
- DOUBLE DUPLEX RECEPTACLE - NEMA 5-20R, UNO
- SPECIAL RECEPTACLE - NEMA TYPE AS NOTED
- TWIST-LOCK TYPE RECEPTACLE
- G GFCI BLANK FACE GFCI FEED THROUGH DEVICE
- GFCI OR GFCI* GFCI TYPE RECEPTACLE*
- IG OR IG* ISOLATED GROUND TYPE RECEPTACLE*
- EM OR EM* EMERGENCY RECEPTACLE*
- RECEPTACLE INSTALLED ABOVE COUNTER OR BACKSPLASH*
- RECEPTACLE INSTALLED IN CEILING*
- RECEPTACLE INSTALLED IN FLOOR*
- RECEPTACLE INSTALLED VIA DROP CORD*
- RECEPTACLE LETTER DESIGNATIONS AS FOLLOWS:
  C = AUTOMATICALLY CONTROLLED
  CH = CLOCK HANGER TYPE
  G=RCPT PROTECTED BY GFCI CIRCUIT BREAKER OR UPSTREAM GFCI DEVICE
  H = HORIZONTALLY MOUNTED
  S = MANUALLY CONTROLLED
  SP / TVSS = SURGE PROTECTION
  TR = TAMPER RESISTANT
  TV = TELEVISION
  USB = USB/DUPLEX
  WP = WEATHER PROOF COVER
  WR = WEATHER RESISTANT
- $^{\#}$ RECEPTACLE
- MULTI-OUTLET ASSEMBLY
- TELEPHONE OUTLET
- DATA OUTLET
- MULTI-SERVICE OUTLET; TELEPHONE AND DATA
  - ABOVE COUNTER, TYP
  - WALL, TYP
  - FLOOR, TYP
- A MULTI-SERVICE POWER POLE WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- A MULTI-SERVICE FLOOR BOX WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- A POKE THROUGH, A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- THERMOSTAT
- CEILING/FLOOR MOUNT JUNCTION/OUTLET BOX
- WALL MOUNT JUNCTION/OUTLET BOX

* SYMBOL DEMONSTRATED WITH DUPLEX RECEPTACLE, WHEN USED IN COMBINATION WITH OTHER DEVICES MEANING IS SIMILAR FOR THOSE DEVICE TYPES.

REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR MORE INFORMATION.

ELECTRICAL ONE-LINE & RISER DIAGRAM

- ###A 3P SWITCH (RATING AS INDICATED)
- ###A 3P DRAWOUT CIRCUIT BREAKER (RATINGS AS INDICATED)
- ###AS 3P ###AF FRS FUSED SWITCH (RATING, POLES AND FUSE TYPE AS INDICATED)
- ###AS 3P ###AF FRS NEMA # COMBINATION FUSED SWITCH/STARTER AND STARTER SIZE
- ###AS 3P FRS NEMA # CIRCUIT BREAKER (RATINGS AS INDICATED)
- ###A 3P NEMA # COMBINATION CIRCUIT BREAKER/STARTER AND STARTER SIZE
- PANELBOARD, SINGLE OR MULTI-SECTION (REFER TO SCHEDULES)
- ISOLATED POWER PANELBOARD W/ INTEGRAL TRANSFORMER (REFER TO SCHEDULES)
- TX## TRANSFORMER (TYPE AND RATINGS AS INDICATED)
- TX## ###A SHIELDED TRANSFORMER (TYPE AND RATINGS AS INDICATED)
- ATS# ###A AUTOMATIC TRANSFER SWITCH (RATINGS AS INDICATED)
- ATS# (W/BYPASS) ###A ###W GENERATOR 480Y/277V, 3Ø, 4W AUTOMATIC TRANSFER SWITCH WITH BYPASS (RATINGS AS INDICATED)
- ###A, 3P M/G GENERATOR (RATINGS AS INDICATED)
  - NON-SEPARATELY DERIVED SOURCE OR
  - SEPARATELY DERIVED SOURCE
- MDP, SWITCHBOARD ELEC ROOM ### AMPS 480Y/277V 3Ø 4W SWITCHGEAR, SWITCHBOARD AND/OR DISTRIBUTION PANELBOARD (TYPE, RATING, DEVICES AND ACCESSORIES AS INDICATED)
- DIGITAL VM/AM ### COMBINATION DIGITAL VOLT METER/AMMETER
- ### CIRCUIT IDENTIFICATION (REFER TO CIRCUIT SCHEDULE)
- GFR GROUND FAULT RELAY
- PFR PHASE FAILURE RELAY
- KK# KIRK-KEY INTERLOCK (# INDICATES KEY PAIR)
- ST SHUNT TRIP
- AM AMMETER (RANGE AS SPECIFIED OR REQUIRED)
- VM VOLTMETER (RANGE AS SPECIFIED OR REQUIRED)
- UTILITY METER M UTILITY METER (AS REQUIRED BY UTILITY)
- AS AMMETER SWITCH
- VS VOLTMETER SWITCH
- WH D 15 WATT-HOUR METER, "D" DENOTES DEMAND REGISTER, "15" DENOTES MINUTES OF DEMAND INTERVAL
- CURRENT TRANSFORMER RATING AS SPECIFIED OR REQUIRED
- POTENTIAL TRANSFORMER RATING AS SPECIFIED OR REQUIRED
- SPD SURGE-PROTECTIVE DEVICE
- GROUND CONNECTION
- GROUND CONNECTION WITH TEST WELL
- GROUND ROD
- LIGHTNING ARRESTER
- CAPACITOR
- CONTACT (OPEN OR CLOSED)
- HEATER
- HP MOTOR
- ## BLOCK LOAD KW OR KVA
- ×F# ×FP# FAULT POINT REFERENCED IN SHORT CIRCUIT CURRENT AND VOLTAGE DROP SPREADSHEET

APPLICABLE ELECTRICAL CODES:

NOTE: PROJECT IS DESIGNED IN COMPLIANCE WITH THE FOLLOWING CODES. THIS IS NOT AN EXHAUSTIVE LIST. PROJECT SHALL COMPLY WITH ALL APPLICABLE CODES, STANDARDS AND LOCAL REQUIREMENTS. REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

ELECTRICAL CODE: **2017 NATIONAL ELECTRICAL CODE, (NFPA 70)**
BUILDING CODE: **2018 INTERNATIONAL BUILDING CODE**
ENERGY CODE: **2018 INTERNATIONAL ENERGY CONSERVATION CODE**

COMMISSIONING / FUNCTIONAL TESTING:

CONTRACTOR'S BID SHALL INCLUDE PROVISIONS TO PROVIDE ALL SERVICES RELATED TO THE CODE REQUIRED BUILDING SYSTEMS COMMISSIONING INCLUDING A COMMISSIONING PLAN, FUNCTIONAL TESTING, AND RELATED DOCUMENTATION, REPORTS AND OWNER TRAINING. THIS INCLUDES RETAINING THE SERVICES OF A 3RD PARTY REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY. REFER TO THE LATEST ADOPTED EDITION OF THE APPLICABLE ENERGY CODE FOR MORE INFORMATION. CONTRACTOR SHALL COMPLETE ALL RELATED COMMISSIONING REQUIREMENTS PRIOR TO FINAL INSPECTIONS IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS, CODE AND MANUFACTURER'S INSTRUCTIONS.

ELECTRICAL SUPPLEMENTAL SPECIFICATIONS:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS. AS APPLICABLE, REVIEW THE LANDLORD CRITERIA, GENERAL NOTES, OTHER TRADE DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT AND ENGINEER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMITTING BID.
2. ALL WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES AS WELL AS APPLICABLE INDUSTRY STANDARDS. ALL EQUIPMENT SHALL BEAR LABELS FOR THE USE INTENDED BY AN AHJ ACCEPTED NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), SUCH AS UL OR ETL. THE FINAL ELECTRICAL INSTALLATION OF THE FACILITY OCCUPIED BY OWNER SHALL BE FREE FROM ELECTRICAL DEFECTS TO THE SATISFACTION OF THE AHJ, OWNER, ARCHITECT AND ENGINEER.
3. COORDINATE FINAL LOCATION AND INSTALLATION REQUIREMENTS OF ALL LIGHT FIXTURES, ELECTRICAL EQUIPMENT AND ELECTRICAL DEVICES WITH ARCHITECTURAL DRAWINGS, EXISTING CONDITIONS AND OTHER TRADES PRIOR TO ROUGH-IN. PROVIDE ALL NECESSARY DEVICES, CORDS, PLUGS, DISCONNECTS AND FINAL CONNECTIONS TO ELECTRICAL EQUIPMENT FOR PROPER OPERATION IN ACCORDANCE WITH CODE, OWNER AND MANUFACTURER REQUIREMENTS.
4. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC/SCHEMATIC IN NATURE AND REPRESENT THE GENERAL SCOPE OF WORK. IT IS NOT WITHIN THE SCOPE OF THE ELECTRICAL DRAWINGS TO SHOW ALL NECESSARY RACEWAY ROUTING, BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF EQUIPMENT AND WIRING DEVICES WITH OTHER TRADES PRIOR TO INSTALLATION AND INSTALL ALL WORK TO CONFORM TO THE OWNER REQUIREMENTS.
5. ALL CONDUCTOR AND CONDUIT LENGTHS SHOWN IN THESE DESIGN DOCUMENTS ARE INTENDED SOLELY FOR USE IN THE DESIGN CALCULATIONS BY THE DESIGN PROFESSIONAL, UNLESS NOTED OTHERWISE. LENGTHS SHOWN SHALL NOT BE USED TO ASSIST IN THE BIDDING TAKEOFF PROCESS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MATERIAL QUANTITIES REQUIRED TO BID AND CONSTRUCT THE COMPLETE PROJECT.
6. PROVIDE PROPER FIRE PROOFING AND SEALANT FOR PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. THE FIRE STOPPING METHOD, MATERIAL AND ITS APPLICATION SHALL BE NRTL LISTED, CODE COMPLIANT AND APPROVED BY AHJ.
7. FOR CAST-IN-PLACE CONCRETE, TILT-UP WALLS, PRECAST OR SIMILAR PRE-ENGINEERED WALL SYSTEMS: COORDINATE THE FINAL LOCATION OF ALL ELECTRICAL DEVICES, RACEWAYS, LIGHT FIXTURES AND PENETRATIONS WITH ARCHITECT, WALL SUPPLIER AND OTHER TRADES PRIOR TO WALL CONSTRUCTION. CONDUIT/RACEWAY IMBEDDED IN CONCRETE WALLS SHALL BE SCHEDULE 80 PVC OR LFMC; OTHER TYPES MAY BE ALLOWED IF APPROVED BY WALL SYSTEM MANUFACTURER AND ENGINEER.
8. WHEN CONCRETE TRENCHING/CORING IS REQUIRED, THE METHODS, DEPTHS, AND LOCATIONS SHALL BE PRE-APPROVED BY LANDLORD, ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO THE START OF WORK. X-RAY SLAB AS NECESSARY TO AVOID DAMAGING ANY UNDER-SLAB UTILITIES OR STRUCTURE. SLAB REPLACEMENT SHALL BE INSTALLED WITH DOWELLING AND REINFORCED CONCRETE AS DIRECTED BY THE STRUCTURAL ENGINEER. WHERE SLAB ON GRADE IS SAW-CUT AND REMOVED FOR TRENCHING THE CONTRACTOR SHALL INSTALL MOISTURE BARRIER PER LANDLORD'S REQUIREMENTS. PROVIDE 3/4" MINIMUM CONDUITS ROUTED THROUGH SLAB AND STUBBED UP INTO DEVICES. FOR SLAB ON DECK, THE FLOOR SHALL BE SLEEVED AND EQUIPPED WITH THE APPROPRIATE LISTED ASSEMBLY. PROVIDE 3/4" MINIMUM CONDUITS ROUTED BELOW SLAB, TIGHT TO STRUCTURE, AND STUBBED UP INTO DEVICES.
9. ALL APPLICABLE SWITCHES, RECEPTACLES, OUTLETS, AND CONTROLS SHALL BE PLACED AT HEIGHTS THAT ARE IN ACCORDANCE WITH ADA ACCESSIBILITY GUIDELINES.
10. COORDINATE FLOOR MOUNTED BOX, RECEPTACLE, AND COVER PLATE TYPES WITH ARCHITECT AND OWNER PRIOR TO ORDER.
11. WIRING DEVICES ADJACENT TO EACH OTHER SHALL BE INSTALLED UNDER A SINGLE COVER PLATE, UNO.
12. WIRING DEVICES SHOWN BACK-TO-BACK ON A COMMON WALL SHALL BE OFFSET A MINIMUM OF 12" HORIZONTALLY TO REDUCE SOUND TRANSMISSION BETWEEN ROOMS, UNO.
13. ALL WP OUTLET BOX HOODS SHALL BE "EXTRA-DUTY" AND "WHILE-IN-USE COVER" TYPE. OUTLET BOX HOODS SHALL BE LOW PROFILE WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. THE USE OF LARGE BUBBLE COVERS SHALL BE AVOIDED ON THE EXTERIOR OF THE BUILDING OR BEHIND EQUIPMENT IN ORDER TO PREVENT DAMAGE TO THE COVER AND TO ALLOW THE EQUIPMENT TO BE LOCATED CLOSE TO THE WALL.
14. ALL 120V RECEPTACLES 50A OR LESS, 208V AND 240V RECEPTACLES 100A OR LESS, SHALL BE GFCI PROTECTED IN LOCATIONS REQUIRED BY CODE; THIS INCLUDES BATHROOMS, KITCHENS/FOOD PREP AREAS, EXTERIOR LOCATIONS AND RECEPTACLES WITHIN 6 FEET OF A SINK. GFCI RECEPTACLES SHALL BE READILY ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND STATIONARY EQUIPMENT. GFCI PROTECTION MAY BE VIA A GFCI CIRCUIT BREAKER OR GFCI RECEPTACLE, UNLESS NOTED OTHERWISE. WHERE NECESSARY, GFCI PROTECTION MAY BE ACHIEVED VIA A BLANK FACE GFCI DEVICE LOCATED IN A READILY ACCESSIBLE LOCATION NEAR RECEPTACLE BEING PROTECTED. FOR DOWNSTREAM WIRING DEVICES LOCATED ON THE SAME BRANCH CIRCUIT, THE GFCI PROTECTION MAY BE PROVIDED FOR BY A SINGLE UPSTREAM DEVICE IF ALL PROTECTED DEVICES ARE LABELED PER CODE.
15. FLEXIBLE CONDUIT IS ONLY PERMITTED WHERE SPECIFICALLY ALLOWED IN THE CONSTRUCTION DOCUMENTS, WHERE CONCEALED FROM VIEW OR EXPOSED FINAL CONNECTIONS TO LIGHT FIXTURES AND EQUIPMENT IN LENGTHS OF 6'-0" OR LESS.
16. ALL EMPTY CONDUIT/RACEWAY SHALL BE INSTALLED WITH PULL STRINGS. TERMINATE CONDUIT STUB-UP WITH A NYLON BUSHING.
17. EXPOSED CONDUIT/RACEWAY SHALL BE PAINTED TO MATCH ADJACENT SURFACE, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
18. CONDUITS/RACEWAYS SHALL BE CONCEALED FROM VIEW WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. ROUTE CONDUITS SERVING ROOFTOP EQUIPMENT CONCEALED INSIDE EQUIPMENT CURB AND MINIMIZE ROOF PENETRATIONS AND EXTERIOR CONDUIT RUNS WHERE PRACTICABLE. SUPPORT RACEWAY FROM STRUCTURE, NOT ROOF DECK. MAINTAIN 2" MIN SPACING FROM BOTTOM OF ROOF DECK TO PREVENT ROOFING SCREWS FROM PENETRATING RACEWAY. DO NOT ROUTE CONDUITS ACROSS SKYLIGHTS, ACCESS PANELS, HATCHED TILES, HVAC DIFFUSERS, OR EQUIPMENT WORKING CLEARANCE SPACE. ROUTE ALL EXPOSED NON-FLEXIBLE CONDUITS TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES AND IN STRUT OR CABLE/PPE TRAY WHERE PRACTICABLE. INSTALL CONDUITS PLUMB/ LEVEL WHERE EXPOSED TO VIEW. COORDINATE RACEWAY ROUTING AND INSTALLATION WITH OTHER TRADES PRIOR TO ROUGH-IN.
19. WHERE PRACTICABLE, ALL UNDER-FLOOR/UNDER-GROUND CONDUITS/RACEWAY SHALL BE INSTALLED A MINIMUM OF 24" BELOW BOTTOM OF SLAB/PAVING/GRADE, UNLESS NOTED OTHERWISE. NOTE: THE DESIGN INTENT FOR INSTALLING ELECTRICAL CIRCUITRY AT THIS DEPTH IS TO PROTECT THE ELECTRICAL CIRCUITRY FROM DAMAGE DUE TO FUTURE WORK.
20. PROVIDE LABEL AT EACH RECEPTACLE COVER PLATE WITH THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
21. MULTIWIRE BRANCH CIRCUITS ARE NOT ALLOWED, UNLESS NOTED OTHERWISE.
22. PROVIDE INSULATED EQUIPMENT GROUNDING CONDUCTOR FOR ALL CIRCUITS, UNLESS NOTED OTHERWISE.

PARAGON STAR

LOT 20 - HUB BUILDING

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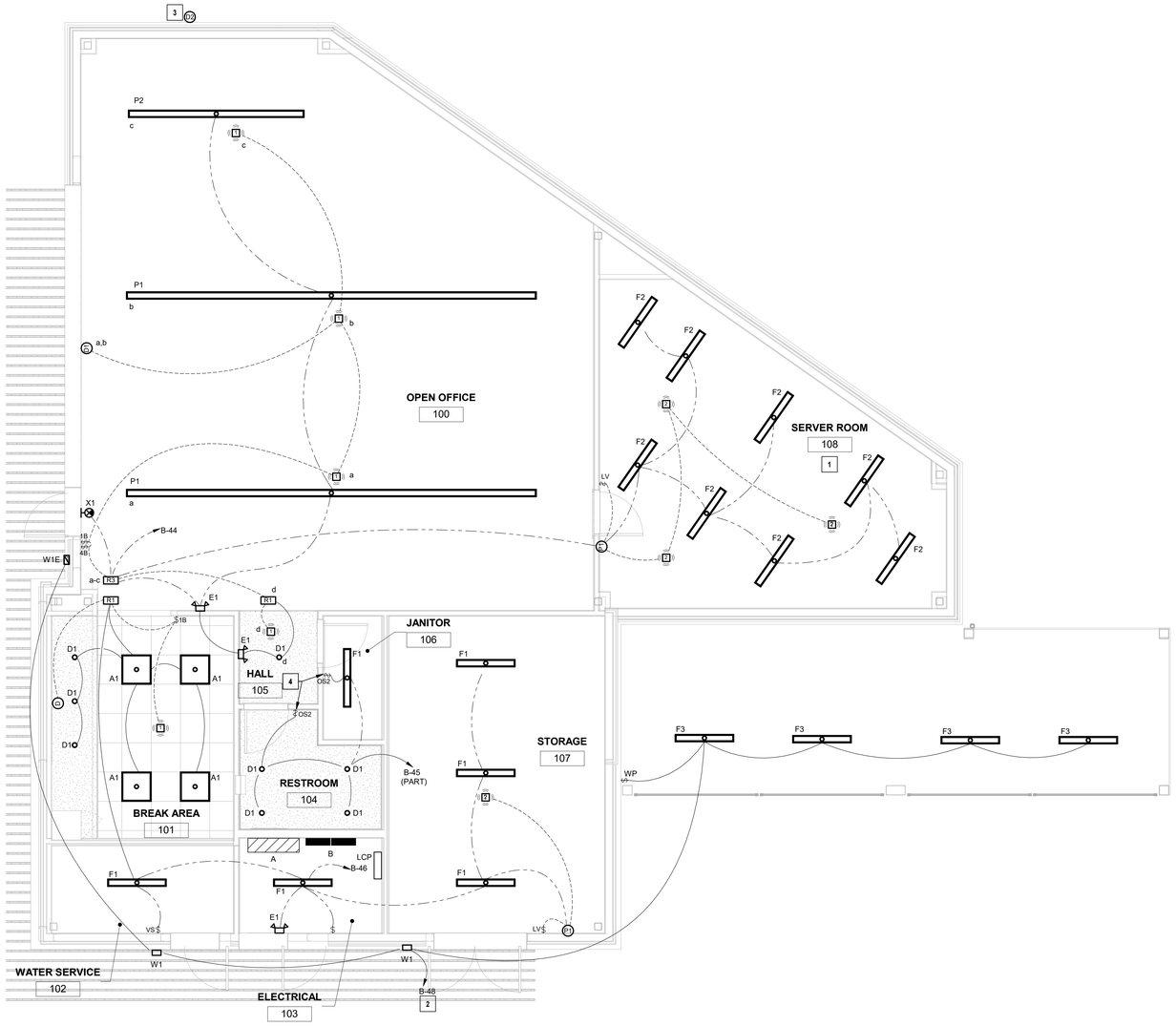
STATE OF MISSOURI ANDREA C MULVANY NUMBER PE-2013039892 PROFESSIONAL ENGINEER

08/06/2021

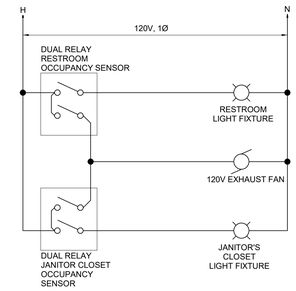
ANDREA C. MULVANY
LICENSE # PE-2013039892

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MEC



1 LIGHTING PLAN
1/4" = 1'-0"



3 EXHAUST FAN/LIGHT CONTROL MULTIPLE ROOMS
NTS

LIGHTING GENERAL NOTES:

1. THE EMERGENCY LIGHTING SYSTEM HAS BEEN DESIGNED TO PROVIDE AN INITIAL FLOOR ILLUMINANCE LEVEL OF 1 FC AVERAGE, 0.1 FC MINIMUM AND NO MORE THAN A 40:1 MAXIMIN RATIO ALONG THE EMERGENCY EGRESS PATHS. WHERE APPLICABLE, ADJUST AIMING OF EMERGENCY LIGHTS AS REQUIRED TO PROVIDE PROPER ILLUMINATION AT FLOOR AVOIDING OBSTACLES AND SHADOWS AFTER STORE SET-UP IS COMPLETE.
2. WALL MOUNTED EXITS SIGNS SHALL BE MOUNTED 12" ABOVE DOOR FRAME AND CENTERED ABOVE DOOR OPENING, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL BE READILY VISIBLE FROM DIRECTION OF EGRESS TRAVEL. COORDINATE FINAL EXIT SIGN LOCATIONS WITH AHJ AND OWNER.
3. SUSPEND BACK OF HOUSE AND STORAGE AREA LIGHT FIXTURES AS HIGH AS PRACTICABLE IN ORDER TO AVOID DAMAGE, UNLESS NOTED OTHERWISE. SUSPEND JUST BELOW DUCTWORK AND SIMILAR OBSTRUCTIONS WHERE NECESSARY TO AVOID SHADOWS. COORDINATE REQUIREMENTS WITH OWNER AND OTHER DISCIPLINES PRIOR TO INSTALLATION.
4. PROVIDE LABEL AT EACH MANUAL LIGHT SWITCH INDICATING THE LIGHT FIXTURE(S) THAT THE SWITCH CONTROLS AND THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. A SINGLE LIGHT SWITCH FOR A SMALL ROOM DOES NOT NEED TO INDICATE THE SPACE CONTROLLED SINCE IT IS INTUITIVELY OBVIOUS. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
5. ALL REMOTELY LOCATED LIGHT FIXTURE POWER SUPPLIES SHALL BE LOCATED IN AN ACCESSIBLE LOCATION WITH PROPER VENTILATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CONCEAL DEVICES AND RELATED WIRING FROM CUSTOMER/PUBLIC VIEW. PROVIDE ENCOSURE IF REQUIRED. COORDINATE LOCATION AND ENCLOSURE TYPE WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.

LIGHTING SUPPLEMENTAL SPECIFICATIONS:

1. REFER TO THE ARCHITECTURAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS, MOUNTING HEIGHTS, TRACK LENGTHS AND ADDITIONAL MOUNTING INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT COORDINATION AND CONFLICT ISSUES ARE RESOLVED PRIOR TO INSTALLATION OF LIGHT FIXTURES. CONTACT ARCHITECT/ENGINEER IMMEDIATELY IF THERE ARE DISCREPANCIES.
2. THROUGH WIRING OF RECESSED LIGHT FIXTURES, IN SUSPENDED CEILINGS, IS NOT PERMITTED. CONNECT EACH LIGHT FIXTURE BY A WHIP TO A JUNCTION BOX. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5'-0" RADIUS OF ITS INDICATED LOCATION. CABLE WHIPS SHALL NOT EXCEED 6'-0" OF UNSUPPORTED LENGTHS.
3. ALL EMERGENCY LIGHTS AND EXIT SIGNS WITH INTEGRAL BATTERY BACK-UP SHALL BE CONNECTED TO A SEPARATE UNSWITCHED CONDUCTOR BYPASSING ALL OTHER CONTROLS AND CONTACTORS, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL NOT BE SWITCHED. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR PROPER INSTALLATION AND TESTING. ALLOW BATTERY TO CHARGE FOR A MINIMUM OF 48 HOURS BEFORE LIGHT LEVEL TESTING. IN ORDER TO PREVENT BATTERY DAMAGE, DO NOT TURN OFF POWER FOR EXTENDED PERIODS OF TIME AFTER EMERGENCY LIGHT HAS BEEN POWERED.
4. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL MOUNTED LINE VOLTAGE LIGHT SWITCHES, UNLESS NOTED OTHERWISE. IF NEUTRAL TERMINATION IS NOT REQUIRED FOR THE DEVICE THEN CAP CONDUCTOR AND TAG AS 'NEUTRAL FOR FUTURE USE'.
5. COORDINATE ALL OCCUPANCY/VACANCY SENSOR SETTINGS WITH OWNER AND ADJUST AS NECESSARY FOR PROPER OPERATION. SETTINGS MUST COMPLY WITH AHJ AND LOCAL ENERGY CODE REQUIREMENTS.
6. DO NOT INSTALL OCCUPANCY/VACANCY SENSORS WITHIN 48" OF AIR DIFFUSER OR SIMILAR OBSTRUCTION THAT MAY ADVERSLY AFFECT THE SENSOR PERFORMANCE. COORDINATE FINAL SENSOR LOCATIONS WITH OTHER TRADES AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

☐ ELECTRICAL PLAN NOTES:

1 COORDINATE LIGHT FIXTURE AND OCCUPANCY SENSOR LAYOUT WITH DATA RACKS AND LADDER RACKS. ADJUST LOCATIONS AS NECESSARY TO AVOID OBSTRUCTIONS.
2 ROUTE CIRCUIT VIA RELAY PANEL. REFER TO SHEET E5.01 FOR ADDITIONAL INFORMATION.
3 PROVIDE EXTERIOR DAYLIGHT SENSOR ON NORTH FACING WALL. SHIELD SENSOR FROM ARTIFICIAL LIGHTING. SENSOR SHALL BE FROM SAME MANUFACTURER AS LIGHTING CONTROL PANEL. PROVIDE LOW-VOLTAGE WIRING TO PANEL PER MANUFACTURER'S REQUIREMENTS.
4 REFER TO DETAIL 2, E1.01 FOR SWITCH CONTROL FOR EXHAUST FAN.

NORTH

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

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REGISTRATION

STATE OF MISSOURI
ANDREA C. MULVANY
NUMBER PE-2013039892
PROFESSIONAL ENGINEER

08/06/2021
ANDREA C. MULVANY
LICENSE # PE-2013039892

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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SHEET TITLE

LIGHTING PLAN

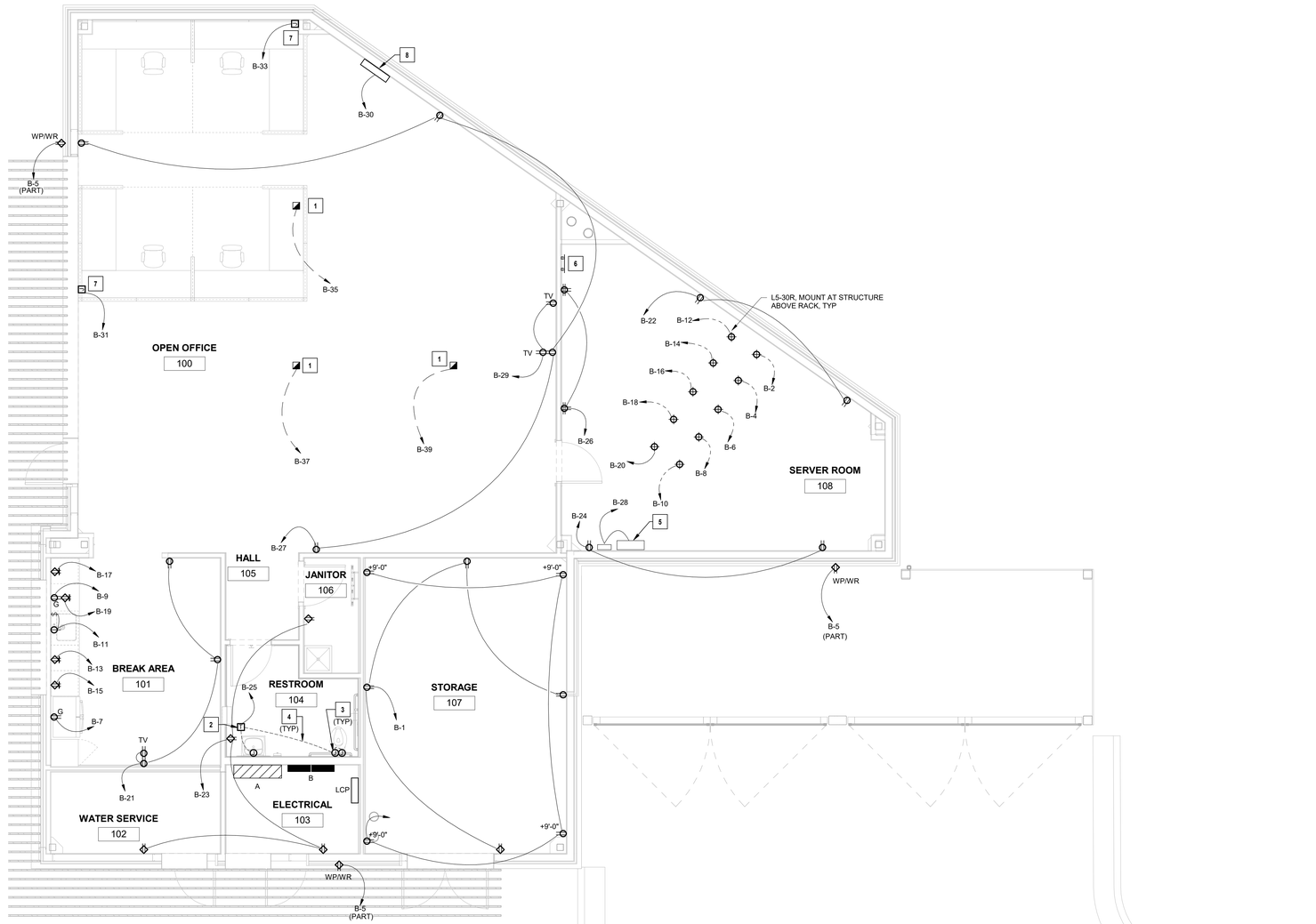
SHEET NUMBER

E1.01

ANDREA C. MULVANY

ELECTRICAL PLAN NOTES:

1. PROVIDE WIREMOLD RFB6E-OG FLOOR BOX (OR APPROVED EQUIVALENT) WITH (2) DUPLEX RECEPTACLES AND (2) COMMUNICATIONS BRACKETS TO MATCH OWNER'S DATA EQUIPMENT. INCLUDE FPBTC FLUSH COVER, SET BOX HEIGHT WITH FLOOR. COVER ASSEMBLY FINISH COLOR TO BE CONFIRMED WITH ARCHITECT. PROVIDE 2" CONDUIT (WITH PULL STRING) FOR DATA AND 1" CONDUIT FOR POWER UNDERSLAB TO NEAREST FULL HEIGHT PARTITION WALL, TURN 90 DEGREES, AND ROUTE TO ABOVE CEILING.
2. PROVIDE JUNCTION BOX AND TOGGLE DISCONNECT SWITCH AND INSTALL LOW-VOLTAGE TRANSFORMER, SUPPLIED BY PLUMBING CONTRACTOR WITH EQUIPMENT, FOR ELECTRONIC ACTUATED FLUSH VALVES AND FAUCETS. COORDINATE EXACT LOCATION AND QUANTITY OF JUNCTION BOX(ES) WITH PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.
3. PROVIDE WALL MOUNTED JUNCTION BOXES FOR SOLENOID AND SENSORS ASSOCIATED WITH AUTOMATIC OPERATION OF PLUMBING FIXTURES. PROVIDE (2) WALL MOUNTED JUNCTION BOXES FOR EACH WATER CLOSET (WC) AND URINAL AND PROVIDE (1) WALL MOUNTED JUNCTION BOX FOR EACH FAUCET. VERIFY EXACT LOCATIONS AND FULLY COORDINATE INSTALLATION WITH PLUMBING CONTRACTOR PER PLUMBING FIXTURE EQUIPMENT INSTALLATION GUIDELINES PRIOR TO ROUGH-IN.
4. PROVIDE 3/4" CONDUIT WITH 24V, #14 AWG WIRE FOR AUTOMATIC OPERATION OF PLUMBING FIXTURES.
5. PROVIDE CONNECTION TO SECURITY PANEL(S), COORDINATE WITH DIVISION 28 PRIOR TO ROUGH-IN.
6. GROUND BAR, REFER TO TN SHEETS FOR ADDITIONAL INFORMATION. REFER TO ONE-LINE DIAGRAM FOR GROUNDING REQUIREMENTS.
7. PROVIDE FURNITURE FEED WHIP PER FURNITURE MANUFACTURER'S REQUIREMENTS. MOUNT IN WALL AT +18" AFF.
8. PROVIDE CONNECTION TO FIRE ALARM CONTROL PANEL, COORDINATE WITH DIVISION 28 PRIOR TO ROUGH-IN.



1 POWER PLAN
1/4" = 1'-0"

NORTH

ANDREA C. MULVANY

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08/06/2021

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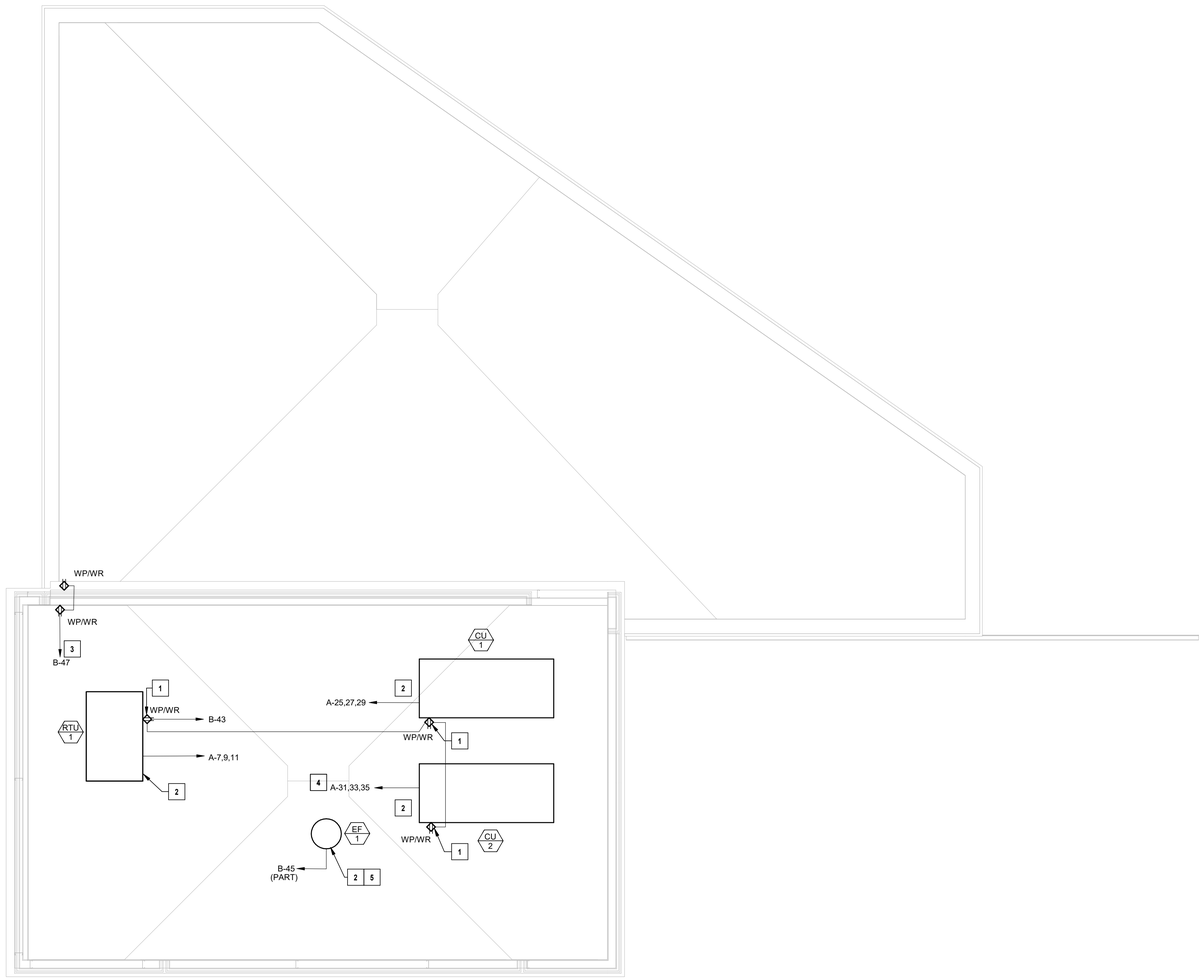
POWER PLAN

SHEET NUMBER

E2.01

ELECTRICAL PLAN NOTES:

1 PROVIDE CONNECTION TO RECEPTACLE FURNISHED WITH ROOF-TOP UNIT (RTU) PER MANUFACTURER'S REQUIREMENTS.
2 MECHANICAL EQUIPMENT FURNISHED WITH INTEGRAL DISCONNECT. PROVIDE CONNECTION PER MANUFACTURERS REQUIREMENTS.
3 ROUTE CIRCUIT VIA RELAY PANEL. REFER TO SHEET E5.01 FOR ADDITIONAL INFORMATION.
4
5 REFER TO DETAIL 2, E1.01 FOR SWITCH CONTROL FOR EXHAUST FAN.



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

NORTH

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POWER ROOF PLAN

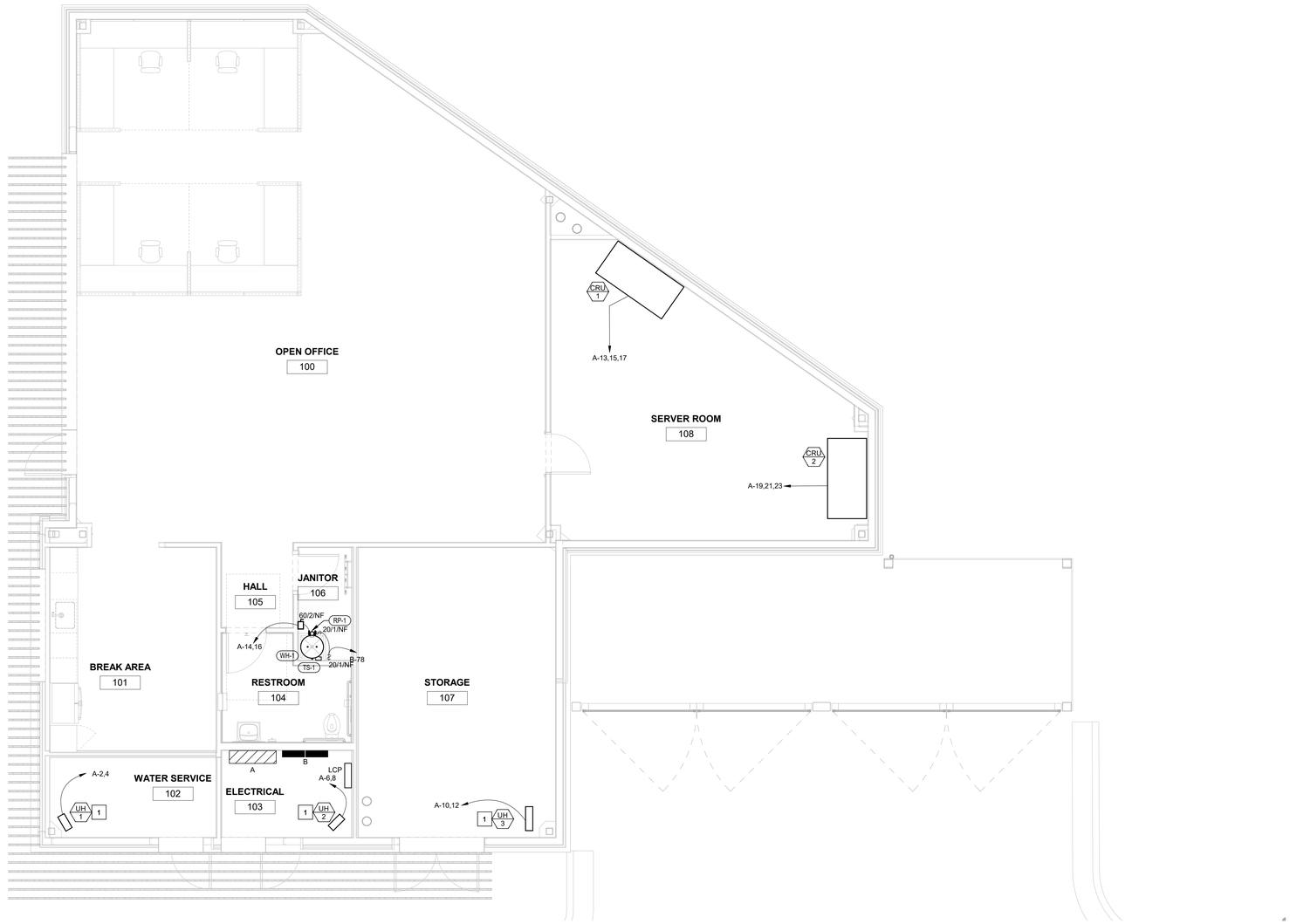
SHEET NUMBER

E2.02

ANDREA C. MULVANY

ELECTRICAL PLAN NOTES:

1 MECHANICAL EQUIPMENT FURNISHED WITH INTEGRAL DISCONNECT. PROVIDE CONNECTION PER MANUFACTURERS REQUIREMENTS.



1 EQUIPMENT CONNECTION PLAN
1/4" = 1'-0"

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TEL 816.663.8700 **FAX** 816.663.8701
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

EQUIPMENT CONNECTION PLAN

SHEET NUMBER

E3.01

ANDREA C. MULVANY

PANELBOARD: A (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: UTILITY

OFFICE BUILDING
BUILDING SQUARE FOOTAGE: 2594

FAULT CURRENT: 10,000 AIC
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAIN DISTRIBUTION
MOUNTING: SURFACE
LOCATION: ELECTRICAL 103

EQUIPMENT GROUND BUS

SERVICE ENTRANCE RATED

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A	PHASE B	PHASE C	P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1							8920 1500			2	20	12		U	UH-1	2
3	PANEL B	--		OL	150	3		8923 1500								4
5									8582 1500	2	20	12		U	UH-2	6
7							6797 1500									8
9	RTU-1	H M		OL	60	3		6797 2500		2	30	10		U	UH-3	10
11									6797 2500							12
13							9391 3000			2	40	8		Z U	WATER HEATER	14
15	CRU-1	C		OL	110	3		9391 3000								16
17									9391 0	1					EQUIPPED SPACE	18
19							9391 0			1					EQUIPPED SPACE	20
21	CRU-2	C		OL	110	3		9391 0		1					EQUIPPED SPACE	22
23									9391 0	1					EQUIPPED SPACE	24
25							1657 0			1					EQUIPPED SPACE	26
27	CU-1	M		OL	15	3		0 0		1					EQUIPPED SPACE	28
29									0 0	1					EQUIPPED SPACE	30
31							1657 0			1					EQUIPPED SPACE	32
33	CU-2	M		OL	15	3		0 0		1					EQUIPPED SPACE	34
35									0 0	1					EQUIPPED SPACE	36
37							0 0			1					EQUIPPED SPACE	38
39	SPD				40	3		0 0		1					EQUIPPED SPACE	40
41									0 0	1					EQUIPPED SPACE	42
		TOTAL LOAD (VA):					43812 VA	41501 VA	38160 VA							
		TOTAL AMPS:					369 A	350 A	318 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	56344 VA	100%	56344 VA
HEATING (H)	17400 VA	0%	0 VA
LIGHTING (L) (PER NEC-220)	7803 VA	125%	9754 VA
RECEPTACLES (R)	9000 VA	100%	9000 VA
MOTORS (M)	4810 VA	100%	4810 VA
SUPPLEMENTAL HEAT (U)	17000 VA	100%	17000 VA
MISC EQUIP (Z)	14160 VA	100%	14160 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGN/DISPLAY (D)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	2990 VA	125%	3738 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

OL - REFER TO ONE-LINE DIAGRAM

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	129507 VA
TOTAL NEC LOAD	114805 VA
TOTAL CONNECTED CURRENT	359 A
TOTAL NEC DEMAND CURRENT	319 A

PANELBOARD: B (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: A

FAULT CURRENT: 10,000 AIC
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENERAL PURPOSE
MOUNTING: SURFACE
LOCATION: ELECTRICAL 103

EQUIPMENT GROUND BUS

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A	PHASE B	PHASE C	P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	STORAGE ROOM	R		12	20	1	720 2000			1	30	10		Z	DATA RACK 1A	2
3	STORAGE ROOM FANS	R		12	20	1		720 2000		1	30	10		Z	DATA RACK 1B	4
5	EXTERIOR	R		12	20	1			540 2000	1	30	10		Z	DATA RACK 1C	6
7	REFRIGERATOR	Z	GF	12	20	1	750 2000			1	30	10		Z	DATA RACK 1D	8
9	DISHWASHER	Z	GF	12	20	1		750 180		1	30	10		R	DATA RACK 1E SPARE	10
11	DISPOSAL	Z M	GF	12	20	1			1176 180	1	30	10		R	DATA RACK 2A SPARE	12
13	COUNTER APPLIANCE A	R		12	20	1	180 180			1	30	10		R	DATA RACK 2B SPARE	14
15	MICROWAVE	Z		12	20	1		1750 180		1	30	10		R	DATA RACK 2C SPARE	16
17	COFFEE MAKER	Z		12	20	1			1500 180	1	30	10		R	DATA RACK 2D SPARE	18
19	COUNTER APPLIANCE B	R		12	20	1	180 180			1	30	10		R	DATA RACK 2E SPARE	20
21	BREAK AREA	R		12	20	1		720 360		1	20	12		R	SERVER ROOM - GENERAL A	22
23	ELEC/WATER/JAN/RR	R		12	20	1			720 360	1	20	12		R	SERVER ROOM - GENERAL B	24
25	FLUSH VALVES	Z		12	20	1	50 360			1	20	12		R	SERVER ROOM - GENERAL C	26
27	OPEN OFFICE - GENERAL	R		12	20	1		720 200		1	20	12			SECURITY PANELS	28
29	OPEN OFFICE TV'S	R		12	20	1			360 360	1	20	12		Z	FIRE ALARM PANEL	30
31	FURNITURE FEED A	Z		12	20	1	500 0			1	20				SPARE	32
33	FURNITURE FEED B	Z		12	20	1		500 0		1	20				SPARE	34
35	OPEN OFFICE FLOOR BOX A	R		12	20	1			360 0	1	20				SPARE	36
37	OPEN OFFICE FLOOR BOX B	R		12	20	1	360 0			1	20				SPARE	38
39	SECRUITY DESK FLOOR	R		12	20	1		360 0		1	20				SPARE	40
41	SPARE				20	1			0 0	1	20				SPARE	42
43	ROOFTOP MAINTENANCE	R		12	20	1	540 920			1	20	12	EM	L Z	OPEN OFFICE/SERVER	44
45	EF-1 / LIGHTS	L M		12	20	1		258 225		1	20	12	EM	L Z	BACK OF HOUSE/BREAK	46
47	HOLIDAY LIGHTS	R	RP	12	20	1			360 366	1	20	12	EM,RP	L	EXTERIOR	48
49	SPARE				20	1	0 0			1	20				SPARE	50
51	SPARE				20	1		0 0		1	20				SPARE	52
53	SPARE				20	1			0 0	1	20				SPARE	54
55	SPARE				20	1	0 0			1	20				SPARE	56
57	SPARE				20	1		0 0		1	20				SPARE	58
59	SPARE				20	1			0 0	1	20				SPARE	60
61	SPARE				20	1	0 0			1	20				SPARE	62
63	SPARE				20	1		0 0		1	20				SPARE	64
65	SPARE				20	1			0 0	1	20				SPARE	66
67	SPARE				20	1	0 0			1	20				SPARE	68
69	SPARE				20	1		0 0		1	20				SPARE	70
71	SPARE				20	1			0 0	1	20				SPARE	72
73	SPARE				20	1	0 0			1	20				SPARE	74
75	SPARE				20	1		0 0		1	20				SPARE	76
77	SPARE				20	1			0 120	1	20	12		M	RECIRC PUMP/TIME SWITCH	78
79	SPARE				20	1	0 0									80
81	SPARE				20	1		0 0		3	40				SPD	82
83	SPARE				20	1			0 0							84
		TOTAL LOAD (VA):					8920 VA	8923 VA	8582 VA							
		TOTAL AMPS:					75 A	75 A	72 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	0 VA	100%	0 VA
LIGHTING (L)	1569 VA	125%	1961 VA
RECEPTACLES (R)	9000 VA	100%	9000 VA
MOTORS (M)	320 VA	100%	320 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	14160 VA	100%	14160 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGN/DISPLAY (D)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	1176 VA	125%	1470 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

EM - EMERG LTG HANDLE-ON CLAMP GF - GFCI TYPE CIRCUIT BREAKER

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	26225 VA
TOTAL NEC LOAD	26911 VA
TOTAL CONNECTED CURRENT	73 A
TOTAL NEC DEMAND CURRENT	75 A

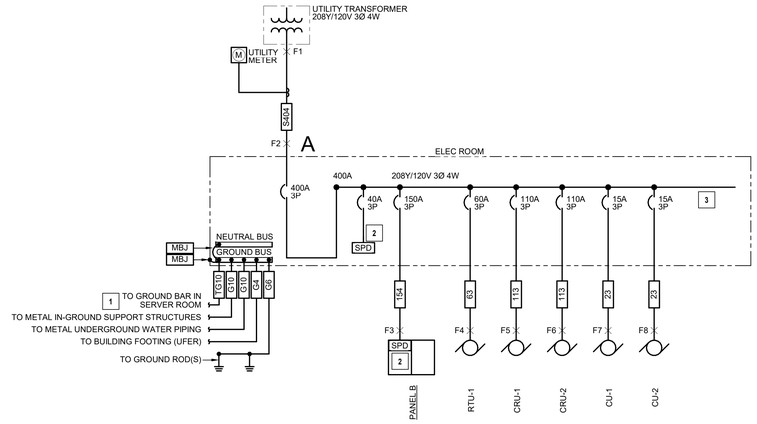
BUILDING LOAD SUMMARY (A)

BUILDING OCCUPANCY TYPE: OFFICE BUILDING
BUILDING SQUARE FOOTAGE: 2594

SERVICE DESCRIPTION: 208Y/120 V

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	56344 VA	100%	56344 VA
HEATING (H)	17400 VA	0%	0 VA
LIGHTING (L) (PER NEC-220)	7803 VA	125%	9754 VA
RECEPTACLES (R)	9000 VA	100%	9000 VA
MOTORS (M)	4810 VA	100%	4810 VA
SUPPLEMENTAL HEAT (U)	17000 VA	100%	17000 VA
MISC EQUIP (Z)	14160 VA	100%	14160 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGN/DISPLAY (D)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	2990 VA	125%	3738 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA
TOTAL LOAD	129507	VA	114805
TOTAL AMPACITY	359	AMPS	319
SERVICE AMPACITY		AMPS	400
SPARE CAPACITY		AMPS	81

FEEDER TAG	FEEDER DESCRIPTION
23	(3)#12, (1)#12 G, 1/2" C
63	(3)#6, (1)#10 G, 3/4" C
113	(3)#2, (1)#6 G, 1-1/4" C
154	(4)#1/0, (1)#6 G, 1-1/2" C
G4	#4 COPPER GROUND, 3/4" C
G6	#6 COPPER GROUND, 3/4" C
G10	#1/0 COPPER GROUND, 3/4" C
MBJ	MAIN BONDING JUMPER, #1/0
S404	(2) 2" C, EACH W/ (4)#3/0
TG10	#1/0 cu



1 ELECTRICAL ONELINE
NTS

ELECTRICAL PLAN NOTES:

1. PROVIDE CONNECTION TO GROUND BAR IN SERVER ROOM, REFER TO TN SHEETS FOR ADDITIONAL INFORMATION.
2. PROVIDE SURGE PROTECTIVE DEVICE (SPD) INTEGRAL TO SWITCHBOARD/PANELBOARD. COORDINATE OVERCURRENT PROTECTION DEVICE SIZE WITH SPD SUBMITTAL INFORMATION AND PROVIDE AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. PROVIDE UNUSED SPACES IN MAIN SWITCHBOARD WITH FULL BUSSING FOR FUTURE INSTALLATION OF DEVICES.

ONE-LINE DIAGRAM GENERAL NOTES:

1. THE INFORMATION SHOWN IN THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATIONS SCHEDULE IS SHOWN FOR CALCULATION PURPOSES ONLY. CONTRACTOR SHALL NOT USE THE CONDUIT TYPES, CONDUCTOR TYPES, SIZES, QUANTITIES OR LENGTHS FOR TAKEOFFS OR BIDDING PURPOSES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN THIS SCHEDULE AND OTHER PORTIONS OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL NOTIFY ENGINEER OF AS-BUILT CONDITIONS THAT CONSTITUTE A CHANGE FROM WHAT IS SHOWN BELOW; THIS INCLUDES CONDUCTOR LENGTHS DIFFERING BY MORE THAN 10%.
2. REFER TO THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATIONS TABLE ON THIS SHEET. AVAILABLE FAULT CURRENT INFORMATION IS LISTED UNDER THE "FAULT CURRENT" COLUMN. VOLTAGE DROP VALUES ARE LISTED UNDER THE "CUMULATIVE VOLTAGE DROP" COLUMN. THE AIC/SCCR RATING OF THE EQUIPMENT SHALL NOT BE LESS THAN THE AVAILABLE 3-PHASE SYMMETRICAL FAULT CURRENT. ALL SERIES RATED EQUIPMENT SHALL BE PROPERLY LISTED AND LABELED PER CODE.
3. FEEDER NUMBER DESIGNATIONS PRECEDED BY "V" INDICATE THAT THE CONDUCTORS ARE UP-SIZED DUE TO VOLT-DROP CONSIDERATIONS. PROVIDE LUG ADAPTERS AS NEEDED IN ORDER TO PROPERLY LAND CONDUCTORS AT TERMINATION(S).
4. FEEDER SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNLESS NOTED OTHERWISE. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC; ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. NUMBER DESIGNATIONS PRECEDED BY "A" INDICATE THAT THE SIZE IS BASED ON ALUMINUM (AL) WIRE. AL CONDUCTOR SIZES ARE BASED ON XHHW-2 INSULATION, UNLESS NOTED OTHERWISE. AL WIRE MAY BE SUBSTITUTED FOR CU FEEDERS AS ALLOWED BY CODE, SPECIFICATIONS AND OWNER, UNLESS NOTED OTHERWISE. AT CONTRACTOR'S OPTION, CU WIRE MAY BE SUBSTITUTED FOR AL, UNLESS NOTED OTHERWISE. ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS, UNLESS NOTED OTHERWISE. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. BRANCH CIRCUIT SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNLESS NOTED OTHERWISE. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC; ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. ALL CONDUCTOR SIZES ARE BASED ON 60 DEG C RATED TERMINATIONS, UNLESS NOTED OTHERWISE. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. PROVIDE A PERMANENT LABEL ON FRONT OF EQUIPMENT ENCLOSURE; REFER TO SPECIFICATIONS FOR LABEL REQUIREMENTS. LABEL SHALL READ AS FOLLOWS (INCLUDE RESPECTIVE NAMES IN BLANKS):

   SERVICE EQUIPMENT LABEL:

   EXAMPLE:
   208Y/120V, 60HZ
   800A
   SCCR = 65,000A
   MAX AVAILABLE FAULT CURRENT = 58,815A
   CALCULATED: 01/01/2018

   PANELBOARD/SWITCHBOARD LABEL:
   LINE 1: PANELBOARD "_____" SUPPLIED BY UPSTREAM
   LINE 2: PANELBOARD/SWITCHBOARD "_____"
   LINE 3: LOCATED IN "_____"
   LINE 4: PANELBOARD "_____" SUPPLIES DOWNSTREAM
   LINE 5: PANELBOARD(S) "_____"

   TRANSFORMERS LABEL:
   LINE 1: TRANSFORMER "_____" SUPPLIED BY UPSTREAM
   LINE 2: PANELBOARD/SWITCHBOARD "_____"
   LINE 3: LOCATED IN "_____"
   LINE 4: TRANSFORMER "_____" SUPPLIES DOWNSTREAM
   LINE 5: PANELBOARD(S) "_____"

ELECTRICAL UTILITY CONTACT NOTE:

UTILITY COMPANY: EVERGY
UTILITY CONTACT: JENNY CASEY OR JEFF WILLIAMS
PHONE: (816) 347-4334 OR (816) 220-5204
EMAIL: JENNY.CASEY@EVERGY.COM OR
JEFF.WILLIAMS@EVERGY.COM

FAULT CURRENT GENERAL NOTE (ESTIMATED VALUE):

THE MAXIMUM AVAILABLE 3-PHASE SYMMETRICAL FAULT CURRENT VALUE AT THE UTILITY TRANSFORMER SECONDARY/POINT OF SERVICE COULD NOT BE DETERMINED AT THE TIME OF THIS SUBMITTAL. THE ESTIMATED WORST CASE VALUE OF 4,164A IS BASED ON AN INFINITE BUS CALCULATION AT THE UTILITY TRANSFORMER. CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE FAULT CURRENT VALUE WITH UTILITY. NOTIFY ENGINEER IF ACTUAL VALUE EXCEEDS ESTIMATED CALCULATED VALUE. ESTIMATED DESIGN VALUE IS BASED ON THE FOLLOWING:

UTILITY TRANSFORMER SECONDARY VOLTAGE: 208Y/120V, 3Ø, 4W
UTILITY TRANSFORMER SIZE: 75KVA, Z=5.0%

OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY GENERAL NOTE:

1. CONTRACTOR SHALL PROVIDE AN OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY TO DETERMINE THE CORRECT SETTINGS FOR THE ADJUSTABLE TRIP CIRCUIT BREAKERS, TO ENSURE SELECTIVE COORDINATION AND TO DOCUMENT ARC-FLASH HAZARDS. CODE REQUIRED EMERGENCY AND LEGALLY REQUIRED STANDBY SYSTEMS SHALL BE SELECTIVELY COORDINATED WITH ALL SUPPLY-SIDE OVERCURRENT PROTECTIVE DEVICES (APPLIES TO BOTH THE NORMAL AND EMERGENCY POWER SOURCES). PROVIDE ALL NECESSARY AS-BUILT INFORMATION REQUIRED FOR COMPLETION OF THE STUDY TO THE ENGINEER DOING THE STUDY. PROVIDE SUBMITTALS INDICATED WITHIN THE SPECIFICATIONS TO OWNER AND ARCHITECT/ENGINEER TO CONFIRM STUDY HAS BEEN COMPLETED. CONTRACTOR SHALL INCLUDE THE COST FOR THIS WORK IN THEIR BID. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

ONE-LINE DIAGRAM SUPPLEMENTAL SPECIFICATIONS:

1. GROUNDING ELECTRODE SYSTEM SHALL BE PER LOCAL REQUIREMENTS AND SHALL NOT BE LESS STRINGENT THAN THAT SPECIFIED IN THE CONSTRUCTION DOCUMENTS.
2. PROVIDE PROPERLY SIZED LUGS FOR ALL EQUIPMENT, CIRCUIT BREAKERS, AND OTHER ELECTRICAL DEVICES TO ACCOMMODATE INSTALLED CONDUCTORS. A LARGER FRAME, OVERSIZED LUGS OR NON-STANDARD PRODUCT MAY BE REQUIRED IN SOME INSTANCES. UTILIZE PIN ADAPTERS ONLY IF NECESSARY AND ONLY AS ALLOWED BY MANUFACTURER AND AHJ.
3. PROVIDE ANY AVAILABLE SPACE IN SWITCHBOARDS/PANELBOARDS WITH BUSSING.
4. PROVIDE TYPED FINAL CIRCUIT DIRECTORY FOR ALL PANELBOARDS TO REFLECT ACTUAL AS-BUILT CONDITIONS. COORDINATE FINAL ROOM NAMES, NUMBERS AND DESCRIPTIONS WITH OWNER PRIOR TO COMPLETION. CIRCUIT DESCRIPTIONS SHALL BE PER CODE AND SHALL BE DISTINGUISHABLE FROM ALL OTHERS.

Short-Circuit and Voltage Drop Calculations

Version 2.11

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

The following calculations are based on the "Point-by-Point" method where:
ISC (2) = ISC(1) x M(1) M= 1/(1+f)
ISC (1) = short circuit current at fault point 1
ISC (2) = short circuit current at fault point 2

Feeder: f (3Ø) = 1.732 x L x Isc / C x E
Feeder: f (1Ø)= 2 x L x Isc / C x E
XFMR: f (3Ø) = IP(sca)x Vp x 1.73 x %Z / 100,000 x KVA
XFMR: f (1Ø)= IP(sca)x Vp x %Z / 100,000 x KVA
IS(sca)= Vp x M x IP(sca) / Vs

VOLTAGE DROP (3Ø):
%VD= ((R x cos(arccos(pf)) + X x sin (arccos(pf))) x L/# x I x 1.73) / E
VOLTAGE DROP (1Ø):
%VD= ((R x cos(arccos(pf)) + X x sin(arccos(pf))) x 2 x L/# x I) / E

IP = Primary short circuit current
Vp = Primary voltage
IS= Secondary short circuit current
Vs= Secondary voltage
L = Length of circuit
C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot
E = Line to line volts
Feeder Types: NM - Non Magnetic Conduit, M -....

%VD CUM= Cumulative Voltage Drop from Fault Point 1 to Fault Point #
R= resistance in ohms per LF
X= reactances in ohms per LF

Date of...

System Voltage: 208Y/120V - 3 phase

Fault Point (F#)	Bus/Feeder Description	Source (Fault Point)	Phase	Source Isc (amps)	Feeder: Conduit Type/ TX	Material	Quantity of Parallel Sets and Bus/ Phase & Neutral Size	Conductor 'C' Value	Busway 'C' Value	L-L Voltage (E)	Circuit Length (L)	Load Power Factor (pf)	Circuit Load (Amperage)	Conductor: Resistance (R)	Reactance (X)	Arccos (pf) (Radians)	Transformer: Type	Degree Rise	kVA	New Xfmr Z	Existing Xfmr Z	Secondary Voltage	Tap Setting	f	M	Fault Current (amps)	Voltage Drop (%VD)	Cumulative Voltage Drop (%VD)	Fault Point (F#)
1	Utility Service Point			4,164 at the secondary of the utility transformer																			Source Isc + 6X Motor Contribution =			5,124			1
	Motor Contribution			160 The connected full load motor amps (includes compressors) on the system																									
2	A	1	3	5,124	NM	CU	2 Set(s) of 3/0 AWG	13923	--	208	70	0.9	320	0.000077	0.000042	0.451027								0.107	0.90	4,628	-0.82%	-0.82%	2
3	B	2	3	4,628	M	CU	1 Set(s) of 1/0 AWG	8925	--	208	5	0.9	120	0.000120	0.000055	0.451027								0.022	0.98	4,530	-0.07%	-0.88%	3
4	RTU-1	2	3	4,628	M	CU	1 Set(s) of 6	2425	--	208	40	1	56	0.000490	0.000064									0.636	0.61	2,829	-0.91%	-1.73%	4
5	CRU-1	2	3	4,628	M	CU	1 Set(s) of 2	5907	--	208	70	0.85	78	0.000200	0.000057	0.554811								0.457	0.69	3,177	-0.91%	-1.73%	5
6	CRU-2	2	3	4,628	M	CU	1 Set(s) of 2	5907	--	208	65	0.85	78	0.000200	0.000057	0.554811								0.424	0.70	3,250	-0.84%	-1.66%	6
7	CU-1	2	3	4,628	M	CU	1 Set(s) of 12	617	--	208	45	0.8	5	0.002000	0.000068	0.643501								2.811	0.26	1,214	-0.31%	-1.12%	7
8	CU-2	2	3	4,628	M	CU	1 Set(s) of 12	617	--	208	40	0.8	5	0.002000	0.000068	0.643501								2.498	0.29	1,323	-0.27%	-1.09%	8

ANDREA C. MULVANY

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
ANDREA C. MULVANY
NUMBER PE-2013039892
PROFESSIONAL ENGINEER

08/06/2021
ANDREA C. MULVANY
LICENSE # PE-2013039892

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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1850004412

EXPIRES 12/31/2021

SHEET TITLE

ONE-LINE DIAGRAM AND SCHEDULES

SHEET NUMBER

E4.01

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES / MODEL	APPROVED ALTERNATES	LED			DIMMING TYPE	VOLTAGE	INPUT WATTS	INPUT VA	DESCRIPTION	NOTES
				CRI	CCT	LUMENS						
A1	HE WILLIAMS	LT-22-L27/835-AF-DIM-UNV	DAY-BRITE HP90 SERIES COLUMBIA LCAT SERIES LITHONIA BLT SERIES	80	3500K	2700	0-10V	120	21	21	2'X2' RECESSED EDGE LIT LED FLAT PANEL TROFFER NOMINAL 2-3/16" DEPTH.	
D1	FOCAL POINT	FLC3D-RT-SW-700L-120V-LD1 LC3-RT-SW-700L-8035K-DNS-WFL-CD-WP	ALPHABET ECONU4 SERIES GOTHAM EVO4 SERIES LITHOLIER LR4 SERIES	80	3500K	700	0-10V	120	8	8	3.5" ROUND RECESSED DOWNLIGHT WITH 60 DEGREE CUTOFF REFLECTOR AND WIDE FLOOD LENS. TRIMLESS. WHITE FINISH. PROVIDE WITH INTEGRAL DIMMING DRIVER.	
E1	SURE-LITES	SEL25	DUALLITE LZ SERIES LITHONIA ELM2L SERIES CHLORIDE CLU SERIES			109 PER HEAD	NON-DIM	120	4	4	TWIN HEAD EMERGENCY LIGHT FIXTURE UL 924 LISTED TO PROVIDE A MINIMUM OF 109 LUMENS PER HEAD FOR 90 MINUTES. MOUNT AT +8'-0" AFF.	
F1	METALUX	4SNLED-L5-34SL-LC-UNV-L835-CD-1-U-AYC	COLUMBIA MPS SERIES LITHONIA ZL1N SERIES DAY-BRITE FLUXSTREAM	80	3500K	3400	NON-DIM	120	21	21	4' LINEAR LED STRIP LIGHT SUSPENDED TO +9'-0" AFF IN AREAS WITH OPEN CEILINGS. CLEAR ROUND LENS.	
F2	METALUX	4SNLED-L5-47SL-LC-UNV-L835-CD-1-U-AYC	COLUMBIA MPS SERIES LITHONIA ZL1N SERIES DAY-BRITE FLUXSTREAM	80	3500K	4700	NON-DIM	120	34	34	SAME AS TYPE F1 EXCEPT WITH HIGHER LUMEN OUTPUT.	
F3	METALUX	4VT3-LD5-4-G-120V-L835-CD1-U	DAY-BRITE DW SERIES COLUMBIA LXEM SERIES LITHONIA VAP LED SERIES	80	3500K	4000	NON-DIM	120	32	32	4' LINEAR LED STRIP LIGHT WET LOCATION RATED FOR OUTDOOR USE. MOUNT TO BOTTOM OF CANOPY.	
P1	FOCAL POINT	FSM4BS-BWFL-625DN-375UP-35K-1C-UNV-LD1-C48-WH-28'	AXIS BEAM 4 SERIES A-LIGHT ACCOLADE D2 METALUMEN RAIL 4	80	3500K	28000	0-10V	120	238	238	28' LINEAR INDIRECT/DIRECT LED FIXTURE SUSPENDED TO 9'-0" AFF. BAT-WING UPLIGHT DISTRIBUTION WITH FLUSH LENS DOWNLIGHT. PROVIDE WITH INTEGRAL DIMMING DRIVER.	
P2	FOCAL POINT	FSM4BS-BWFL-625DN-325UP-35K-1C-UNV-LD1-C48-WH-12'	AXIS BEAM 4 SERIES A-LIGHT ACCOLADE D2 METALUMEN RAIL 4	80	3500K	12000	0-10V	120	102	102	SAME AS TYPE P1 EXCEPT 12' LONG.	
W1 W1E	MCGRAW-EDISON	IST-SA1-A-735-1-T2-BK -CBP	HUBBELL RWL1 SERIES ACUITY ARC SERIES GARDCO 101 SERIES	70	3500K	2802	NON-DIM	120	20	20	EXTERIOR WALL SCONCE WITH TYPE II DISTRIBUTION. MOUNT AT +9'-0" AFG. -E: PROVIDE COLD WEATHER BATTERY PACK UL 924 LISTED TO PROVIDE A MINIMUM OF 1000 LUMENS FOR 90 MINUTES	
X1	SURE-LITES	EUX71R	DUALLITE LE SERIES LITHONIA EDG SERIES CHLORIDE 44R SERIES				NON-DIM	120	1	1	EDGE LIT EXIT SIGN WALL MOUNTED ABOVE DOOR FRAME RED LETTERS	

GENERAL NOTES:

A. REFER TO LIGHT FIXTURE SCHEDULE GENERAL NOTES AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

LIGHTING CONTROL SEQUENCE OF OPERATIONS

A. HOURS OF OPERATION

General Note: Confirm all sensor time delays with owner prior to final programming.

B. GENERAL REQUIREMENTS
1. The building does not have a central time clock. All lights are controlled locally via occupancy sensors, integral photocells and/or manual control.
2. Emergency Lighting: Emergency egress lighting is powered from emergency light fixtures.

C. OPEN OFFICE, HALL
1. Manual Control: Occupant can manually control and dim lights via local switch(es).
2. Occupancy: Upon occupancy, lights automatically turn on to 50%. Occupant must manually turn on lights to 100%.
3. Vacancy: After 20 minutes in any individual zone, lights shall automatically dim to 20%. After 20 minutes in all control zones, all controlled lights shall turn off.
4. Daylight: Lighting in daylight zones 'a' and 'b' shall continously dim in response to daylight when control zone is occupied.

C. BREAK AREA
1. Manual Control: Occupant can manually control and dim lights via local switch(es).
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: After 20 minutes, all controlled lights shall turn off.

D. SERVER ROOM, STORAGE, WATER SERVICE
1. Manual Control: Occupant can manually control lights via local switch(es).
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: After 20 minutes, all controlled lights shall turn off.

D. JANITOR
1. Manual Control: Occupant can manually control lights and exhaust fan via local switch(es).
2. Occupancy: Occupant must manually turn on lights and exhaust fan.
3. Vacancy: After 20 minutes, all controlled lights and exhaust fan shall turn off.

E. RESTROOM
1. Manual Control: Occupant can manually control lights and exhaust fan via local switch(es).
2. Occupancy: All controlled lights and exhaust fan shall automatically turn on.
3. Vacancy: After 20 minutes, all controlled lights and exhaust fan shall turn off.

F. ELECTRICAL
1. Manual Control: Occupant can manually control lights via local switch(es).

G. EXTERIOR
1. Daylighting: Light fixtures shall be controlled via integral photocells based on ambient daylight.

LIGHTING CONTROL DEVICE SCHEDULE

LINE-VOLTAGE WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$ VS	LEGRAND DW-100	ACUITY, COOPER HUBBELL, LEVITON LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCH. SINGLE RELAY. LINE-VOLTAGE. LOAD: 120V=800W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	
$ OS2	LEGRAND DW-200	ACUITY, COOPER HUBBELL, LEVITON LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCHES. DUAL RELAY. LINE-VOLTAGE. LOAD: 120V=800W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

STAND-ALONE LOW-VOLTAGE LIGHTING CONTROL SYSTEMS

STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
2	LEGRAND DT-300	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE. LOW-VOLTAGE. ISOLATED RELAY.	PIR MAJOR 36' Ø PIR MINOR 25' Ø ULT 36' x 36'	24	

STAND-ALONE LOW-VOLTAGE POWER PACKS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
P	LEGRAND BZ-250	ACUITY, COOPER HUBBELL, LEVITON	POWER PACK FOR LOW-VOLTAGE OCCUPANCY SENSORS. 20A LOAD. (1) RELAY. MANUAL- AND AUTO-ON MODES. HOLD-ON AND -OFF INPUTS. LOAD: 16A AT 120V OR 277V. OUTPUT: 225mA AT 24V. PLENUM RATED.	120/ 277	

STAND-ALONE LOW-VOLTAGE SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ LV	LEGRAND DCC2	ACUITY, COOPER HUBBELL, LEVITON	MOMENTARY 1-BUTTON DECORATOR SWITCH FOR MANUAL ON/OFF CONTROL OF STAND- ALONE LOW-VOLTAGE OCCUPANCY SENSORS. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON.	24	

NETWORK LIGHTING CONTROL SYSTEMS

NETWORK OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
1	LEGRAND LMDC-100	ACUITY, CRESTRON ETC, HUBBELL	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE. DIGITAL. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	PIR MAJOR 32' Ø PIR MINOR 15' Ø ULT MAJOR 25' x 25'	24	

NETWORK DAYLIGHT SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
D	LEGRAND LMLS-400	ACUITY, CRESTRON ETC, HUBBELL	CLOSED LOOP DAYLIGHT SENSOR FOR (1) ZONE. ON/OFF SWITCHING, BI-LEVEL, TRI-LEVEL, OR CONTINUOUS DIMMING. CEILING MOUNTED. 0-6,500 FC. DIGITAL. (1) RJ45 PORT. IR TRANSCEIVER FOR WIRELESS SETUP.	24	
OD	LEGRAND LMIO-301 / LMPO-200	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL INPUT MODULE WITH EXTERIOR PHOTOELECTRIC SWITCH. FACE SENSOR NORTH NORTH AND ORIENT WITH HOOD ABOVE LENS. 0-200 FC. (2) RJ45 PORTS.	24	

NETWORK ROOM CONTROLLERS (POWER PACK)

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
R1	LEGRAND LMRC-211 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	
R3	LEGRAND LMRC-213 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (3) RELAY OUTPUTS. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	

NETWORK LIGHTING SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ 4B	LEGRAND LMSW-104	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL 4-BUTTON SWITCH FOR MANUAL ON/OFF AND SCENE CONTROL. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP. SWITCH DESIGNATIONS VARY PER PROJECT; REFER TO LIGHTING PLANS AND/OR SWITCH SCHEDULE FOR PROGRAMMING.	24	
$ 1B	LEGRAND LMDM-101	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL SWITCH FOR MANUAL ON/OFF/DIMMING CONTROL. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	24	

NETWORK AUXILIARY LIGHTING EQUIPMENT

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
NONE	LEGRAND LMCT-100	ACUITY, CRESTRON ETC, HUBBELL	WIRELESS CONFIGURATION TOOL WITH USB. 2-WAY IR COMMUNICATION FOR DATA UPLOAD, DOWNLOAD, CONFIRMATION, AND STORAGE. OLED SCREEN. PROVIDE ONE TOOL PER SYSTEM AND LEAVE WITH OWNER. (3) AAA BATTERIES INCLUDED.	BATTERY	

GENERAL NOTES:

A. OCCUPANCY SENSOR LAYOUT DESIGNED FROM BASIS-OF-DESIGN COVERAGE PATTERNS. IF SUBMITTING ALTERNATE PER 'EQUIVALENT MANUFACTURER' COLUMN, ADJUST SENSOR QUANTITIES AND LOCATIONS PER MANUFACTURER-SPECIFIC SPACING CRITERIA.

B. PROVIDE SHOP DRAWINGS FOR ENGINEER AND ARCHITECT REVIEW THAT INCLUDE PRODUCT CUTSHEETS AND PROJECT-SPECIFIC LAYOUTS. LAYOUTS MUST INCLUDE SENSOR LOCATIONS, HEIGHTS, ORIENTATION, AND COVERAGE AREAS. SHOW COORDINATION WITH ALL OTHER CEILING DEVICES INCLUDING BUT NOT LIMITED TO HVAC SUPPLY AND RETURN GRILLES, SPRINKLERS, LIGHT FIXTURES, AND OTHER OWNER-PROVIDED CEILING MOUNTED DEVICES SUCH AS SPEAKERS, SECURITY CAMERAS, PROJECTORS, ETC. (SENSORS MAY BE ADVERSELY AFFECTED IF LOCATED TOO CLOSE TO OTHER CEILING MOUNTED DEVICES). ALSO PROVIDE SCHEMATICS AND SCHEDULES WHEN APPLICABLE.

C. LIGHTING CONTROLS PRICING SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING.

D. VERIFY COLOR(S) FOR ALL WALL AND CEILING MOUNTED DEVICES WITH THE ARCHITECT.

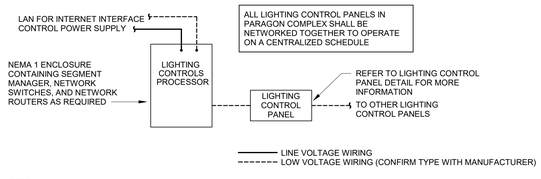
E. ALL WALL SWITCH AND CEILING SENSORS SHALL HAVE AN ADJUSTABLE TIME DELAY RANGE OF 0-30 MIN, UNO. CONFIRM SENSOR SETTINGS WITH SEQUENCE OF OPERATIONS AND OWNER PRIOR TO SYSTEM COMMISSIONING.

F. PROVIDE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS FOR ALL DEVICES TO OWNER.

G. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL SWITCH LOCATIONS PER NEC REQUIREMENTS.

H. DO NOT SHARE NEUTRAL CONDUCTOR ON LOAD SIDE OF DIMMERS.

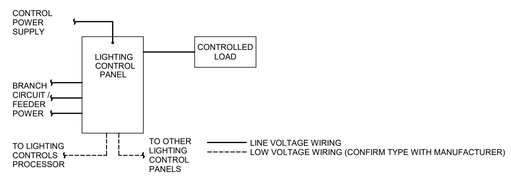
VERSION: 4.04



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
3. CIRCUITING SHOWN ON PLAN(S) CORRESPONDS TO LIGHTING CONTROL INTENT. IF CIRCUITING IS FIELD-MODIFIED, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS ORIGINAL LIGHTING CONTROL INTENT.
4. INTEGRAL TIMECLOCK SHALL BE ASTRONOMIC, PROGRAMMABLE WITH 365 DAY / HOLIDAY SCHEDULING, AND HAVE 24 HOUR BATTERY BACK-UP. LIGHTING CONTROL SYSTEM SHALL COMPLY WITH ALL LOCAL AND STATE ENERGY CODES.
5. COORDINATE WITH OWNER AND LANDLORD FOR PROGRAMMABLE TIMECLOCK SCHEDULES. PROVIDE GENERAL CONTRACTOR WITH OPERATIONS MANUALS FOR ALL COMPONENTS OF LIGHTING CONTROL SYSTEM.
6. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

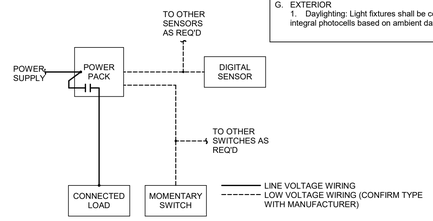
3 HYBRID LIGHTING CONTROL DIAGRAM
NTS



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
3. CIRCUITING SHOWN ON PLAN(S) CORRESPONDS TO LIGHTING CONTROL INTENT. IF CIRCUITING IS FIELD-MODIFIED, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULE(S) IN RECORD DRAWINGS.
4. LEAVE A TYPEWRITTEN SCHEDULE INCLUDING ANY FIELD-MODIFICATIONS IN EACH LIGHTING CONTROL PANEL DOOR.
5. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.
6. REFER TO LIGHTING CONTROL PANEL SCHEDULE(S) FOR MORE INFORMATION.

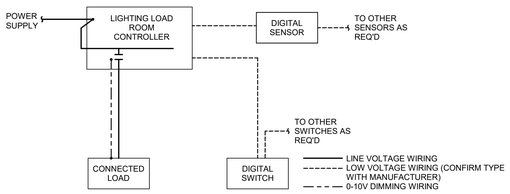
4 LIGHTING CONTROL PANEL DETAIL
NTS



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. PROVIDE QUANTITY OF POWER PACKS AS REQUIRED BY MANUFACTURER TO SUPPORT QUANTITY OF SENSORS INDICATED ON PLANS.
3. DETAIL IS DIAGRAMMATIC AND IS BASED ON WATTSTOPPER. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
4. CIRCUITING SHOWN ON THE PLAN CORRESPONDS TO THE LIGHTING CONTROL INTENT. IF CIRCUITING IS CHANGED IN THE FIELD, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS THE ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULES IN RECORD DRAWINGS.
5. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

1 OCCUPANCY SENSOR DETAIL - SINGLE POWER SUPPY AND SWITCH
NTS



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. QUANTITY OF RELAYS SHOWN IS GENERIC. REFER TO PLANS, LIGHTING CONTROL DEVICE SCHEDULE, AND SHOP DRAWINGS FOR FINAL QUANTITY PER ROOM CONTROLLER.
3. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
4. CIRCUITING SHOWN ON THE PLAN CORRESPONDS TO THE LIGHTING CONTROL INTENT. IF CIRCUITING IS CHANGED IN THE FIELD, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS THE ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULES IN RECORD DRAWINGS.
5. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

2 ROOM CONTROLLER DETAIL - ON/OFF OR ON/OFF/0-10V DIMMING CONTROL
NTS

MULTI-BUTTON SWITCH SCHEDULE

**NOTE: PROVIDE FACTORY BUTTON ENGRAVING FOR ALL MULTI-BUTTON SWITCHES WITH MORE THAN ONE BUTTON UNLESS NOTED OTHERWISE. REFER TO BUTTON LABEL COLUMN FOR TEXT.

SWITCH	BUTTON	BUTTON LABEL	CONTROLLED LOAD	BUTTON OPERATION
1B	1	OFFICE	Zones a, b, c, d	ON/OFF/RAISE/LOWER
4B	1	SOUTH	Zone a	ON/OFF
	2	CENTER	Zone b	ON/OFF
	3	NORTH	Zone c	ON/OFF
	4	HALL	Zone d	ON/OFF

* SCHEDULE ONLY APPLIES TO OPEN OFFICE. '1B' SWITCH IN BREAK ROOM APPLIES ONLY TO LIGHTS IN THE BREAK ROOM

LIGHTING CONTROL PANEL SCHEDULE

PANEL NAME:	LCP	MOUNTING:	SURFACE
LOCATION:	ELECTRICAL ROOM	VOLTAGE:	120V

RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)	ZONE
1	B-48	EXTERIOR LIGHTING	NON-DIM	366	
2	B-47	HOLIDAY LIGHTS	NON-DIM	360	
3		SPARE			
4		SPARE			

NOTE: RELAY NUMBERING ON SCHEDULE IS INTENDED TO COMMUNICATE DESIGN INTENT AND IS FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING FINAL RELAY CONFIGURATION WITH LIGHTING CONTROL VENDOR AND FIELD CONDITIONS.

LIGHTING CONTROL PANEL NOTES

PROVIDE WITH EXTERIOR PHOTOCELL ON NORTH FACING WALL. REFER TO LIGHTING PLANS

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
ANDREA C MULVANY
MEMBER PE-2013039892
PROFESSIONAL ENGINEER

08/06/2021
ANDREA C. MULVANY
LICENSE # PE-2013039892

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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1850004412

EXPIRES 12/31/2021

SHEET TITLE

LIGHTING FIXTURE SCHEDULE AND CONTROLS

SHEET NUMBER

E5.01

ANDREA C. MULVANY

Division 26: GENERAL ELECTRICAL REQUIREMENTS

1 GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

All requirements under Division 01 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01, this section and division take precedence. Become thoroughly familiar with all tis contents as to requirements that affect this division, section, or both. Work required under this division includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and any portion of work described in one shall be provided as if described in both. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the Work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They convey the scope of work, indicating the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

2004 Edition	1995 Edition
Division 21 – Fire Suppression	Division 15
Division 22 – Plumbing	Division 15
Division 23 – HVAC	Division 15
Division 26 – Electrical	Division 16
Division 27 – Communications	Division 16
Division 28 – Electronic Safety and Security	Division 16

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."

Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division.

Engineer: Where referenced in this Division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, as defined in the General and/or Supplementary Conditions. When used in this division, Engineer means increased involvement and rights and obligations to the Engineer, in addition to involvement by and obligations to the Architect.

AHJ : The local code and/or inspection agency (Authority) Having Jurisdiction over the Work.

NRTL : Nationally Recognized Testing Laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. Nationally recognized testing laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

Homerun: That portion of an electrical circuit originating at a junction box, termination box, receptacle, or switch with termination at an electrical panelboard. Note: Where MC cable is utilized, the homerun includes lighting branch circuiting loads, the originating point of the homerun shall be at the first load in the circuit or at a junction box located in an accessible ceiling space as close as possible to the first load.

Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Substitutions include Value Engineering proposals.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for convenience: changes proposed by contractor or owner that are not required in order to meet other project requirements but may offer advantage to contractor or owner.

When 'furnish', 'install', 'perform', or 'provide' is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the Engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, certified, or all three, by an NRTL, and acceptable to the AHJ over this project.

C. PRE-BID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. MATERIAL AND WORKMANSHIP

Provide new material, equipment, and apparatus under this contract unless otherwise stated herein, of best quality normally used for the purpose in good commercial practice, and free from defects. Model numbers listed in the specifications or shown on the drawings are not necessarily intended to designate the required trim, written descriptions of the trim govern model numbers.

Provide markings or a nameplate for all material and equipment identifying the manufacturer and providing sufficient reference to establish quality, size, and capacity. All workmanship shall be of the finest possible by experienced mechanics of the proper trade. In general, provide the following quality grade(s) for all materials and equipment.

Commercial specification grade

Provide all hoists, scaffolds, staging, runways, tools, machinery, and equipment required for the performance of the electrical work. Store and maintain material and equipment in clean condition, and protected from weather, moisture, and physical damage.

Furnish only material and equipment that are listed, labeled, certified, or all three, by an NRTL whenever any listing or labeling exists for the types of material and equipment specified.

At a minimum, general work practices for electrical construction shall be in accordance with NECA 1 (latest edition), "Standard Practices for Good Workmanship in Electrical Construction".

E. MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

F. COORDINATION

Coordinate all work with other divisions and trades so that various components of the systems are installed at the proper time, fit the available space, and allow proper service access to those items requiring maintenance. Components which are installed without regard to the above shall be relocated at no additional cost to the Owner.

All roof penetrations, floor chasing and/or core drilling shall require the specific approval of the Landlord and Owner. All work in common areas, shafts or other Landlord owned spaces must be reviewed and approved by the Landlord and Owner prior to commencement of the work. Contractor shall minimize any disruption and disturbances to other tenants. All work within other tenant spaces must be coordinated with and approved by the Landlord and Owner.

Unless otherwise indicated, the General Contractor shall provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the General Contractor with information where chases and openings are required. Contractor shall keep informed as to the work of other trades engaged in the construction of the project and shall execute work in a manner as to not interfere with or delay the work of other trades.

Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor shall be held responsible for errors that could have been avoided by proper checking and inspection.

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the specifications or shown on the drawings are not intended to designate the required trim.

Make all offsets required to clear equipment, beams, and other structural members, and to facilitate concealing raceways in the manner anticipated in the design. Provide materials with trim that will fit properly the types of ceiling, wall, or floor finishes actually installed.

Coordinate all work with Architectural phasing drawings to properly stage transitions of work to provide power to existing, new and temporary loads. Monitor loads on distribution system to ensure shifting of loads does not overload electrical equipment.]

G. ORDINANCES AND CODES

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the following:

1. National Fire Protection Association (NFPA)
2. Underwriters Laboratories (UL)
3. Occupational Safety and Health Administration (OSHA)
4. American National Standards Institute (ANSI)
5. American Society of Testing Materials (ASTM)
6. Rules and regulations of public utilities and municipal departments affected by construction of services.
7. Other national standards and codes where applicable.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the attention of the Architect and Engineer for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for, and furnish certificates of inspection to Owner. Provide all safety lights, guards, and warning signs required for the performance of the work and for the safety of the public.

Electrical equipment shall be located so that the code required minimum working clearance and dedicated electrical space are maintained. Existing equipment not meeting current code required clearance requirements may remain if allowed by the AHJ, Engineer and Owner.

H. PROTECTION OF EQUIPMENT AND MATERIALS

Store and protect from damage equipment and materials delivered to job site. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment and material damaged by construction activities shall be rejected, and Contractor shall furnish new equipment and material of a like kind at his own expense.

Keep premises broom clean of foreign material created during work performed under this contract. Conduit, equipment, etc. shall have a neat and clean appearance at the termination of the work.

Protect adjacent materials indicated to remain. For work specific to this Division, install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.

Plug or cap open ends of conduits while stored and installed during construction when not in use to prevent the entrance of debris into the systems.

I. SUBSTITUTIONS

Materials, products, equipment, and systems described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by the proposed substitution. The base bid shall include only the products from manufacturers specifically named in the drawings and specifications. To request a substitution, request the Substitution Request Form from the Architect or Engineer. Complete and send the Substitution Request From for each material, product, equipment, or system that is proposed to be substituted. The burden of proof of the merit of the proposed substitution is upon the proposer.

Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, Architect, and Owner the following:

1. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects unless stated otherwise in the substitution request.
2. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance service, and sourcing of replacement parts.

Proposed substitution has received necessary approvals of authorities having jurisdiction.

Same warranty will be furnished for proposed substitution as for specified Work.

If accepted substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.

Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation. No substitution will be considered prior to receipt of bids unless written request for approval to bid has been received by the Engineer at least ten (10) calendar days prior to the date for receipt of bids.

If the proposed substitution is approved prior to receipt of bids, such approval will be stated in an addendum. Bidders shall not rely upon approvals made in any other way. Verbal approval will not be given. No substitutions will be considered after the contract is awarded unless specifically provided in the contract documents.

Provide factory generated point-by-point calculations for all exterior light fixtures.(photometric files supplied so the engineer can generate a point-by-point do not suffice for the point-by-point calculations). Provide interior point-by-point calculations at the discretion of the engineer.

J. SUBMITTALS

Assemble and submit for review shop drawings, material lists, manufacturer product literature for equipment to be furnished, and items requiring coordination between contractors under this contract. Provide submittals in sufficient detail so as to demonstrate compliance with these Contract Documents and the design concept. Prior to transmitting submittals, verify that the equipment submitted is mutually compatible with and suitable for the intended use, will fit the available space, and maintain manufacturer recommended service clearances. If the size of equipment furnished makes necessary any change in location or configuration, submit a shop drawing showing the proposed layout.

Transmit submittals as early as required to support the project schedule. Allow two weeks for Engineer review time, plus to/from mailing time via the Architect, plus a duplication of this time for resubmittals, if required. Only resubmit those sections requested for resubmittal.

Submittals shall contain the project name, applicable specification section, submittal data, equipment identifications acronym as used on the drawings, and the Contractor's stamp. The stamp shall certify that the submittal has been checked by the Contractor, complies with the drawings and specifications, and is coordinated with other trades. Manufacturer product literature shall include shop drawings, product data, performance sheets, samples, and other submittals required by this division. Highlight, mark, list, or indicate the materials, performance criteria, and accessories that are being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

Submittals and shop drawings shall not contain firm name, logo, the seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

Separate submittals according to individual specification sections. Illegible submittals will be rejected and returned without review. Catalog data shall be properly bound, identified, indexed and arranged in a 3-ring binder. Each item or model number shall be clearly marked and accessories indicated. Label the catalog data with the equipment identification acronym or number as used on the drawings and include performance curves, capacities, sizes, weights, materials, finishes, wiring diagrams, electrical requirements and deviations from specified equipment or materials. Mark out inapplicable items. Shop drawings will be returned without review if the above mentioned requirements are not met.

Provide the quantity of submittals required by Division 01. If not indicated and hard-copy sets are provided, submit a minimum of six (6) copies. Refer to Division 01 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 01. Contractor shall notify the Architect and Engineer that the submittals have been posted. If electronic submittal procedures are not defined in Division 01, Contractor shall include the website, user name, and password information needed to access the submittals. For submittals sent by e-mail, Contractor shall copy the designated representatives of the Architect and Engineer. Contractor shall allow for the Engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the submittal.

The checking and subsequent acceptance of submittals by the Engineer and/or Architect shall not relieve the Contractor from responsibility for deviations from the drawings and specifications, errors in dimensions, details, sizes of equipment, or quantities, omissions of components or fittings, coordination of electrical requirements, and proper fabricating items with actual building conditions and adjacent work. Contractor shall request and secure written acceptance from the Engineer and Architect prior to implementing any deviation.

K. ELECTRONIC DRAWING FILES

In preparation of shop drawings or record drawings, Contractor may, at his option, obtain electronic drawing files in AutoCAD or DXF format on CD-ROM disk, DVD disk, flash drive, or direct download, as desired, from the Engineer for a shipping and handling fee of $200 for a drawing set up to 12 sheets and $15 per sheet for each additional sheet. Contact the Architect for written authorization and Engineer for the necessary agreement form and to specify shipping method and drawing format. In addition to payment, the written authorization from the Architect and release agreement form from the Engineer must be received before electronic drawing files will be sent.

L. RECORD DRAWINGS (AS-BUILT DRAWINGS)

During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings. Insert one set into each copy of the manual described below.

See Division 01 and General Conditions for additional information.

M. OPERATION AND MAINTENANCE INSTRUCTIONS

During the course of construction, collect and compile a complete brochure of equipment furnished and installed on this project. Include operational and maintenance instructions, manufacturers catalog sheets, wiring diagrams, parts lists, approved submittals and shop drawings, warranties, and descriptive literature as furnished by the equipment manufacturer. Include an inside cover sheet that lists the project name, date, Owner, Architect, Engineer, General Contractor, Sub-Contractor, and an index of contents.

Submit three copies of literature bound in approved binders with index and tabs separating equipment types to the Architect at the termination of the work. Paper sleeves, staples, rubber bands, spring-lead binding, and mailing envelopes are not considered approved binders. Final approval of systems installed under this contract shall be withheld until this equipment brochure is received and deemed complete by the Architect and Engineer. Instruct workmen to save required literature shipped with the equipment itself for inclusion in this brochure.

Include Record Drawings as described above.

Refer to Division 01 for acceptance of electronic manuals for this project. For electronic manuals, refer to paragraph "Submittals" for requirements.

N. TRAINING

At a time mutually agreed upon between the Owner and Contractor, provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include, but not be limited to, an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the Architect stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The Contractor and the Owner's representative shall sign the certification letter indicating agreement that the training has been provided.

Schedule training with Owner with at least 7 days advance notice.

O. WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion, unless specific items are noted to carry a longer warranty in these construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects occurring within the warranty period(s) as stated in the General Conditions and Division 01.

Warranties shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

Also warrant the following additional items:

1. All raceways are free from obstructions, holes, crushing, or breaks of any nature.
2. All raceway seals are effective.
3. The entire electrical system is free from all short circuits and unwanted open circuits and grounds.

At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2 GENERAL MATERIALS AND INSTALLATION

A. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal all conduit and raceways except in unfinished areas and where otherwise indicated on the drawings.

B. CONCRETE BASES

Provide concrete bases (e.g., housekeeping pads) for equipment where indicated on the drawings and as specified herein. Concrete bases shall have chamfered edges. Size of base shall be a minimum of 4 inches greater than the footprint of the equipment that it is supporting and shall have a minimum height of 3-1/2 inches.

Construct equipment bases of a minimum 28-day, 4000-psi concrete conforming to American Concrete Institute Standard Building Code for Reinforced Concrete (ACI 318) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C 150 Type I, aggregate conforming to ASTM C33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases with No. 4 reinforcing bars conforming to ASTM A615 or 6x6 – W2.9 x W2.9 welded wire mesh conforming to ASTM A185. Place reinforcing bars 24 inches on center with a minimum of two bars each direction.

Provide galvanized anchor bolts for equipment placed on concrete bases or on concrete slabs. Anchor bolts size, number, and placement shall be as recommended by the manufacturer of the equipment.

C. SUPPORT SYSTEMS

Steel Slotted Support Systems (Slotted Channel): Comply with MFMA-3, factory-fabricated components for field assembly; 12-gauge, 1-5/8-inch by 1-5/8-inch.

Finishes:

1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-3.
2. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane or polyester coating applied according to MFMA-3.
3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-3.

Aluminum Slotted Support Systems (Slotted Channel): Comply with MFMA-3, Type 6063-T6, per ASTM B221; factory-fabricated components for field assembly; 12-gauge, 1-5/8-inch by 1-5/8-inch.

Manufacturers: Cooper B-Line, ERICO International, Hilti, Power-Strut, Thomas and Betts, or Unistrut.

Field Fabrication:

Where field cutting of standard lengths of channel are required, make cuts straight and perpendicular to manufactured surfaces.

For field-cut or damaged surfaces of coated channels, dress cut ends, damaged surfaces, or both, with an abrasive material (e.g., file, grinding stone, or similar) and cleanser to remove oils, rust, sharp edges, and shards.

For channel with a factory-applied coating, re-finish cut edges with a coating compatible with the factory finish and as recommended by the manufacturer (e.g., manufacturer's touch-up paint or zinc-rich cold-galvanizing compound, as applicable).

D. ACCESS DOORS

Provide access doors for all concealed equipment where indicated or as required, except where above lay-in ceilings. Access doors shall be adequately sized for the devices served with a minimum size of 18 inches x 18 inches. Access doors must be of the proper construction for the type of construction in which it is installed. Obtain Architect's approval of type, size, location and color before ordering. Provide factory-fabricated and assembled units, complete with attachment devices and fasteners ready for installation, concealed hinges, flush screwdriver-operated cam locks, and anchor straps. Provide access doors manufactured by: Bar-Co, J.L. Industries, Karp Associates, Milcor, Nystrom Building Products, Wade, or Zum.

E. PENETRATIONS

Coordinate sleeve selection and application with selection and application of fire-stopping specified in Division 07 section "Through-Penetration Firestop Systems."

Roofs:

1. Coordinate all roof penetrations with Engineer, Owner, and as applicable, the roofing contractor providing a roof warranty.
2. Keep all raceway penetrations within mechanical equipment curbs wherever possible. Coordinate with Division 01.
3. Flash and counterflash all openings through roof, and/or provide pre-fabricated molded seals compatible with the roof construction installed, or as required by the Engineer, Owner, or roofing contractor. All roof penetrations shall be leakight at the termination of the work and shall not void any new or existing roof warranties.

Walls and Floors:

1. Steel Pipe Sleeves for Raceways and Cables: ASTM A53/A53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends, and drip rings.
2. Cast-Iron Pipe Sleeves for Raceways and Cables: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052 inch thickness and of length to suit application.

F. FIRESTOPPING

Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with UL 2079 or ASTM E 814, or other NRTL acceptable to AHJ.

Manufacturers: Hilti, RectorSeal, Specified Technologies Inc., United States Gypsum Company, or 3M corp.

Through and Membrane Penetration Firestopping Systems Product Schedule: Provide UL listing, location, wall or floor rating, and installation drawing for each penetration fire stop system.

Where project conditions require modification to qualified testing and inspecting agency's illustrations for a particular firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Include qualifications data for testing agency.

G. EQUIPMENT FURNISHED BY OTHERS

Provide necessary equipment and accessories that are not provided by the equipment supplier or Owner to complete installation of equipment furnished by others in locations as indicated on the drawings, specified herein, or both. Equipment and accessories not provided by the equipment supplier may include, but not be limited to, flexible cords and plugs as required for proper operation of the complete system, in accordance with the manufacturers' instructions.

Contractor shall be responsible for correct rough-in dimensions, and verify them with Architect and/or equipment supplier prior to rough-in and service installations.

H. SYSTEM TESTING AND ADJUSTING

Adjust, align, and test all electrical equipment on this project provided under this division and all electrical equipment furnished by others for installation or wiring under this division for proper operation.

Test all systems and equipment according to the requirements in NETA ATS (latest edition) and all additional requirements specified in following sections.

Maintain the following on the project premises at all times: a true RMS reading voltmeter, a true RMS reading ammeter, and a megohmmeter insulation resistance tester. Provide test data readings as requested or as required by the Engineer.

I. EQUIPMENT IDENTIFICATION

Provide equipment identification nameplates on all panelboards, electrical equipment enclosures, access doors, disconnect switches, enclosed circuit breakers, and feeder devices in distribution panelboards.

Nameplates:

1. Engraved, contrasting color, three-layer, laminated plastic, indicating the name of the equipment, load, or circuit as designated on the drawings and in the specifications:
2. Field-applied permanent epoxy adhesive, compatible with the equipment finish.
3. Self-adhering, with a permanent weatherproof adhesive.
4. Attached with stainless steel screws and hardware.

Attachment method shall be acceptable to the manufacturers of the equipment to which the nameplates are being applied.

Nameplate Color:

1. Black background with white letters for Normal Power;
2. Red background with white letters for Emergency Power.
3. Letter height: 3/8-inch minimum.

B. SYSTEM START UP

Perform the following prior to starting up the electrical systems:

1. Check all components and devices and lubricate items accordingly.
2. Tighten screws and bolts for connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
3. Adjust taps on each transformer for rated secondary voltage when the transformer is at minimum load.
4. Check and record building's service entrance voltage, grounding conditions, grounding resistance, and proper phasing.
5. Replace all burned-out lamps and lamps used for temporary construction lighting in permanent light fixtures.
6. After all systems have been inspected and adjusted, confirm all operating features required by the drawings and specifications and make final adjustments as necessary.

END OF SECTION 26

Division 26: BASIC ELECTRICAL MATERIALS AND METHODS

1 RACEWAYS

A. METALLIC CONDUIT AND TUBING

Electrical Metallic Tubing, Couplings, and Fittings (EMT): ANSI C80.3, UL 797. Only steel products allowed. Reduced wall EMT is not allowed.

Flexible Metal Conduit (FMC): Zinc-coated steel or aluminum, UL 1. Reduced-wall FMC is not allowed.

Intermediate Metal Conduit (IMC): Hot-dip Galvanized Rigid Steel Conduit, ANSI C80.6, UL 1242.

Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with PVC jacket, UL 360; fittings: NEMA FB 1.

Rigid Metal Conduit (RMC):

1. Hot-dip Galvanized Rigid Steel Conduit (GRS): ANSI C80.1, UL 6.
2. Rigid Aluminum Conduit (RAC): ANSI C80.5, UL 6A.

Plastic-Coated IMC, RMC, and Fittings: NEMA RN 1, NRTL listed. Coating thickness of 0.04 inches minimum.

IMC and RMC Fittings: NEMA FB 1; compatible with conduit type and material, NRTL listed.

Manufacturers: AFC Cable, Affex, Anamet Electrical, Electri-Flex, Indalex, Manhattan/CDT/Cole-Flex, O-Z/Gedney, Republic Raceway, Tyco International, Western Tube and Conduit, or Wheatland Tube.

B. NON-METALLIC CONDUIT AND TUBING

Rigid Nonmetallic Conduit (RNC): Schedule 40 PVC, 90 deg C rated, NEMA TC-2, UL 651

Fittings: NEMA TC 3, TC 6; UL 651, compatible with conduit/tubing type and material, NRTL listed.

Manufacturers: AFC Cable, Anamet International, Anamet Electrical, Amco, Cantex, Certainteed, Condux International, Elecsys, Electri-Flex, Lamson and Sessions, Manhattan/CDT/Cole-Flex, Prime Conduit, Raco, Spiraliduct, Superflex Ltd, or Thomas and Betts.

2 RACEWAY INSTALLATION

A. GENERAL RACEWAY INSTALLATION REQUIREMENTS

Install raceways parallel and perpendicular to building lines.

Install raceways to requirements of structure, to requirements of all other work on the project, and to clear all openings, depressions, pipes, ducts, reinforcing steel, and other immovable obstacles.

Install raceways set in forms for concrete structure in such a manner that installation will not affect the strength of the structure.

Except where approved in writing by the Engineer, install no raceway in a slab-on-grade. Locate raceway below granular fill below slabs-on-grade.

Install raceways a minimum of 24" below bottom of slab/paving/grade where practicable.

Install raceways continuous between connections to outlets, boxes, and cabinets with a minimum possible number of bends and not more than the equivalent of four 90-degree bends between connections. Use manufactured elbows for all 45- and 90-degree bends, unless approved by the Engineer in advance. Make other bends smooth, even and without flattening raceway or flaking galvanizing or enamel. Radii of bends shall be as long as possible and never shorter than the corresponding trade elbow.

Conceal raceways from view unless noted or approved otherwise.

Route raceways serving rooftop equipment inside equipment curb and minimize roof penetrations and exterior raceway runs. Support raceway from structure, do not support from the roof decking. Maintain 2" spacing between the raceway and roof deck to prevent roofing screws from penetrating raceway. Do not route raceways across skylights or other roof penetrations.

Route all exposed non-flexible raceways tight to structure, parallel to building lines in strut or cable tray where practicable. Install raceways plumb/level where exposed to view.

Use long radius elbows for all underground installations, where necessary, or where otherwise indicated.

Securely fasten raceways in place with approved straps, hangers, and steel supports as required. Attach raceway supports to the building structure. Hang single raceways for feeders with malleable split ring hangers with rod and turnbuckle suspension from inserts spaced not over 10 feet apart in construction above. Clamp groups of horizontal feeder raceways to steel channels that are suspended from inserts spaced not over 10 feet apart in construction above. Securely clamp vertical feeder raceways to structural steel members attached to structure. Install cable clamps for support of vertical feeders where required. Add raceway supports within 12 inches of all bends, on both sides of the bends. Do not support raceways from suspended ceiling components.

Ream raceway ends, thoroughly clean raceways before installation, and keep clean after installation. Plug or cover openings and boxes as required to keep raceways clean during construction and fish all raceways clear of obstructions before pulling conductor wires. Provide raceways of ample size for pulling of wire, not smaller than code requirements and not less than 1/2-inch in size, unless indicated otherwise on Drawings. Homeruns containing more than one branch circuit shall not be less than 3/4-inch in size.

Protect all raceway installations against damage during construction. Repair all raceways damaged or moved out of line after roughing-in to meet Engineer's approval without additional cost to the Owner.

Align and install true and plumb all raceway terminations at panelboards, switchboards, motor control equipment, and junction boxes.

Install approved expansion/deflection fittings where raceways pass through (if embedded) or across (if exposed) expansion joints, and when using RNC or RAC in exposed environments in accordance with NFPA 70 and expansion/contraction properties of RNC or RAC.

Install a pull wire in each empty raceway that is left for installation of conductors or cables under other divisions or contracts. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack at each end of pull wire.

Terminate all conduit stub-ups with nylon bushings.

Make all joints and connections in a manner that will ensure mechanical strength and electrical continuity.

Coordinate raceway routing and installation with other trades prior to rough-in and installation.

B. ABOVE GROUND RACEWAY USE:

Install all circular raceways concealed above suspended ceilings or concealed in walls or floors wherever possible except where otherwise indicated. Provide GRS for all conduits exposed to weather or other hazardous conditions.

Unless noted otherwise, all other raceway may be EMT where approved by local code. Use compression type fittings for EMT, with all fittings NRTL listed for the environment in which they are used. Unless noted otherwise, set-screw type fittings are not allowed.

C. UNDERGROUND RACEWAY USE:

Provide GRS installed below grade with a corrosion-resistant bonded-plastic or approved mastic coating. This shall include the 90-degree elbow below grade and the entire vertical transition to above grade.

RNC conduit may be used underground where permitted by local code and where not specifically restricted by these documents. When used, provide plastic-coated GRS, as specified above, for all bends greater than 30 degrees, including the 90-degree elbows below grade and the entire vertical risers for transitions from below to above grade or above slab.

All site electrical conduits shall be 1" minimum, unless noted otherwise.

D. EQUIPMENT CONNECTIONS

Use FMC for final connection to each motor, transformer, and any device that would otherwise transmit motion, vibration, or noise. Use LFMC where exposed to liquids, vapors, or sunlight. Provide all FMC and LFMC with an insulated bonding conductor.

Use only metal raceways for all power wiring from the output of variable frequency drives to their respective motors.

E. BUSHINGS AND LOCKNUTS

Rigidly terminate conduits entering sheet metal enclosures to the enclosure with a bushing and locknut on the inside and a locknut or an approved hub on the outside. Conduit shall enter the enclosure squarely.

Provide bushings and locknuts made of galvanized malleable iron with sharp, clean-cut threads.

Where EMT enters a box, provide approved EMT compression connectors.

Use insulated, grounding, or combination bushings wherever connection is subject to vibration and/or moisture, or when required by NFPA 70.

Provide nylon bushings for all communications and low voltage wiring conduits and sleeves, unless noted otherwise.

3 CONDUCTORS AND CABLES

A. GENERAL CONDUCTOR AND CABLE REQUIREMENTS

Annealed (soft) copper complying with ICEA S-95-658/NEMA WC70 and UL standards 44 or 83 as applicable.

Conductor Insulation Types: 90-degree C-rated, Type THHN/THWN-2 or XHHW-2 complying with ICEA S-95-658/NEMA WC70.

Sizes of conductors and cables indicated or specified are in American Wire Gage (AWG - Brown and Sharpe).

All feeder and branch circuit conductors No. 8 AWG and larger: Stranded.

All conductors, No. 10 AWG and smaller: Solid copper.

All Branch Circuit Wiring: Not smaller than No. 12 AWG. If no conductor size is indicated on the Drawings for a branch circuit, provide conductors and conduit sized per NFPA and based on the indicated branch circuit overcurrent protective device (OCPD) rating and number of poles. Where no circuit size (i.e., conductors and QCPD) is indicated on the drawings for a branch circuit, provide three No. 12 AWG conductors, in 3/4-inch raceway, and a 20A circuit breaker.

Control Wiring: Stranded copper conductors, 600V insulation, of the proper type, size, and number as required to accomplish specified function. Minimum size: No. 14 AWG, unless noted otherwise.

Flexible Cords and Cables: Conductor provided for all, unless noted otherwise.

Special Purpose Conductors And Cables, Such As Low Voltage Control And Shielded Instrument Wiring: As recommended by the system equipment manufacturer unless indicated otherwise.

Copper Conductor Manufacturers: Advance Wire and Cable, AFC Cable, Alan Wire, Affex, American Insulated Wire, Encore Wire, Northern Cables, Okonite, or Southwire.

Connections: Apply a zinc based anti-oxidizing compound to connections. Do not use terminals on wiring devices to feed through to the next device.

B. CONDUCTORS AND CABLES INSTALLATION

Install all wiring in approved raceway and enclosures, except where specified or indicated for low-voltage wiring, where specified or indicated for direct-buried cables, or where type MC cable is indicated or specified as acceptable.

Install all conductors and cables in raceways continuous without taps or splices. Splice or tap only in approved boxes and enclosures with approved solderless connectors, or crimp connectors and terminal blocks for control wiring, and keep to the minimum required. Insulate all splices, taps, and joints as required by codes.

All materials used to terminate, splice, or tap conductors: designed for, properly sized for, and NRTL listed for the specific application and conductors involved, and installed in strict accordance with the manufacturer's recommendations, using the manufacturer's recommended tools.

Where wiring is indicated as installed, but the connection is indicated "FUTURE" or "BY OTHER DIVISION, TRADES, OR CONTRACTS", leave a minimum 3-foot "Pigtail" at the box, tape the ends of the conductors, and cover the box.

In general, the direction of branch circuit "home run" routing is indicated on the drawings, complete with circuit numbers and panelboard designation. Continue all such "home run" wiring to the designated panelboard, as though "circuit runs" were indicated in their entirety.

Common or shared neutrals are not allowed unless shown on the drawings to be used or specifically noted to be allowed.

Where multi-wire branch circuits (i.e., shared neutral) are allowed, they shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point the branch circuit originates. Multi-pole breakers or 3 single-pole breakers with a handle tie are two examples.

When multiple home runs are combined into a single raceway such that the number of conductors exceeds four (conductor count is made up of any combination of phase and neutral conductors), the following restrictions apply, which are in addition to those in NFPA 70:

Normal or Non-Essential circuits:

1. Maximum of 16 conductors in a single raceway. For up to eight conductors in a raceway, minimum raceway size: 3/4-inch. For greater than eight conductors in a raceway, minimum raceway size: 1-inch. Do not install any other type of circuit in this raceway.
2. Minimum wire size for all conductors in this raceway: No. 10 AWG.
3. Only 15A and 20A branch circuit homeruns may be combined into one raceway.

GFCI circuits:

1. Do not use multi-conductor circuits, with a shared neutral, for any GFCI circuit breaker or receptacle circuit.

For branch circuits fed from GFCI circuit breakers, limit the one-way conductor length to 100 feet between the panelboard and the most remote receptacle or load on the GFCI circuit.

Properly identify all terminal blocks and wire terminals for control wiring with vinyl stick-on markers or equivalent. Provide Engineer with a list of proposed identifying numbers for review prior to installing markers.

Provide an equipment-grounding conductor, including jumper, as applicable, in all feeders and branch circuits, sized in accordance with NFPA 70 Tables 250.66 or 250.122, as applicable, unless indicated as larger on the drawings.

Wiring shall have insulation of the proper color to match color code system in the table below unless there is a color system currently in use by the facility, utility, or enforced by local amendments, in which case the colors are to match the requirements set forth by the AHJ, utility or facility management. In larger sizes where properly colored insulation is not available, use vinyl plastic electrical tape of the appropriate color around each conductor at all termination points, junctions

MECHANICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V2.07

STANDARD MOUNTING HEIGHT

THERMOSTATS (USER ADJUSTABLE)	46"
CONTROLS	46"

INSTALL DEVICES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS ARE AFF OR AFG TO TOP OF THE DEVICE UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ANNOTATION

- 1 — MECHANICAL PLAN NOTE CALLOUT
- CU 1 — MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / M1 — DETAIL REFERENCE. UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 / M1 — SECTION CUT DESIGNATION

ABBREVIATIONS

A/C	AIR CONDITIONING
ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BB	BACKBONE
BD	BACKDRAFT DAMPER
BD	BLOWDOWN
BFC	BELOW FINISHED CEILING
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BHP	BRAKE HORSEPOWER
BI	BINARY INPUT
BO	BINARY OUTPUT
BOD	BOTTOM OF DUCT
BOS	BOTTOM OF STRUCTURE
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
CLG	COOLING
CP	CONDENSATE PUMP
CPT	CONTROL POWER TRANSFORMER
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRU	COMPUTER ROOM UNIT
CV	CONTROL VALVE
CU	CONDENSING UNIT
DB	DECIBELS
DBA	DECIBEL AVERAGE
DDC	DIRECT DIGITAL CONTROL
DI	DIGITAL INPUT
DISC	DISCONNECT
DN	DOWN
DS	DUCT SILENCER
DX	DIRECT EXPANSION
(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
ED	EXHAUST DUCT
EDB	ENTERING DRY BULB
EF	EXHAUST FAN
EFF	EFFICIENCY
EMS	ENERGY MANAGEMENT SYSTEM
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
FCU	FAN COIL UNIT
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FF	FINISHED FLOOR
FPI	FINS PER INCH
FPM	FEET PER MINUTE
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HTG	HEATING
IN WC	INCHES OF WATER COLUMN
L	LOUVER
LAT	LEAVING AIR TEMPERATURE
LDB	LEAVING DRY BULB
LP	LOW PRESSURE
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MD	MOTORIZED DAMPER
MFR	MANUFACTURER
MIN	MINIMUM
N/A	NOT APPLICABLE
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
NOM	NOMINAL
NC	NOISE CRITERIA
NF	NON-FUSED
NIC	NOT IN CONTRACT
OA	OUTSIDE AIR
PICV	PRESSURE INDEP. CONTROL VALVE
PROVIDE	FURNISH AND INSTALL
QTY	QUANTITY
RA	RETURN AIR
RC	ROOM CRITERIA
RD	RETURN DUCT
REA	RELIEF AIR
RF	RETURN FAN
RFR	REFRIGERANT
RH	RELATIVE HUMIDITY
RH	ROOF HOOD
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SD	SMOKE DUCT DETECTOR
SD	SUPPLY DUCT
SF	SUPPLY FAN
SH	SENSIBLE HEAT CAPACITY
SOW	SCOPE OF WORK
SP	STATIC PRESSURE
TBD	TO BE DETERMINED
TC/C	TEMPERATURE CONTROLS CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TF	TRANSFER FAN
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TH	TOTAL HEAT CAPACITY
TSP	TOTAL STATIC PRESSURE
TT	TEMPERATURE TRANSMITTAL
TYP	TYPICAL
U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
U/NO	UNLESS NOTED OTHERWISE
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VRF	VARIABLE REFRIGERANT FLOW
VRV	VARIABLE REFRIGERANT VOLUME
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WPD	WATER PRESSURE DROP

HVAC DUCTWORK AND ACCESSORIES

- LINEAR SLOT DIFFUSER
- INSULATED FLEXIBLE DUCT (MAX. 5'-0" LONG)
- BRANCH DUCT WITH 45° RECTANGLE-ROUND BRANCH FITTING AND MANUAL VOLUME DAMPER
- ELBOW WITH TURNING VANES
- BRANCH DUCT WITH BELL-MOUTH FITTING & MANUAL VOLUME CONTROL DAMPER
- DUCT UP
- DUCT DOWN
- EA — EXHAUST AIR
- GEA — EXHAUST AIR - GREASE
- OA — OUTSIDE AIR
- REA — RELIEF AIR
- EA — RETURN AIR
- XEA — SPECIAL EXHAUST
- SA — SUPPLY AIR
- EQUIPMENT WITH FLEXIBLE DUCT CONNECTION
- 10" (NECK SIZE) CSD-1 (TYPE) 300 CFM (CFM OF SUPPLY DIFFUSER OR REGISTER)
- 24x24 (NECK SIZE) CEG-1 (TYPE) 800 CFM (CFM OF EXHAUST GRILLE)
- EQUIPMENT ACCESS TILE (IN ACT CEILINGS)
- ACCESS PANEL (IN GYPSUM)
- MANUAL VOLUME DAMPER
- SQUARE TO ROUND TRANSITION
- RD / 1 — DUCT MOUNTED SMOKE DETECTOR (SD=SUPPLY/RD=RETURN)
- XX" Ø — ROUND DUCT TAG INDICATING DIAMETER
- XX" x XX" — RECTANGULAR DUCT TAG INDICATING INTERNAL DUCT DIMENSIONS.
- XX' / XX" — FLAT OVAL DUCT TAG INDICATING INTERNAL DUCT DIMENSIONS
- R — RISER DESIGNATION
- FD — FIRE DAMPER
- FSD — FIRE SMOKE DAMPER
- SD — SMOKE DAMPER
- VD — VOLUME DAMPER
- MD — MOTORIZED DAMPER
- BD — BACKDRAFT DAMPER

ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS. REFER TO DUCTWORK SPECIFICATIONS FOR DUCTWORK INSULATION AND LINER INFORMATION.

PIPING SYMBOLS

- DIRECTION OF FLOW
- CONTROL VALVE
- THREE-WAY CONTROL VALVE
- SHUTOFF VALVE
- CHECK VALVE
- BALANCING VALVE WITH PRESSURE PORTS
- TRIPLE DUTY VALVE WITH PRESSURE PORTS
- STRAINER
- STRAINER WITH BLOWDOWN VALVE
- RELIEF / SAFETY VALVE
- SOLENOID VALVE
- PRESSURE REDUCING VALVE
- GAS PRESSURE REGULATOR
- THERMOSTATIC MIXING VALVE
- PA — PIPE ANCHOR
- EXPANSION JOINT
- PIPE GUIDE
- PIPING SUPPORT
- F & T TRAP
- BUCKET TRAP
- THERMOSTATIC TRAP
- BACKFLOW PREVENTER
- PRESSURE GAUGE
- THERMOMETER
- PRESSURE AND TEMPERATURE TEST PLUG
- UNION
- FLANGE CONNECTION
- VACUUM RELIEF VALVE
- AV — AUTOMATIC AIR VENT
- MV — MANUAL AIR VENT
- PRESSURE / VACUUM SWITCH
- CLEANOUT
- CAP
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- ELBOW UP WITH SHUT-OFF VALVE (SOV)
- ELBOW DOWN WITH SHUT-OFF VALVE (SOV)
- TEE UP WITH SHUT-OFF VALVE (SOV)
- TEE DOWN WITH SHUT-OFF VALVE (SOV)
- REDUCER
- RECIRCULATION PUMP
- P-TRAP
- GAS COCK
- TOP BEAM CLAMP
- TRAPEZE HANGER
- FLEXIBLE CONNECTION

PIPING LINETYPES

- EXISTING PIPING TO BE REMOVED OR RELOCATED
- EXISTING PIPING TO REMAIN
- CD — CONDENSATE DRAIN (CD)
- ACD — AUXILIARY CONDENSATE DRAIN (ACD)
- NPW — NON-POTABLE WATER (NPW)
- G — NATURAL GAS (G)
- G — NATURAL GAS ON ROOF (G)
- MPG — MEDIUM PRESSURE NATURAL GAS (MPG)
- MPG — MEDIUM PRESSURE NATURAL GAS ON ROOF (MGP)
- FOS — FUEL OIL SUPPLY (FOS)
- FOR — FUEL OIL RETURN (FOR)
- FOV — FUEL OIL VENT (FOV)
- LPG — LIQUEFIED PETROLEUM GAS (LPG)
- BFW — BOILER FEED WATER (BFW)
- HPS — HIGH PRESSURE STEAM SUPPLY (HPS)
- HPC — HIGH PRESSURE STEAM CONDENSATE (HPC)
- LPS — LOW PRESSURE STEAM SUPPLY (LPS)
- LPC — LOW PRESSURE STEAM CONDENSATE (LPC)
- CPD — CONDENSATE PUMP DISCHARGE (CPD)
- HWS — HEATING HOT WATER SUPPLY (HWS)
- HWR — HEATING HOT WATER RETURN (HWR)
- CHWS — CHILLED WATER SUPPLY (CHWS)
- CHWR — CHILLED WATER RETURN (CHWR)
- HCS — HOT / CHILLED WATER SUPPLY (HCS)
- HCR — HOT / CHILLED WATER SUPPLY (HCR)
- CWS — CONDENSER WATER SUPPLY (CWS)
- CWR — CONDENSER WATER RETURN (CWR)
- RL — REFRIGERANT LIQUID (RL)
- RD — REFRIGERANT DISCHARGE (HOT GAS) (RD)
- RS — REFRIGERANT SUCTION (RS)
- RDB — REFRIGERANT DISCHARGE BYPASS (RDB)
- RV — REFRIGERANT VENT (RV)

HVAC CONTROL DEVICES

- H — HUMIDISTAT
- T — THERMOSTAT
- CO — CARBON MONOXIDE SENSOR
- CO2 — CARBON DIOXIDE SENSOR
- DP — DIFFERENTIAL PRESSURE SENSOR
- FS — FLOW SWITCH
- HS — HUMIDITY SENSOR
- PS — PULL STATION
- RT — REMOTE TESTING STATION WITH INDICATING LIGHT
- SP — STATIC PRESSURE
- TS — TEMPERATURE SENSOR

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	NEW
DEMOLISH	FUTURE

GENERAL NEW NOTES:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER AND/OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. COORDINATE THE INSTALLATION OF THE MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE A NEAT AND ORDERLY INSTALLATION. INSTALL DUCTWORK AND PIPING AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. ANY MODIFICATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.
3. ALL MECHANICAL EQUIPMENT SHOWN ON THE MECHANICAL PLANS SHALL BE PROVIDED BY DIVISION 23 UNLESS OTHERWISE NOTED.
4. NEW MECHANICAL EQUIPMENT, DUCTWORK AND PIPING ARE SHOWN AT APPROXIMATE LOCATIONS. FIELD MEASURE FINAL DUCTWORK AND PIPING LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED TO FIT THE DUCTWORK AND PIPING WITHIN THE AVAILABLE SPACE. VERIFY THAT FINAL EQUIPMENT LOCATIONS MEET MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
5. REFER TO ARCHITECTURAL DRAWINGS FOR RELATED CONSTRUCTION DETAILS AS APPLICABLE TO THE HVAC SYSTEM. VERIFY CHASES AND PENETRATIONS SHOWN ON ARCHITECTURAL DRAWINGS THAT ARE INTENDED FOR DUCTWORK AND PIPING MEET REQUIREMENTS.
6. COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
7. INDOOR AIR QUALITY MEASURES: PROTECT INSIDE OF (INSTALLED AND DELIVERED) DUCTWORK AND HVAC UNITS FROM EXPOSURE TO DUST, DIRT, PAINT AND MOISTURE. REPLACE INSULATION THAT HAS BECOME WET AT ANY TIME DURING CONSTRUCTION, DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ANY TEARS OR JOINTS OF INTERNAL FIBERGLASS INSULATION. REMOVE DEBRIS FROM CEILING/RETURN AIR PLENUM INCLUDING DUST. AN INDEPENDENT, PROFESSIONAL DUCT CLEANING COMPANY SHALL VACUUM CLEAN ANY DUCTWORK CONNECTED TO HVAC UNITS THAT WERE OPERATED DURING THE CONSTRUCTION PERIOD AFTER NEW FILTERS ARE INSTALLED AND PRIOR TO TURNING SYSTEM OVER TO THE OWNER. THE INTERNAL SURFACES AND ASSOCIATED COILS OF ANY HVAC UNITS THAT WERE OPERATED SHALL ALSO BE CLEANED.
8. INSTALL DUCTWORK AND PIPING PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
9. OVERHEAD HANGERS AND SUPPORTS FOR EQUIPMENT, DUCTWORK AND PIPING SHALL BE FASTENED TO BUILDING JOISTS OR BEAMS. DO NOT ATTACH HANGERS AND SUPPORTS TO THE ABOVE FLOOR SLAB OR ROOF EXCEPT WHERE CONCRETE INSERTS IN CONCRETE SLABS ARE ALLOWED BY THE SPECIFICATIONS.
10. COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
11. SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
12. COORDINATE THE EXACT MOUNTING SIZE AND FRAME TYPE OF DIFFUSERS, REGISTERS AND GRILLES WITH THE SUPPLIER TO MEET THE CEILING, WALL AND DUCT INSTALLATION REQUIREMENTS.
13. ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
14. PAINT PORTIONS OF DUCTWORK AND INSULATION THAT ARE EXPOSED TO VIEW BY THE INSTALLATION OF DIFFUSERS, REGISTERS, AND GRILLES IN CEILINGS OR WALLS FLAT BLACK. PORTIONS INCLUDE BOTH THE INTERIOR OF UNLINED DUCTWORK AND THE EXTERIOR OF DUCTWORK AND INSULATION.
15. LOCATE AND SET THERMOSTATS AND HUMIDISTATS AT LOCATIONS SHOWN ON PLANS. VERIFY EXACT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. INSTALL DEVICES WITH TOP OF DEVICE AT MAXIMUM 48" AFF TO MEET ADA REQUIREMENTS UNLESS NOTED OTHERWISE ON PLANS. PROVIDE INSULATED BACKING FOR THERMOSTATS MOUNTED ON EXTERIOR BUILDING WALLS. INSTALL WIRING IN CONDUIT PROVIDED BY DIVISION 26. AT A MINIMUM, PROVIDE CONDUIT IN THE WALL FROM THE JUNCTION BOX TO 6" ABOVE THE CEILING.
16. COORDINATE THE LOCATION AND ELEVATION OF WALL-MOUNTED DEVICES WITH PRESENTATION BOARDS, DISPLAY CABINETS, SHELVES OR OTHER COMPONENTS SHOWN ON THE ARCHITECTURAL DRAWINGS THAT ARE TO BE INSTALLED UNDER OTHER DIVISIONS. CONTRACTOR WILL NOT BE REIMBURSED FOR RELOCATION OF WALL-MOUNTED DEVICES CAUSED BY A LACK OF COORDINATION.
17. PROVIDE A MANUAL BALANCING DAMPER IN EACH DUCT TAKEOFF FROM SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
18. PROVIDE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKEOFF FITTING FOR BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS AND GRILLES. PROVIDE WITH INTEGRAL MANUAL BALANCING DAMPER AND LOCKING QUADRANT WHERE INDICATED ON PLANS.
19. BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
20. REFER TO SPECIFICATIONS FOR DUCTWORK AND PIPING INSULATION REQUIREMENTS. DUCT SIZES ON MECHANICAL PLANS INDICATE CLEAR INSIDE AIRFLOW DIMENSIONS, INCREASE SHEET METAL SIZES ACCORDINGLY TO ACCOUNT FOR THICKNESS OF DUCT LINER.
21. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORTED TO AVOID SHARP BENDS AND SAGGING. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
22. RIGIDLY SUSPEND UNIT HEATER FROM STRUCTURE WITH SUPPORTING ANGLES AND ALL-THREAD HANGING RODS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
23. PROVIDE A NEW SET OF AIR FILTERS IN UNITS PRIOR TO TESTING, ADJUSTING AND BALANCING AND BEFORE TURNING SYSTEM(S) OVER TO OWNER.

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.:	19050.02
Date:	08/06/2021
Issued For:	PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI — BRADLEY E. CHAMBON — NUMBER PE-028603 — PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

MECHANICAL GENERAL NOTES AND LEGEND

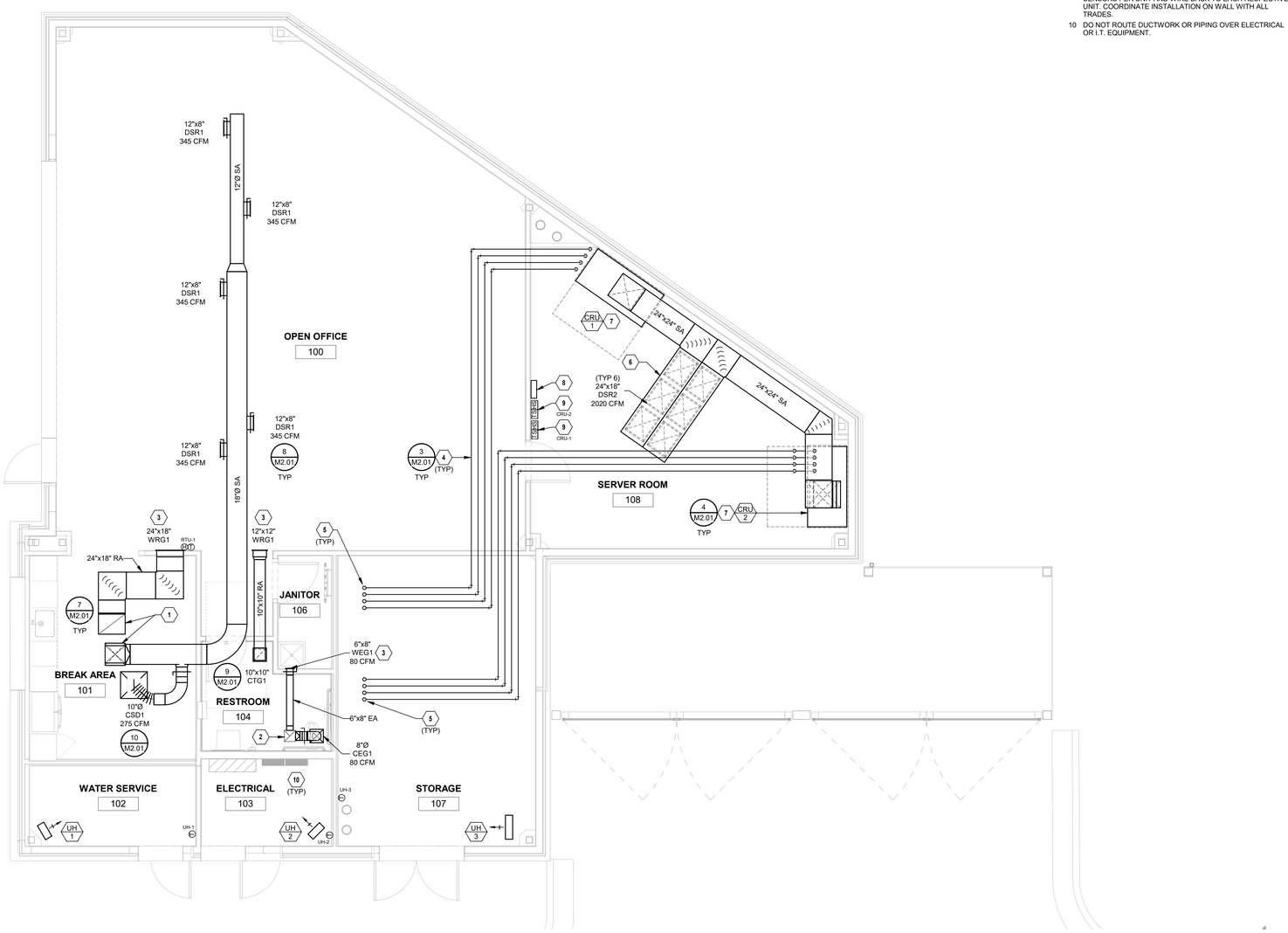
SHEET NUMBER

M0.00

BRADLEY E. CHAMBON

MECHANICAL PLAN NOTES:

1. 20"X18" SUPPLY AIR DUCT AND 24"X18" RETURN AIR DUCT UP THROUGH ROOF TO RTU-1. PROVIDE TRANSITIONS AS REQUIRED TO MATCH THE UNIT CONNECTION SIZES.
2. 10"X10" EXHAUST DUCT UP THROUGH ROOF TO EF-1. PROVIDE TRANSITION AS REQUIRED TO MATCH FAN CONNECTION SIZE.
3. MOUNT GRILLE TIGHT TO THE BOTTOM OF STRUCTURE. COORDINATE EXACT LOCATION AND FINISH COLOR WITH ARCHITECT.
4. ROUTE REFRIGERANT PIPING BETWEEN THE ROOF-MOUNTED CONDENSING UNIT AND THE INDOOR UNIT. SIZE AND ROUTE PIPING PER THE MANUFACTURER'S REQUIREMENTS. COORDINATE WITH CABLE TRAYS, DUCTWORK, AND ALL OTHER DISCIPLINES.
5. REFRIGERANT PIPING UP THROUGH THE ROOF. SIZE AND INSTALL PER THE MANUFACTURER'S REQUIREMENTS.
6. PROVIDE SUPPLY AIR IN-BETWEEN THE RACKS IN THE SERVER ROOM. ROUTE DUCTWORK TIGHT TO THE BOTTOM OF STRUCTURE. COORDINATE ROUTING WITH CABLE TRAYS AND ALL OTHER DISCIPLINES.
7. MAINTAIN THE MANUFACTURER'S REQUIRED CLEARANCE IN FRONT OF THE UNIT TO ENSURE ADEQUATE RETURN AIR FLOW.
8. INSTALL AUTO-CHANGE OVER PANEL AT LOCATION SHOWN.
9. REMOTE LIEBERT TEMPERATURE AND HUMIDITY SENSORS TO CONTROL CRU-1 AND CRU-2. PROVIDE ONE SET OF SENSORS PER UNIT AND WIRE BACK TO EACH RESPECTIVE UNIT. COORDINATE INSTALLATION ON WALL WITH ALL TRADES.
10. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL OR I.T. EQUIPMENT.



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

NORTH

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

MECHANICAL PLAN

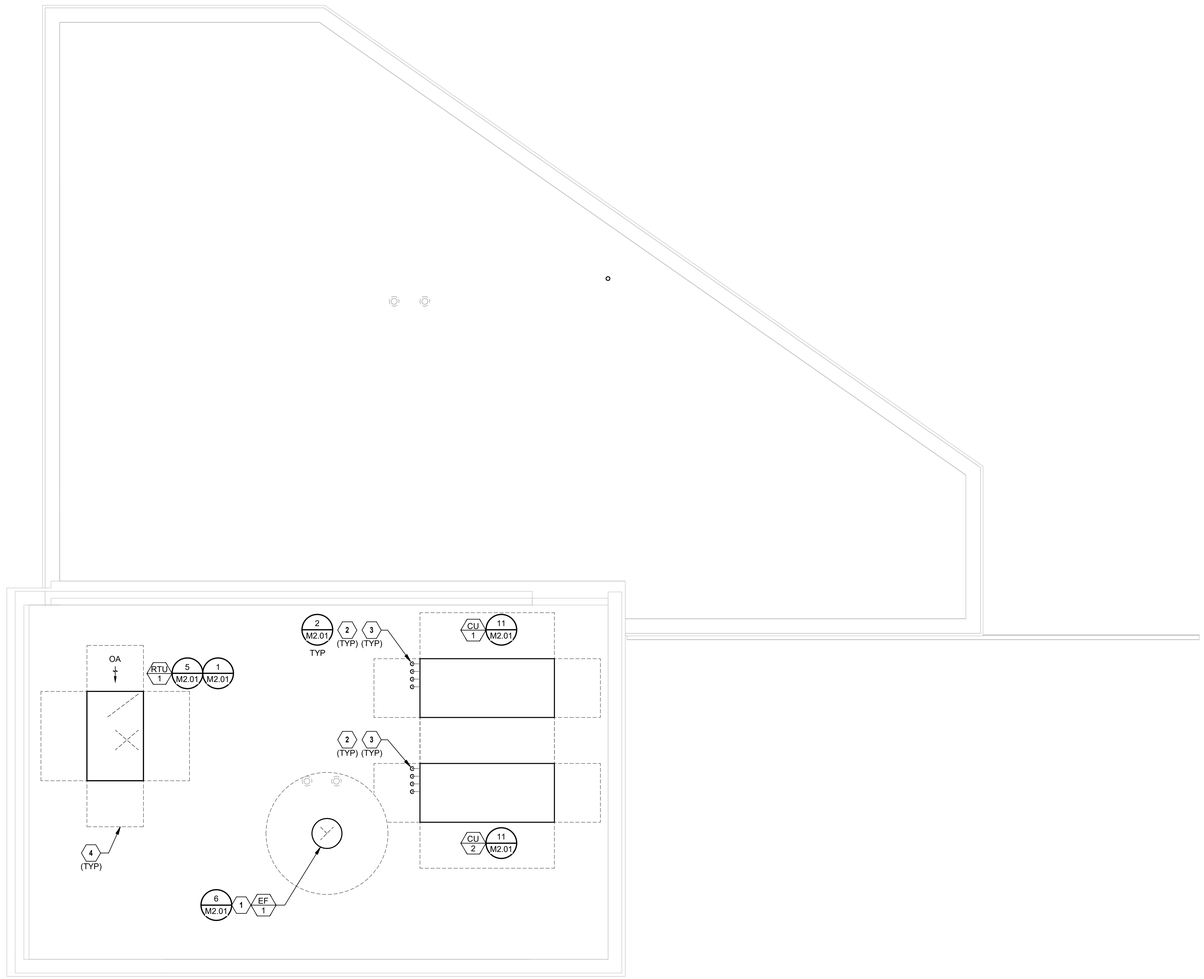
SHEET NUMBER

M1.01

BRADLEY E. CHAMBON

MECHANICAL PLAN NOTES:

1. PROVIDE ROOF-MOUNTED EXHAUST FAN. MAINTAIN A MINIMUM OF 10'-0" SEPARATION FROM ALL OUTSIDE AIR INTAKES.
2. ROUTE REFRIGERANT PIPING BETWEEN THE ROOF-MOUNTED CONDENSING UNIT AND THE INDOOR UNIT. SIZE AND ROUTE PIPING PER THE MANUFACTURER'S REQUIREMENTS. COORDINATE WITH CABLE TRAYS, DUCTWORK, AND ALL OTHER DISCIPLINES.
3. REFRIGERANT PIPING DOWN THROUGH THE ROOF.
4. DASHED LINES REPRESENT MANUFACTURER REQUIRED CLEARANCES.



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

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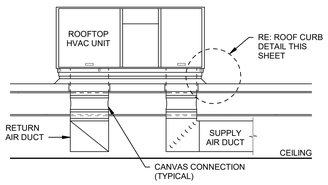
MECHANICAL ROOF PLAN

SHEET NUMBER

M1.02

NORTH

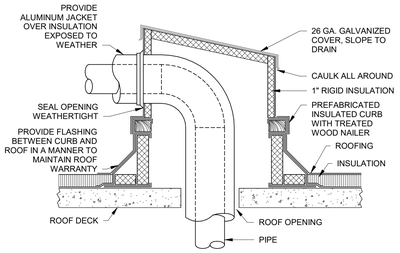
BRADLEY E. CHAMBON



NOTES:

1. PROVIDE OPENING THROUGH ROOF AND ROOF DECK INSULATION NO LARGER THAN REQUIRED TO ALLOW DUCTS TO PASS THROUGH. REFER TO PLANS FOR DUCT SIZES. TRANSITION AS REQUIRED IN ROOF CURB TO RTU SUPPLY AND RETURN OPENINGS.
2. PROVIDE SLOPED ROOF CURB TO INSTALL ROOFTOP UNIT LEVEL TO ENSURE PROPER DRAINAGE. COORDINATE ROOF SLOPE WITH ARCHITECTURAL. FLASH AND COUNTER FLASH ROOF PENETRATIONS, ETC. TO ENSURE WEATHER TIGHT INSTALLATION.

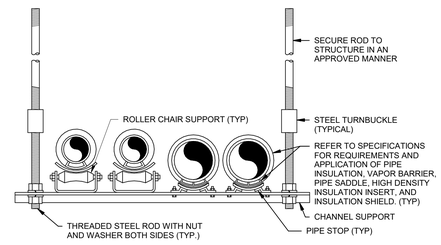
① ROOFTOP UNIT WITH DUCTWORK DETAIL
NTS



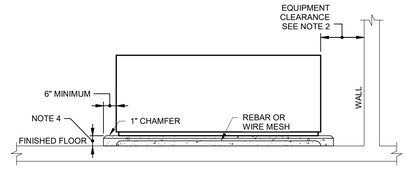
NOTES:

1. FOR MULTIPLE PIPES, PROVIDE ONE ENCLOSURE, WHERE FEASIBLE.

② PIPE ROOF PENETRATION ENCLOSURE DETAIL
NTS



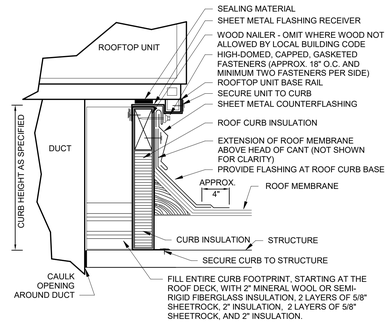
③ MULTIPLE PIPE TRAPEZE HANGER DETAIL
NTS



NOTES:

1. POUR SLAB FLAT WITH NO VALLEYS.
2. MINIMUM CLEARANCE AROUND EQUIPMENT, ALL SIDES, PER MANUFACTURER.
3. DIMENSIONS SHOWN ARE MINIMUM ACCEPTABLE; REVISE AS REQUIRED FOR EQUIPMENT BEING PROVIDED.
4. COORDINATE PAD HEIGHT WITH SPECIFICATIONS. WHEN APPLICABLE, COORDINATE PAD HEIGHT WITH CONDENSATE DRAIN TRAP DEPTH +1" CLEARANCE. ABSOLUTE MINIMUM PAD HEIGHT IS 3-1/2" WHEN NOT OTHERWISE SPECIFIED.

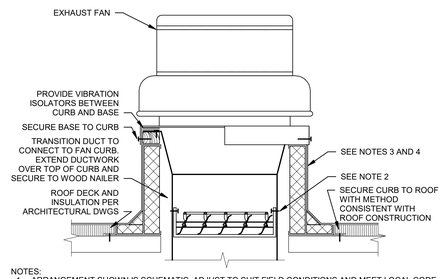
④ INTERIOR EQUIPMENT PAD DETAIL
NTS



NOTES:

1. CUT METAL DECKING TO ALLOW CURB INSTALLATION ON STEEL FRAMING. AFTER CURB IS SET IN PLACE, TRIM REMAINING METAL DECKING AND INSTALL WITHIN CURB. TACK WELD DECKING TO SUPPORT STEEL. DO NOT WELD INTERIOR DECKING TO ROOF CURB. PROVIDE ADDITIONAL CROSS FRAMING TO SUPPORT INTERIOR DECKING AND FILL MATERIAL AS REQUIRED.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.

⑤ ROOF CURB DETAIL
NTS

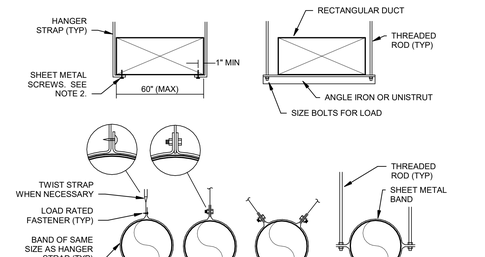


NOTES:

1. ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE.
2. IF DAMPER IS SPECIFIED IN EQUIPMENT SCHEDULE, INSTALL DAMPER AT BASE OF CURB AND SECURE FROM ABOVE TO ALLOW SERVICE THROUGH TOP OF CURB.
3. PREFABRICATED INSULATED ROOF CURB WITH TREATED WOOD NAILER, CANT, AND STEP AS REQUIRED TO ACCOMMODATE ROOF INSULATION. FRAME AND SECURE CURB TO ROOF WITH METHOD CONSISTENT WITH ROOF CONSTRUCTION. ROOF CURB SHALL BEAR ON ROOF STRUCTURE. REFER TO ARCHITECTURAL DRAWINGS AND CURB MANUFACTURER'S DETAILS FOR MORE INFORMATION.
4. FOR SLOPED ROOFS, PROVIDE CURB WITH DIMENSIONS CAPABLE OF COMPENSATING ROOF SLOPE TO ENSURE FAN IS INSTALLED LEVEL.

HIGH WIND STRAPPING: PROVIDE STAINLESS STEEL STRAPS OF LENGTH, WIDTH, THICKNESS, AND SPACING SUFFICIENT TO SECURE FAN TO CURB TO WITHSTAND WIND SPEED REQUIREMENTS PER LOCAL CODE. WRAP STRAPS OVER FAN AND SECURELY ATTACH TO OPPOSITE SIDE OF THE CURB.

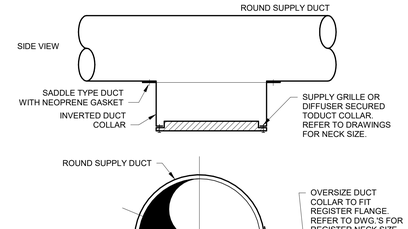
⑥ ROOF MOUNTED DOWNBLAST FAN DETAIL
NTS



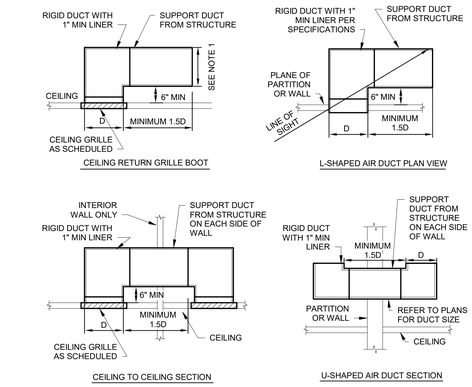
NOTES:

1. USE THREADED ROD FOR RECTANGULAR DUCTS LARGER THAN 60" WIDE.
2. OMIT SHEET METAL SCREWS IF HANGER STRAP IS CONTINUOUS AND LOOPS UNDER ENTIRE RECTANGULAR DUCT.
3. FOR ROUND DUCTS LARGER THAN 36"∅, USE TWO HANGER RODS TO SUPPORT DUCT FROM EACH SIDE.
4. HANGERS MUST NOT DEFORM DUCT SHAPE.

⑦ DUCT HANGER LOWER ATTACHMENT DETAILS
NTS



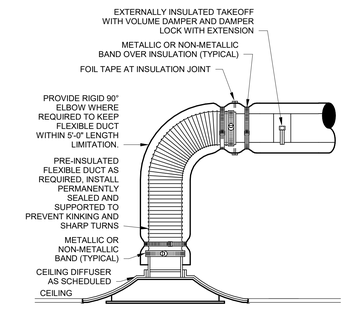
⑧ REGISTER MOUNTING TO ROUND DUCT DETAIL
NTS



NOTES:

1. REFER TO FLOOR PLAN FOR OUTLET DEPTH. WHEN NO DEPTH IS SHOWN, MINIMUM DEPTH SHALL BE AS REQUIRED TO LIMIT AIR VELOCITY TO 500 FPM WITH A MINIMUM SIZE OF 0.5D.

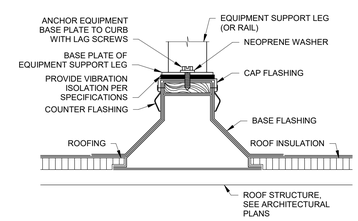
⑨ RETURN/TRANSFER AIR DUCT DETAIL
NTS



NOTES:

1. FLEXIBLE DUCT LENGTH MAY NOT EXCEED 5'-0". EXTEND RIGID DUCT AS REQUIRED.
2. REFER TO SPECIFICATIONS FOR FLEXIBLE DUCTWORK INSTALLATION REQUIREMENTS.

⑩ CEILING DIFFUSER DETAIL
NTS



NOTES

1. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR EQUIPMENT SUPPORTS, ANCHORING AND SEISMIC/WIND RESISTANCE.

⑪ ROOF EQUIPMENT SUPPORT RAIL DETAIL
NTS

BRADLEY E. CHAMBON

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

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PROJECT TEAM

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EXPIRES 12/31/2021

SHEET TITLE

MECHANICAL DETAILS

SHEET NUMBER

M2.01

ROOFTOP UNIT CONTROL MATRIX

CONTROL FEATURE	UNITS	RTU-1 SETPOINT OR Y/N	POINT TYPE INTERFACE WITH DDC (READ/WRITE)	NOTES
BUILDING AUTOMATION SYSTEM (BAS)				
BAS MONITORING AND MANAGEMENT INTERFACE (FOR FUTURE USE)		Y	BACNET	A
SETPOINTS				
COOLING - OCCUPIED SETPOINT	°F	75	READ/WRITE	
COOLING - UNOCCUPIED SETPOINT	°F	80	READ/WRITE	
DEAD BAND - MINIMUM HEATING AND COOLING TEMPERATURE SETPOINT DIFFERENCE	°F	5		
HEATING - OCCUPIED SETPOINT	°F	70	READ/WRITE	
HEATING - UNOCCUPIED SETPOINT	°F	60	READ/WRITE	
DEHUMIDIFICATION SETPOINT - HUMIDITY SENSOR FEEDBACK	% RH	60%	READ/WRITE	B
PROGRAMMED CONTROL FEATURES				
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT		Y	READ	B
EQUIPMENT ACCESSORIES AND CONTROL MODULES				
OUTSIDE AIR DAMPER - MOTOR OPERATED (MODULATING)		Y	READ POSITION	L
INTEGRATED ECONOMIZER - ENTHALPY ENABLE	BTU/LB	26	READ/WRITE	E
ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) SYSTEM		Y	READ	F, G
RELIEF - BAROMETRIC DAMPER		Y		
COOLING COIL (DX - STAGED)		Y	READ STATUS	M
DEHUMIDIFICATION - HOT GAS REHEAT		Y	READ STATUS	O
HEATING COIL (ELECTRIC)		Y	READ STATUS	M
SUPPLY FAN CONTROL METHODS				
ON DURING OCCUPIED HOURS		Y		
CYCLE WITH LOADS DURING OCCUPIED HOURS		N		
VARIABLE VOLUME - STAGED FAN CONTROL IN RESPONSE TO ACTIVE COOLING COIL STAGES		Y	READ STATUS	M, Q
SAFETIES, INTERLOCKS, AND ALARMS				
RETURN AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	READ	U

DIV. 23 CONTRACTOR SHALL PROVIDE CONTROL PANEL(S), WIRING, THERMOSTAT(S), TEMPERATURE SENSOR(S), HUMIDISTAT(S), AND/OR CO2 SENSOR(S) WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO FACILITATE THE SCHEDULED CONTROL MODULES AND SEQUENCES OF OPERATION. EACH UNIT SHALL CONTROL BASED ON ITS OWN INTERNAL SAFETIES, TIME DELAYS, AND SEQUENCES UNLESS NOTED OTHERWISE. COORDINATE WITH OWNER FINAL BUILDING AND EQUIPMENT SCHEDULES DURING STARTUP. REFERENCE DIVISION SPECIFICATIONS FOR INDIVIDUAL DEVICE REQUIREMENTS.

NOTES:
A. PROVIDE UNIT WITH FACTORY MOUNTED DDC CONTROLS AND INTEGRATE INTO THE BAS. BAS SHALL PROVIDE REMOTE SETPOINT ADJUSTMENT, SCHEDULING, AND MONITORING OF THE POINTS LISTED IN THE SCHEDULE FOR EACH UNIT.
B. DIVISION 23 CONTRACTOR SHALL PROVIDE DEVICE.
E. IF SETPOINT VALUE IS LISTED, IT INDICATES ECONOMIZER HIGH-LIMIT SHUTOFF. UNIT SHALL BE IN ECONOMIZER IF CONDITIONS ARE LESS THAN SETPOINT. THE FOLLOWING SENSORS SHALL DETERMINE ECONOMIZER ON POINT. OUTSIDE AIR HUMIDITY; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
F. DEVICE SHALL BE FACTORY MOUNTED AND PRE-WIRED FOR OPERATION SUBJECT TO THE ONBOARD CONTROLLER.
G. PROVIDE UNIT WITH AN FDD SYSTEM CONSISTING OF PERMANENTLY INSTALLED OUTSIDE AIR, SUPPLY AIR, AND RETURN AIR TEMPERATURE SENSORS. THE UNIT CONTROLLER SHALL AT A MINIMUM BE CAPABLE OF PROVIDING SYSTEM STATUS OF ECONOMIZER, COMPRESSOR, HEATING, MIXED AIR LOW LIMIT ALARM, AND SENSOR VALUES. EACH OPERATING MODE SHALL BE CAPABLE OF INDEPENDENTLY OPERATING FOR TESTING. THE SYSTEM SHALL REPORT FAULTS TO AN APPLICATION ACCESSIBLE BY SERVICE PERSONNEL. THE FOLLOWING FAULTS SHALL BE DETECTED: AIR TEMPERATURE SENSOR FAILURE, ECONOMIZER ENABLED/DISABLED WHEN ECONOMIZER SHOULD BE OFF/ON, RESPECTIVELY, DAMPER NOT MODULATING, AND EXCESS OUTSIDE AIR.
L. EQUIPMENT MANUFACTURER SHALL PROVIDE MODULATING DAMPER AND CONTROLS CAPABLE OF ADJUSTING THE DAMPER POSITION TO MAINTAIN THE SCHEDULED OUTSIDE AIR ON THE DRAWINGS ACROSS ALL FAN SPEEDS. DIV. 23 CONTRACTOR SHALL PROGRAM MULTIPLE DAMPER POSITION SETPOINTS IN THE FIELD DURING TESTING AND BALANCING TO MAINTAIN MINIMUM VENTILATION WHEN NOT IN ECONOMIZER. DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.
M. UNITARY CONTROLLER SHALL MODULATE AND/OR CYCLE SUPPLY FAN SPEED SETTING AND COIL CAPACITY STAGES SUBJECT TO THE INTERNAL SAFETIES AND SEQUENCES TO MAINTAIN SCHEDULED SETPOINTS.
Q. PROVIDE STAGED FAN CONTROL WITH MINIMUM 2 FAN SPEEDS. LOW SPEED SHALL NOT EXCEED 66% OF FULL SPEED AND SHALL DRAW NO MORE THAN 40% OF FAN POWER AT FULL SPEED.
U. DIVISION 28 CONTRACTOR SHALL PROVIDE DEVICE.

ROOFTOP UNIT SCHEDULE (DX COOLING, ELECTRIC HEATING)

MARK	MANUFACTURER	MODEL	NOMINAL TONS	SUPPLY FAN				COOLING COIL								HEATING COIL					MIN. O/A CFM	ELECTRICAL				WEIGHT (LBS)	NOTES
				CFM	ESP (IN)	NOM HP	VFD (Y/N)	TH (MBH)	SH (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	REFR TYPE	MIN EFF (EER)	MIN NO STAGES	MAX VEL (FPM)	MIN OUT (MBH)	NOM (KW)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES		V/PH	MCA	MOCP	DISC TYPE		
RTU 1	TRANE	TSC060	5	2000	0.8	1.00	No	60.0	44.5	75.8	62.6	54.8	52.0	R410A	12	1	550	61.4	18.0	61.7	90.0	2	315	208/3	57	60	NON-FUSED	930	A-P

MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER, MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. REFER TO ROOFTOP UNIT CONTROL MATRIX FOR CONTROL FEATURES, MODULES, AND ACCESSORIES THAT SHALL BE PROVIDED WITH THE EQUIPMENT.
B. EQUIPMENT SIZED FOR 105 °F AMBIENT TEMPERATURE.
C. PROVIDE 4" MERV 13 EFFICIENT PLEATED THROWAWAY AIR FILTERS.
D. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
E. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE FACTORY 2-SPEED MOTOR TO FACILITATE STAGED FAN SPEED CONTROL.
G. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
H. PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
J. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
K. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 16 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
L. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT AND CURB.
M. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
N. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
P. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL KW IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT POWER SUPPLY WITH ELECTRICAL CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED.

FAN SCHEDULE

MARK	SERVICE DESCRIPTION	MANUFACTURER	MODEL	MOUNTING	CFM	ESP (IN)	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	ELECTRICAL			WEIGHT (LBS)	NOTES
										V/PH	DISC TYPE	STARTER TYPE		
EF 1	EXHAUST	GREENHECK	G-070-VG	ROOF	160	0.4	0.07	1489	DIRECT	115/1	NON-FUSED	FVNR	30	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
B. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER.
C. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
D. PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	AREA SERVED	MANUFACTURER	MODEL	MIN OUT (MBH)	NOM (KW)	MIN NO OF STAGES	CFM	MOTOR HP	THROW (FT)	V/PH	DISC TYPE	NOTES
UH 1	WATER ENTRY	QMARK	MUH03-81	10.2	3.0	1	350	0.01	12	208/1	NON-FUSED	A-D
UH 2	ELECTRICAL	QMARK	MUH03-81	10.2	3.0	1	350	0.01	12	208/1	NON-FUSED	A-D
UH 3	STORAGE	QMARK	MUH05-81	17.0	5.0	1	350	0.01	12	208/1	NON-FUSED	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. MOUNT 10 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH WALL MOUNTED THERMOSTAT.
C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR HORIZONTAL DISCHARGE.
D. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.

COMPUTER ROOM UNIT SCHEDULE (DX COOLING)

MARK	MANUFACTURER	MODEL	REFR TYPE	SUPPLY FAN			COOLING COIL						HUMIDIFIER		ELECTRICAL			WEIGHT (LBS)	NOTES
				CFM	ESP (IN)	HP	TC (MBH)	SC (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	KW	LBS / HR	V/PH	MCA	MOCP		
CRU 1	LIEBERT	VS042AD	R407C	6060	0.5	3.75	127.0	115.0	75.0	61.0	57.7	53.6	4.8	11	208/3	96	110	1550	A-H
CRU 2	LIEBERT	VS042AD	R407C	6060	0.5	3.75	127.0	115.0	75.0	61.0	57.7	53.6	4.8	11	208/3	96	110	1550	A-H

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. ASSOCIATED CONDENSING UNIT SHALL BE BY THE SAME MANUFACTURER.
B. EQUIPMENT SIZED FOR 105°F AMBIENT TEMPERATURE.
C. PROVIDE 2" MERV 8, EFFICIENT THROWAWAY AIR FILTERS.
D. PROVIDE GRAVITY OPERATED BACKDRAFT DAMPER AT UNIT DISCHARGE.
E. UNIT SHALL CONTAIN MINIMUM 2 SEMI-HERMETIC COMPRESSORS TO PROVIDE MINIMUM OF 2 STAGES OF COOLING.
F. PROVIDE UNIT WITH INTEGRAL STARTER AND NON-FUSED DISCONNECT SWITCH.
G. PROVIDE FRONT INLET WITH MANUFACTURER RETURN GRILLES.
H. PROVIDE TOP DISCHARGE WITH DUCT CONNECTION.

COMPUTER ROOM CONDENSING UNIT

MARK	SERVICE	MANUFACTURER	MODEL	AMBIENT (°F)	VOLTS	PH	MCA	MOCP	WEIGHT (LBS)	NOTES
CU 1	CRU 1	LIEBERT	MCM080E8	105	208	3	6	15	450	A,B,C
CU 2	CRU 2	LIEBERT	MCM080E8	105	208	3	6	15	450	A,B,C

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
B. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
C. PROVIDE 2-FAN DUAL CIRCUIT CONDENSER.
D. UNIT SHALL OPERATE DOWN TO ZERO DEGREES FAHRENHEIT.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	CONSTRUCTION TYPE	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
CEG1	EXHAUST	PRICE	80	ALUMINUM	EGGCRATE	CEILING	12"x12"	25	0.08	B,C,F,H
CSD1	SUPPLY	PRICE	SCD	STEEL	SQUARE CONE	CEILING	12"x12"	25	0.08	A,B,C,F
CTG1	TRANSFER	PRICE	80	ALUMINUM	EGGCRATE	CEILING	12"x12"	25	0.08	B,C,F
DSR1	SUPPLY	PRICE	520	STEEL	LOUVERED	DUCT	REFER TO PLANS	25	0.08	B,D,E,F,G
DSR2	SUPPLY	PRICE	510	STEEL	LOUVERED	DUCT	REFER TO PLANS	30	0.08	B,D,F,G
WEG1	EXHAUST	PRICE	630	ALUMINUM	LOUVERED	WALL	REFER TO PLANS	25	0.08	B,D,F,G
WRG1	RETURN/TRANSFER	PRICE	530	STEEL	LOUVERED	WALL	REFER TO PLANS	25	0.08	B,D,F,G

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
C. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
D. FRONT BLADES PARALLEL TO LONG DIMENSION.
E. DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE.
F. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
G. BAKED ENAMEL FINISH, PAINT TO MATCH WALL/DUCT COLOR. COORDINATE WITH ARCHITECT FOR FINISH COLOR.
H. PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.

BRADLEY E. CHAMBON

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
185000412
EXPIRES 12/31/2021

SHEET TITLE

MECHANICAL SCHEDULES

SHEET NUMBER

M3.01

Division 23: HEATING, VENTILATING, AND AIR CONDITIONING

1. GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

All requirements under Division 01 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01, this section and division take precedence. Become thoroughly familiar with all its contents as required under that effect this division, section, or both. Work required under this division includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and these specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and any portion of work described in one shall be provided as if described in both. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They convey the scope of work, indicating the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

Edition	2004 Edition	1995
1.	Division 21 – Fire Suppression	Division 15
2.	Division 22 – Plumbing	Division 15
3.	Division 23 – HVAC Division 15	
4.	Division 26 – Electrical	Division 16
5.	Division 27 – Communications	Division 16
6.	Division 28 – Electronic Safety and Security	Division 16

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations."

Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete and ready for intended use, including all items and services incidental to the work necessary to the installation or operation. Include the installation under the warranty required by this division."

Engineer: Where referenced in this division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, as defined in the General and/or Supplementary Conditions. When used in this division, Engineer means increased involvement by and obligations to the Engineer, in addition to involvement by and obligations to the Architect.

AHJ: The local code and/or inspection agency (Authority) Having Jurisdiction over the work.

NRTL: Nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. Nationally recognized testing laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Substitutions include Value Engineering proposals.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the Engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean "listed, or both, by an NRTL, and acceptable to the AHJ over this project.

C. PREBID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. MATERIAL AND WORKMANSHIP

Provide new material, equipment, and apparatus under this contract unless otherwise stated herein, of best quality normally used for the purpose in good commercial practice, and free from defects. Install material and equipment in accordance with the manufacturer's installation instructions. Model numbers listed in the specifications or shown on the drawings are not necessarily intended to restrict to the required trim, written descriptions of the trim govern model numbers.

Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States or certified to meet the specified ASTM and ANSI standards.

Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the Architect and Engineer. Workmanship shall be the finest possible by experienced mechanics. Installations shall comply with applicable codes and laws.

The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal noise caused by rotating equipment, piping, ducts, air devices, and squeaks in rotating components shall not be acceptable. Materials and equipment shall be of commercial specification grade in quality. Light duty and residential grade equipment shall not be accepted unless otherwise indicated.

Remove from the premises waste material present as a result of work, including cartons, crating, paper, stickers, and/or excavation material not used in backfilling, etc. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.

Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction. Provide all safety lights, guards, and warning signs required for the performance of the work and for the safety of the public.

E. MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

F. COORDINATION

Coordinate work with that of other trades so that the various components of the systems are installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. Components which are installed without regard to the above shall be relocated at no additional cost to the Owner.

Unless otherwise indicated, the General Contractor shall provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the General Contractor with information where chases and openings are required. Contractor shall keep informed as to the work of other trades engaged in the construction of the project and shall execute work in a manner as to not interfere with or delay the work of other trades.

Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor shall be held responsible for errors that could have been avoided by proper checking and inspection.

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the specifications or shown on the drawings are not intended to designate the required trim.

G. ORDINANCES AND CODES

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the following:

1. National Electrical Code (NEC)
2. National Fire Protection Association (NFPA)
3. Underwriters Laboratories (UL)
4. Occupational Safety and Health Administration (OSHA)
5. American Society of Mechanical Engineers (ASME)
6. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
7. American National Standards Institute (ANSI)
8. American Society of Testing and Materials (ASTM)
9. Other national standards and codes where applicable.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the attention of the Architect and Engineer for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for, and furnish certificates of inspection to Owner.

H. PROTECTION OF EQUIPMENT AND MATERIALS

Store and protect from damage equipment and materials delivered to job site. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dust, dirt, paint, water, or physical damage. Replace insulation that has become wet at any time during construction. Drying the insulation is not acceptable. Seal any tears or joints of internal fiberglass insulation. Equipment and material damaged by construction activities shall be rejected and Contractor shall furnish new equipment and material of a like kind at his own expense.

Keep premises broom clean of foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work. Remove debris from ceiling/return air plenum, including dust.

Plug, seal, or cap open ends of ductwork and piping systems while stored and installed during construction when not in use to prevent the entrance of debris into the systems. Remove temporary protection prior to starting equipment and turning the system over to the owner.

I. SUBSTITUTIONS

Materials, products, equipment, and systems described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by the proposed substitution. The base bid shall include only the products from manufacturers specifically named in the drawings and specifications. To request a substitution, request the Substitution Request Form from the Architect or Engineer. Complete and send the Substitution Request Form for each material, product, equipment, or system that is proposed to be substituted. The burden of proof of the merit of the proposed substitution is upon the proposer.

Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, Architect, and Owner the following:

1. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects unless stated otherwise in the substitution request.
2. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance service, and sourcing of replacement parts.
3. Proposed substitution has received necessary approvals of authorities having jurisdiction.
4. Same warranty will be furnished for proposed substitution as for specified Work.
5. If accepted substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.
6. Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation. No substitution will be considered prior to receipt of bids unless written request for approval to bid has been received by the Engineer at least ten (10) calendar days prior to the date for receipt of bids.

If the proposed substitution is approved prior to receipt of bids, such approval will be stated in an addendum. Bidders shall not rely upon approvals made in any other way. Verbal approval will not be given. No substitutions will be considered after the contract is awarded unless specifically provided in the contract documents.

J. SUBMITTALS

Assemble and submit for review shop drawings, material lists, manufacturer product literature for equipment to be furnished, and items requiring coordination between contractors under this contract. Provide submittals in sufficient detail so as to demonstrate compliance with these contract documents and the design concept. Prior to the submittal of submittals, verify that the equipment submitted is mutually compatible and suitable for the intended use, will fit the available space, and maintain manufacturer recommended service clearances. If the size of equipment furnished makes necessary any change in location or configuration, submit a shop drawing showing the proposed layout.

Transmit submittals as early as required to support the project schedule. Allow for two weeks Engineer review time, plus to/from mailing time via the Architect, plus a duplication of this time for resubmittal, if required. Only resubmit those sections requested for resubmittal.

Submittals shall contain the project name, applicable specification section, submittal date, equipment identification acronym as used on the drawings, and the Contractor's stamp. The stamp shall certify that the submittal has been checked by the Contractor, complies with the drawings and specifications, and is coordinated with other trades. Manufacturer product literature shall include shop drawings, product data, performance sheets, samples and other submittals required by this division. Highlight, mark, list, or indicate the materials, performance criteria, and accessories that are being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned for review.

Submittals and shop drawings shall not contain the firm name, logo, seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

Separate submittals according to individual specification sections. Illegible submittals will be rejected and returned without review. Catalog data shall be properly bound, identified, indexed and tabbed in a 3-ring binder. Each item or model number shall be clearly marked and accessories indicated. Label the coating data with the equipment identification acronym or number as used on the drawings and include performance curves, capacities, sizes, weights, materials, finishes, wiring diagrams, electrical requirements and deviations from specified equipment or materials. For equipment with motor starters or VFDs, include short circuit current ratings. Mark out inapplicable items. Shop drawings will be returned without review if the above mentioned requirements are not met.

Provide the quantity of submittals required by Division 01. If not indicated and hard-copy sets are provided, submit a minimum of six (6) copies. Refer to Division 01 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 01. Contractor shall notify the Architect and Engineer that the submittals have been posted. If electronic submittal procedures are not defined in Division 01, Contractor shall include name, e-mail, and password information necessary to access the submittals. For submittals sent by e-mail, Contractor shall copy the designated representatives of the Architect and Engineer. Contractor shall allow for the Engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal.

The checking and subsequent acceptance of submittals by the Engineer and/or Architect shall not relieve the Contractor from responsibility for deviations from the drawings and specifications, errors in dimensions, details, size of members, or quantities, omissions of components or fittings, coordination of electrical requirements, and not coordinating items with actual building conditions and adjacent work. Proceed with the procurement and installation of equipment only after receiving approved shop drawings relative to each item.

K. ELECTRONIC DRAWING FILES

In preparation of shop drawings or record drawings, Contractor may, at his option, obtain electronic drawing files in AutoCAD or DXF format on CD-ROM disk, DVD disk, flash drive or direct download, as desired, from the Engineer for a shipping and handling fee of $200 for a drawing set up to 12 sheets and $15 per sheet for each additional sheet. Contact the Architect for written authorization and Engineer for the necessary release agreement form and to specify shipping method and drawing format. In addition to payment, the written authorization from the Architect and release agreement form from the Engineer must be received before electronic drawing files will be sent.

L. RECORD DRAWINGS (AS-BUILT DRAWINGS)

During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings. Insert one set into each copy of the manual described below.

See Division 01 and General Conditions for additional information.

M. OPERATION AND MAINTENANCE INSTRUCTIONS

During the course of construction, collect and compile a complete brochure of equipment furnished and installed on this project. Include operational and maintenance instructions, manufacturer's catalog sheets, wiring diagrams, parts lists, approved submittals and shop drawings, warranties, and descriptive literature as furnished by the equipment manufacturer. Include an inside cover sheet that lists the project name, date, Owner, Architect, Engineer, General Contractor, Sub-Contractor, and an index of contents.

Submit three copies of literature bound in approved binders with index and tabs separating equipment types to the Architect, for Engineer's review, at the termination of the work. Paper clips, staples, rubber bands, loose-leaf binding, and mailing envelopes are not considered approved binders. Final approval of systems installed under this contract shall be withheld until this equipment brochure is received and deemed complete by the Architect and Engineer. Instruct workmen to save required literature shipped with the equipment itself for inclusion in this brochure.

Include Record Drawings as described above.

Refer to Division 01 for acceptance of electronic manuals for this project. For electronic manuals, refer to paragraph "Submittals" for requirements.

N. SPARE PARTS

Furnish to Owner, with receipt, the following spare parts for the equipment furnished for this project:

1. One set of spare filters of each type required for each unit. In addition to the spare set of filters, install new filters prior to testing, adjusting, and balancing work and before turning system over to Owner.
2. Furnish one complete set of belts for each fan.
3. Furnish three operating keys for each type of air outlet and inlet that require them.

O. TRAINING

At a time mutually agreed upon between the Owner and Contractor, provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include, but not be limited to, an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the Architect stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The Contractor and the Owner shall sign the certification letter indicating agreement that the training has been provided.

Schedule training with Owner with at least 7 days advance notice.

P. WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects, occurring within the warranty period(s), as stated in the General Conditions and Division 01.

Warrantises shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2. GENERAL MATERIALS AND INSTALLATION

A. BUILDING OPERATION

Comply with the schedule of operations as outlined in the architectural portions of this specification. Accomplish work requiring interruption of building operation at a time when the building is not in operation and only with written approval of building Owner and/or tenant. Coordinate interruption of building operation with the Owner and/or tenant a minimum of seven (7) days in advance of work.

B. COINCIDENTAL DAMAGE

Repair streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in the course of the work. Repair materials shall match existing construction as closely as practical. Repair work shall meet all requirements of the Owner, local authorities having jurisdiction, and meet the satisfaction of the Architect.

C. CUTTING AND PATCHING

Conform to the requirements in Division 01. Cut walls, floors, ceilings, and other portions of the facility as required to install work under this division. Obtain permission from the Architect prior to cutting. Do not cut or disturb structural members without prior approval from the Architect and Structural Engineer. For post-tension slabs, x-ray slab and closely coordinate all core drill locations with Architect and Structural Engineer prior to performing any work. Obtain approval from Architect and/or Structural Engineer for all core drills and penetrations at least four days prior to performing work. Penetrations shall be made as small as possible while maintaining required clearances between the building element penetrated and the system component. Patch around openings to match the adjacent construction including fire ratings, if applicable. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the Architect.

D. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal piping, conduit, and rough-in except in unfinished areas and where otherwise shown.

E. CONCRETE BASES

Provide concrete bases (e.g., housekeeping pads) for equipment where indicated on the drawings and as specified herein. Concrete bases shall have chamfered edges. Size of base shall be a minimum of 4 inches greater than the footprint of the equipment that it is supporting and shall have a minimum height of 3-1/2 inches.

Construct equipment bases of a minimum 28 day, 4000 psi concrete conforming to American Concrete Institute Standard Building Code for Reinforced Concrete (ACI 318-99) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C150 Type I, aggregate conforming to ASTM C33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases and housekeeping pads with No. 4 reinforcing bars conforming to ASTM A615 or 6x6 - W2.9 x W2.9 welded wire mesh conforming to ASTM A185. Place reinforcing bars 24 inches on center with a minimum of two bars each direction

Provide galvanized anchor bolts for equipment placed on concrete equipment bases, housekeeping pads or on concrete slabs. Anchor bolts size, number and placement shall be as recommended by the manufacturer of the equipment.

F. STRUCTURALSUPPORT SYSTEMS

Structural steel used for support of equipment, ductwork and piping shall be new, clean, and conform to ASTM Designation A-36.

Support mechanical components from the building structure. Do not support mechanical components from ceilings, other mechanical or electrical components, and other non-structural elements.

G. PRE-ENGINEERED ROOF EQUIPMENT SUPPORTS AND CURBS

Provide prefabricated equipment support rails and roof curbs manufactured by AES Industries, Custom Curb, Inc., Pate Company, Thybar or approved equal. Provide with fully mitered raised cant and step to match roof insulation thickness, welded, minimum 18 gauge galvanized steel shell, internally reinforced to load bearing factors of equipment being supported, minimum 1-1/2 inch thick, 3 pound rigid insulation internal to shell to maintain continuous roof insulation where required, factory installed wood nailer, and minimum 18 gauge jacket with counterflashing where equipment does not fully cover the equipment support. Provide sloped roof equipment supports to enable level installation. Provide rigid backing material behind cant to maintain cant slope. Provide multiple support rails to uniformly support the equipment. Attach to roof structure according to manufacturer's installation instructions.

Attach equipment directly to pre-engineered roof equipment support using one of the following methods:

1. Rail Equipment Supports: Secure each equipment support leg to the rail with a minimum of 4 points of connection per leg.
2. Roof Curbs: Secure each corner of the equipment to the curb nailer using a minimum of 4 lag screws, located along the length of the equipment. Alternatively, Secure equipment to the curb using hold-down brackets. Provide minimum 6 inch long, 14 gauge galvanized steel brackets sized to wrap around top of curb and under equipment base rail with sufficient horizontal offset to cover overlap gap between the equipment rail and curb. Secure bracket to equipment and curb nailer using a minimum of 8 points of connection per bracket. Provide one bracket at each corner along the length of the unit.
3. Submit signed and sealed drawings that indicate the design and installation requirements of pre-engineered roof supports can withstand the design criteria listed. Include installation requirements for anchoring to the roof structure. The Engineer is not responsible and will not provide the seal and signature. Deliver submittal to the local AHJ for approval prior to installation of the contractor provided, pre-engineered roof supports.

H. ACCESS PANELS AND DOORS

Refer to Architectural documents for specification of access panels and doors.

Provide access doors for all concealed equipment and duct and piping accessories that require service where indicated or as required, except where above lay-in ceilings. Access doors shall be adequately sized for the devices served with a minimum size of 18 inches x 18 inches. Access doors must be of the proper construction for type of construction in which it is installed. Obtain Architect's approval of type, size, location and color before ordering. Provide factory-fabricated and assembled units, complete with attachment devices and fasteners ready for installation, concealed hinges, flush screwdriver-operated cam lock, and anchor straps. Provide qualifications data for testing agency that will perform testing.

N. SPARE PARTS

Furnish to Owner, with receipt, the following spare parts for the equipment furnished for this project:

1. One set of spare filters of each type required for each unit. In addition to the spare set of filters, install new filters prior to testing, adjusting, and balancing work and before turning system over to Owner.
2. Furnish one complete set of belts for each fan.
3. Furnish three operating keys for each type of air outlet and inlet that require them.

O. TRAINING

At a time mutually agreed upon between the Owner and Contractor, provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include, but not be limited to, an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the Architect stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The Contractor and the Owner shall sign the certification letter indicating agreement that the training has been provided.

Schedule training with Owner with at least 7 days advance notice.

P. WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects, occurring within the warranty period(s), as stated in the General Conditions and Division 01.

Warrantises shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2. GENERAL MATERIALS AND INSTALLATION

A. BUILDING OPERATION

Comply with the schedule of operations as outlined in the architectural portions of this specification. Accomplish work requiring interruption of building operation at a time when the building is not in operation and only with written approval of building Owner and/or tenant. Coordinate interruption of building operation with the Owner and/or tenant a minimum of seven (7) days in advance of work.

B. COINCIDENTAL DAMAGE

Repair streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in the course of the work. Repair materials shall match existing construction as closely as practical. Repair work shall meet all requirements of the Owner, local authorities having jurisdiction, and meet the satisfaction of the Architect.

C. CUTTING AND PATCHING

Conform to the requirements in Division 01. Cut walls, floors, ceilings, and other portions of the facility as required to install work under this division. Obtain permission from the Architect prior to cutting. Do not cut or disturb structural members without prior approval from the Architect and Structural Engineer. For post-tension slabs, x-ray slab and closely coordinate all core drill locations with Architect and Structural Engineer prior to performing any work. Obtain approval from Architect and/or Structural Engineer for all core drills and penetrations at least four days prior to performing work. Penetrations shall be made as small as possible while maintaining required clearances between the building element penetrated and the system component. Patch around openings to match the adjacent construction including fire ratings, if applicable. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the Architect.

D. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal piping, conduit, and rough-in except in unfinished areas and where otherwise shown.

E. CONCRETE BASES

Provide concrete bases (e.g., housekeeping pads) for equipment where indicated on the drawings and as specified herein. Concrete bases shall have chamfered edges. Size of base shall be a minimum of 4 inches greater than the footprint of the equipment that it is supporting and shall have a minimum height of 3-1/2 inches.

Construct equipment bases of a minimum 28 day, 4000 psi concrete conforming to American Concrete Institute Standard Building Code for Reinforced Concrete (ACI 318-99) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C150 Type I, aggregate conforming to ASTM C33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases and housekeeping pads with No. 4 reinforcing bars conforming to ASTM A615 or 6x6 - W2.9 x W2.9 welded wire mesh conforming to ASTM A185. Place reinforcing bars 24 inches on center with a minimum of two bars each direction

Provide galvanized anchor bolts for equipment placed on concrete equipment bases, housekeeping pads or on concrete slabs. Anchor bolts size, number and placement shall be as recommended by the manufacturer of the equipment.

F. STRUCTURALSUPPORT SYSTEMS

Structural steel used for support of equipment, ductwork and piping shall be new, clean, and conform to ASTM Designation A-36.

Support mechanical components from the building structure. Do not support mechanical components from ceilings, other mechanical or electrical components, and other non-structural elements.

G. PRE-ENGINEERED ROOF EQUIPMENT SUPPORTS AND CURBS

Provide prefabricated equipment support rails and roof curbs manufactured by AES Industries, Custom Curb, Inc., Pate Company, Thybar or approved equal. Provide with fully mitered raised cant and step to match roof insulation thickness, welded, minimum 18 gauge galvanized steel shell, internally reinforced to load bearing factors of equipment being supported, minimum 1-1/2 inch thick, 3 pound rigid insulation internal to shell to maintain continuous roof insulation where required, factory installed wood nailer, and minimum 18 gauge jacket with counterflashing where equipment does not fully cover the equipment support. Provide sloped roof equipment supports to enable level installation. Provide rigid backing material behind cant to maintain cant slope. Provide multiple support rails to uniformly support the equipment. Attach to roof structure according to manufacturer's installation instructions.

Provide 1/2 inch thick cellular foam insulation around perimeter of non-pressure pipe passing thru concrete slab on grade. Insulation shall extend to 2 inches above and below the concrete slab.

J. FIRESTOPPING

Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with UL 2079 or ASTM E 814, or other NRTL acceptable to AHJ.

Manufacturers: Hilti, RectorSeal, Specified Technologies Inc., United States Gypsum Company, or 3M corp.

Through and Membrane Penetration Firestopping Systems Product Schedule: Provide UL listing, location, wall or floor rating, and installation drawing for each penetration fire stop system.

Where project conditions require modification to qualified testing and inspecting agency's illustrations for a particular firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Include qualifications data for testing agency.

K. MOTORS AND STARTERS

Provide motors and starting equipment where not furnished with the equipment package. Motors shall have copper windings, Class B insulation, and standard starting torque and current draw characteristics suitable for the equipment served. Motors controlled by variable frequency drives shall be rated for voltage peaks and minimum rise times in accordance with NEMA MG1, Part 31. Motors 5 horsepower and larger controlled by variable frequency drives shall be provided with a shaft grounding system equal to Aegis SGR Bearing Protection Ring, Inpro/Seal Current Chaser Bearing Protection Ring (CDR) or approved equal. Motors for air handling equipment shall be selected for quiet operation. Each motor shall be checked for proper rotation and mechanical connection has been completed. Provide drip-proof enclosure for locations protected from weather and not in air stream of fan; and totally enclosed fan cooled enclosure for motors exposed to weather. Motors shall be manufactured by Century, General Electric, Louis Allis, Westinghouse, or approved equal.

Provide every motor, except fractional horsepower single phase motors with an approved type of "built-in" thermal overload protection, with a motor starter. Each starter shall be provided with properly sized thermal units used to the motor rating, and every three phase motor starter shall have overload heaters in each phase. Ambient compensated heaters shall be installed wherever necessary. Unless noted otherwise, motor starters shall be furnished by the Division 23 Contractor for installation and connection by the Division 26 Contractor. Starters shall be Allen-Bradley, Clark, Furnas, Square D, or approved equal.

L. ELECTRICAL WIRING

High voltage wiring is defined as 50 Volts or higher. Low voltage wiring is defined as less than 50 Volts. Line voltage wiring shall be provided by Division 26. Line voltage control and interlock wiring for mechanical systems shall also be provided by Division 26. Low voltage control wiring shall be provided by Division 23. Furnish wiring diagrams to Division 26 as required for proper equipment hookup. Coordinate with Division 26 the actual wire sizing amps for mechanical equipment (from the equipment nameplate) to ensure proper installation.

Provide power and communication wiring with transient protection in accordance with IEEE C62.41.2. All control and interlock wiring shall comply with the NEC. Control wiring shall be sized to accommodate the voltage drop associated with the distance between the control device and the controller. Control wiring not installed in conduit shall be UL rated for plenum installation. All NEC Class 1 (line voltage) wiring shall be UL listed in approved raceway according to the NEC and Division 26 requirements. Maximum allowable voltage for control wiring shall be 120 V. All low-voltage wiring per NEC Class 2 requirements. Low-voltage power circuits shall be sub-fused when required to meet Class 2 current limit.

Conduit for Control Wiring: EMT with compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections.

Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.

Install wiring parallel to building lines wherever possible. Conceal all control wiring in finished rooms. Do not install Class 2 wiring in raceway containing Class 1 wiring. Boxes and panels containing high voltage wiring and equipment may not be used for low-voltage wiring except for the purpose of interfacing the two wires (e.g., relays and transformers). All wire-to device and wire-to-wire connections shall be made at a terminal block or terminal strip. All runs of communication wiring shall be unspliced length when that length is commercially available. Verify the integrity of the entire network following the cable installation. Use appropriate test measures for each particular cable. Label all wiring and cabling at each end within 2 inches of termination with the controller termination number. Label control devices used in the system with permanent labels using the identifiers that match the record documents.

M. EQUIPMENT FURNISHED BY OTHERS

Provide necessary equipment and accessories that are not provided by the equipment supplier or Owner to complete installation of equipment furnished by others in locations as indicated on the drawings, specified herein, or both. Equipment and accessories not provided by the equipment supplier may include, but not be limited to flues, vents, intakes, associated roof jacks and caps to outdoors, dampers, in-line fans, roof fans, and control interlocks, etc. as required for proper operation of the complete system in accordance with the manufacturer's instructions.

Contractor shall be responsible for correct rough-in dimensions and shall verify them with Architect and/or equipment supplier prior to service installations.

N. SYSTEM TESTING, ADJUSTING, AND BALANCING

Upon completion of each phase of the installation, test each system in conformance with local code requirements and as noted below. Furnish labor and equipment required to test each system installed under this contract. Assume all costs involved in making the tests and repairing and/or replacing any damages resulting therefrom.

Final system testing, balancing and adjustments (TAB) shall be performed by a Contractor certified by the National Environmental Balancing Bureau (NEBB), Associated Air Balance Council (AABC), or Testing, Adjusting and Balancing Bureau (TABB). TAB shall be performed in accordance with the most current edition of the certified agencies procedural standard for testing, adjusting and balancing and shall comply with the strictest interpretation of that standard for execution and reporting of all TAB work.

Test, adjust, and balance equipment and systems included in the scope of work. Prepare testing and balancing report log using forms equivalent with the standard forms available from the TAB certification standard being followed. Adjust equipment to deliver specified flow amounts on the drawings. For air systems, include airflow supply quantities, entering and leaving temperatures, and pressures at design flow. For hydronic systems, include entering and leaving temperatures and pressures at design flow. Include fan and unit test readings, motor voltage and amp draws, etc., and submit six copies of the final compilation of data to the Architect for evaluation and approval before final inspection of the project.

Balance air systems to within plus or minus 10 percent for terminal devices and branch lines and plus or minus 5 percent for main ducts and air handling equipment of the amount of air shown on the drawings. TAB Contractor shall record space temperatures and make adjustments in airflow to each diffuser to obtain uniformity of temperature (no greater than +/- 3 F) in spaces. Document temperatures and adjustments in tab report. Balance hydronic systems to provide flow rates within plus or minus 5 percent of flow specified on drawings or as required for proper system operation. Adjust equipment to operate as intended by the specification. TAB report shall include a "report summary/remarks' section in accordance with the procedural standard provides both system set up and a summary of deficiencies as defined by the procedural standard.

TAB Contractor shall be responsible to calibrate, set, and adjust automatic temperature control sensors, actuators and control devices. Check proper sequencing of interlock systems, and operation of safety controls, adjust thermostats, and control setpoints, limits and time based adjustment to operate in accordance with the performance requirements of the Construction Documents. Adjust pumps, fans, etc. for proper and efficient operation. Certify to Architect that adjustments have been made and that system is operating satisfactorily. Calibrate, set, and adjust automatic temperature control devices, check proper sequencing of interlock systems, and operation of safety controls.

Division 23 contractor shall align bearings and replace bearings that have dirt or foreign material in them with new bearings without additional cost to the Owner.

O. VIBRATION ISOLATION

Provide vibration isolation equipment and materials by a single manufacturer. If type and deflection for specific equipment is not specified within the contract documents, reference ASHRAE Handbook "HVAC Applications" chapter to provide per manufacturer's recommendations. Approved manufacturers include Caldyn, Kinetics Noise Control, Mason Industries, Inc., Vibration Eliminator Co., Inc., Vibration Mounting and Controls, or Vibro-Acoustics, provided their systems are in compliance with the specified design and performance requirements.

General Requirements: Select vibration isolators by the weight distribution to produce uniform deflection. Vibration isolators shall have either known un-deflected heights or calibration markings so that, after adjustment, the static deflection can be verified, thus determining that the load is within the proper range of the isolator. Isolators shall operate in the linear portion of their load versus deflection curves. Spring isolators shall have 50 percent excess capacity without becoming coil bound. Coat vibration isolators with factory-applied paint. Coat vibration isolators exposed to weather and other corrosive environments with factory-applied corrosion resistance protection. Install and adjust vibration isolators in accordance with manufacturers written instructions.

Pipe connections. Provide flexible connectors for piping system connections on equipment side of shutoff valves for all pumps, mechanical equipment supported or suspended by spring isolators, and where indicated on drawings. Fabricate flexible piping connectors from stainless steel or other corrosion resistant materials as suitable for fluid. Flexible piping connectors shall be bellows, spherical or braided hose type as recommended by the manufacturer for the application.

Isolator Types:

1. Type WP (Waffle Pads): Provide 5/16 inch thick neoprene pads ribbed or waffled on both sides. Manufacture pads with bridge bearing quality neoprene and select for a maximum durometer of 50 and designed for 15 pounds per square inch pressure, with a load deflection characteristic of steel load-spreading plates where required between the equipment and the neoprene pad to provide selected deflection. If the isolator is bolted to the structure, install a neoprene mounting sleeve under the bolt head between the steel washer and the base plate to prevent metal to metal contact. Provide Mason Industries Type W or equal.
2. Type SPNH (Spring and Neoprene Hangers): Provide a steel hanger box containing a laterally stable, double-deflecting neoprene isolator in series with a steel spring. Design springs so the ratio of the horizontal to vertical spring constant is between one and two. The spring diameter shall be not less than 80 percent of the compressed height

Division 23: HEATING, VENTILATING, AND AIR CONDITIONING (CONTUNIED)

5. PIPING AND PIPING SPECIALTIES

A. REFRIGERANT PIPING AND INSULATION

Copper Tubing: ASTM B280, Type ACR, hard-drawn straight lengths, and soft-annealed coils, seamless copper tubing. Tubing shall be factory cleaned, ready for installation, and have ends capped to protect cleanliness of pipe interiors prior to shipping.

Bendable Copper Tubing: ASTM B280, ACR Type L with H55 temper, straight piping lengths as manufactured by Refekk. Bends shall be made by factory trained personnel using tools approved by the manufacturer. End connections shall be made using brazing rings composed of 15% silver, 5% phosphorous and remainder copper. Tubing shall be factory cleaned, ready for installation, and have ends capped to protect cleanliness of pipe interiors prior to shipping.

Refrigerant Line Kits: Soft-annealed copper tubing with pipe diameters as recommended by the manufacturer and of length as required for the installation. Tubing shall be factory or field insulated with flexible unicellular insulation with thickness as specified below.

Fittings: wrought-copper fittings: ANSI B16.22, streamlined pattern.

Press fit fittings as manufactured by Rapid Locking System (Zoomlock) are an acceptable option to solder or brazed fittings. Fittings shall be approved for use with the copper tubing in the system and be compatible with the refrigerant and oils used in the system. Fittings shall be rated for continuous operating temperature from -40 F to 250 F and maximum operating pressure of 700 psi. Installers shall be trained using manufacturers training tools prior to installing any joints. Prepare the tubing, install fittings to minimum depth and crimp the fitting in accordance with manufacturers instructions. Verify the joint is properly made using crimp gauges or manufacturer's approved verification methods.

Solder filler metals: ASTM B32, 95-5 Tin-Antimony.

Brazing filler metals:
1. AWS A5.8, Classification BAg-5: Silver (Ag) 44.0-46.0 percent, Zinc (Z) 23.0-27.0 percent, and Copper (Cu) 29.0-31.0 percent.
2. AWS A5.8, Classification BCuP-5: Phosphorus (P) 4.8-5.2 percent, Silver (Ag) 14.5-15.5 percent, and Copper (Cu) remainder.

Braze mechanical joints. Solder joints connecting to refrigerant valves and specialties. Continuously purge the pipe and fittings during brazing with an inert gas per manufacturer's recommendation (e.g., dry nitrogen) to prevent formation of scale. Maintain purge until the joint is cool to the touch. Provide temporary cap or cover on completed joints with open ends to prevent entry of contaminating materials.

Insulate refrigerant lines with flexible elastomeric insulation, Armeflex or equal. Insulate suction and liquid lines between the expansion valve, evaporator, and compressor with 1/2 inch thick insulation on pipes less than 1 inch in size and 1 inch thick for pipes 1 inch and larger. Insulate hot gas and liquid lines between the compressor condenser, and expansion valve with 1 inch thick insulation on pipes less than 1-1/2 inch and 1-1/2 inch thick for pipes 1-1/2 inch and larger. Piping insulation shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Coat insulation that is exposed to the elements with a protective sealer. Install and support piping to keep noise and vibration to a minimum. Support and secure piping to Unistrut type supports so that no vibration passes to the building structure. Pipe attachments shall be copper-plated or have nonmetallic coating for electrolytic protection where attachments are in direct contact with copper tubing. Install a support within one foot of each change of direction. Mount pipe hangers around the outside of the insulation with saddles to prevent hangers from rupturing the insulation. Replace insulation that is cut or broken by the hangers.

Run refrigerant lines parallel and perpendicular to wall and floor lines and to appear straight and in good order. Pitch suction lines down slightly (1 inch in 20 feet) towards the compressor. Provide oil traps at the base of vertical suction risers over 6 feet high. Install liquid line sight glasses in liquid lines nearest the expansion valve. Factory mount expansion valves with the sensing bulbs shipped loose. Field mount expansion valve bulb after refrigerant piping is complete (damage may occur if bulbs come in contact with heat).

For systems of 5 ton capacity and smaller, the contractor shall have the option to provide copper refrigerant tubing line set sized as recommended by equipment manufacturer and of length as required for the installation. Provide quick-connect flare tubing compression fittings, solder connections, or brazed connections as recommended by the manufacturer to match the connections of the condensing unit and evaporator coil.

B. SYSTEM EVACUATION AND CHARGING

Blow out refrigeration lines with dry nitrogen at a suitable pressure before making final connection at the condensing unit or coil to ensure against dirt, scale, or other foreign material being in the lines. Draw a vacuum to 29 inches of mercury. Break this vacuum by charging dry refrigerant gas into the system, raising the pressure to 0 PSIG. Repeat the latter two steps for a triple evacuation before the final evacuation is started. Make final evacuation by reducing the system absolute pressure to a maximum of 0.5 millimeters (500 microns) and allowing the pump to run at this pressure for a minimum of two hours.

Repeat the proper amount of refrigerant charge per the manufacturer's recommendations. Record the amount of refrigerant by weight charged into the system for each circuit recorded to the nearest 1/4 pound on tags and attach tags to the liquid line near the condensing unit. Refrigerant shall be supplied by the HVAC Contractor.

6. TEMPERATURE CONTROLS

A. GENERAL REQUIREMENTS

Provide a complete temperature control system including control panels, controllers, control power transformers, thermostats, sensors, time switches, override timers, actuators, relays, and wiring as required to control the systems as specified on the drawings.

Submit shop drawings of equipment provided for temperature control. Submit operation and maintenance data, including trouble-shooting maintenance guide, step-by-step procedures indexed for each controller and thermostat function, inspection period, cleaning methods and materials, and calibration tolerances.

Provide integrated wiring diagrams showing interconnections between field-installed equipment and package wiring furnished with the HVAC equipment. Control wiring shall be sized to accommodate the voltage drop associated with the distance between the control device and the controller.

Provide supervision and on-job checkout service as required to ensure that installation and operation of the temperature control system meets requirements of the drawings, specifications, and sequences of operation. The system shall be guaranteed for a period of one year following the acceptance of the system by the Architect/Engineer. Correct defects occurring during this period at no additional cost to the Owner.

Install control devices with top of device at 48 inches AFF to meet ADA requirements unless otherwise noted on the plans.

B. THERMOSTAT CONTROL EQUIPMENT

Provide thermostat control equipment with sufficient communication, programming, input and output connections, and modulating or staging capability to meet the sequence of operations. Provide thermostats with the features as indicated:
1. LCD or LED display screen.
2. Button or touchscreen interface.
3. Display temperature.
4. Display temperature setpoint.
5. Adjust temperature setpoint.
6. Limit temperature setpoint adjustment within plus or minus 3 degrees F.
7. Display operating mode.
8. Adjust operating mode.
9. Adjust schedule, minimum seven day occupied/unoccupied.
10. Security lockout.
11. Insulated backing for exterior wall mounting.
12. At contractor's option where multiple sensors are shown, the sensors may be provided with the thermostat in a single device.

Provide thermostat control equipment that shall interface with a BAS by Automated Logic, Delta Controls, Honeywell, Johnson Controls, KMC Controls, Schneider Electric, Siemens, or Trane with quality and features as indicated.

Provide programmable thermostats or controllers with wall module interfaces that shall control non-packaged equipment requiring customized controls per the sequence of operations by Automated Logic, Delta Controls, Honeywell, Johnson Controls, Schneider Electric, Siemens, or Trane with quality and features as indicated. Include additional controllers and sensors as required for economizer operation.

Provide programmable thermostats that shall control packaged equipment by the packaged equipment manufacturer or Honeywell, Johnson Controls, Trane, or equal.

Provide non-programmable thermostats for on/off operation by the equipment manufacturer or Honeywell, Johnson Controls, Trane, or equal.

Provide wall or duct-mounted humidistat as indicated on the drawings that is compatible with the thermostat.

Provide economizer controllers for equipment specified to include economizer in its sequence of operation but is not factory furnished with economizer controls included. Economizer controller shall be Honeywell YW7220 Jade Economizer module kit or equal. Economizer module kit shall include the economizer logic module, damper actuator, and sensors of type required to implement the type of economizer scheduled on the drawings.

C. SENSORS AND RELAYS

Manufacturers and model numbers are listed for reference as to quality and features required for the sensors and relays. Provide general-purpose type sensing elements for use in input and output sensors. Provide transmitters or transducers with sensor as required, compatible with the controllers used, with range suitable for the systems encountered. Transmitters and transducers shall have offset and span adjustments, temperature compensation, shock and vibration immunity, and zeroing capability. Accuracy requirements shall include the combined effects of linearity, hysteresis, repeatability, and the transmitter.

Provide sensors that meet the following minimum performance:
1. Dry-bulb temperature sensors at a minimum shall be accurate to +/- 2 degrees Fahrenheit over the range of 40 to 80 degrees Fahrenheit.
2. Wet-bulb temperature shall be calculated using dry-bulb temperature and humidity and shall be accurate to +/- 2 degrees Fahrenheit.
3. Enthalpy shall be calculated using dry-bulb temperature and humidity and shall be accurate to +/- 3 BTU/lb over the range of 20 to 36 BTU/lb.
4. Humidity sensors at a minimum shall be accurate within +/- 3 percent full range between 20 and 95 percent, with drift less than 1 percent full scale per year.
5. Pressure transmitters at a minimum shall be accurate to +/- 1 percent full scale with drift less than 1 percent full scale per year.
6. Carbon dioxide (CO_2) sensors shall measure total percentage of CO_2 in ppm. Sensor shall have an accuracy of plus/minus 75 ppm at a 600 and 1000 ppm concentration and certified by the manufacturer to require calibration no more frequently than once every 5 years.

Provide 24 Volt or 120 Volt timeswitches Intermatic Series FM1D20 or equal programmable type with 7-day programming with up to two "ons" and "offs" per day. Battery backup shall provide 48 hours of memory retention. Override timer switches shall be spring wound, 6-hour, normally open type. Coordinate 120 V wiring of timeswitch with electrical contractor if 120 V model is provided.

Provide relays with contact rating, configuration, and coil voltage that is suitable for the application. Relay shall be general purpose, enclosed plug-in type and protected by a heat and shock resistant duct cover. Number of contacts and operational function shall be as required. Transient suppression shall be provided as an integral part of the relay. Contactors shall be single coil, electrically operated, mechanically held, double-break, silver-to-silver type protected by arcing contacts. Positive locking shall be obtained without the use of hooks, latches, or semi-permanent magnets. Operating and release times shall be 100 milliseconds or less.

D. WIRING

Provide electrical and control wiring as specified under the section "Electrical Wiring."

7. SEQUENCE OF OPERATION

A. ROOFTOP UNIT CONTROL

Reference the Rooftop Unit Control Matrix for sequence of operations.

B. EXHAUST FAN CONTROL

Interlock fan operation with the wall switch.

C. COMPUTER ROOM AIR CONDITIONING UNIT CONTROL

Operate computer *room* air conditiong unit supply fan continuously. Cycle stages(s) of DX cooling and electric heating coil to maintain thermostat set point (73 degrees Fahrenheit cooling, 68 degrees Fahrenheit heating). Cycle humidifier operation to maintain humidification set point (60% RH).

Auto-changeover panel shall dictate unit operation, operating in lead-lag configuration.

8. ALTERNATES

A. DESCRIPTION

Refer to the architectural portion of the specification for list of alternates. Applicable sections of the base specifications shall apply to all work required by the alternate unless otherwise specified. Determine whether or not and how each alternate affects work. Include labor, materials, equipment, and transportation services necessary for and incidental to the completion of work under each particular alternate. Furnish separate bid for each alternate applicable to work, stating the amount to be added or deducted from the base bid.

END OF SECTION 23

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

MECHANICAL SPECIFICATIONS

SHEET NUMBER

M4.02

BRADLEY E. CHAMBON

PLUMBING SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V2.02

STANDARD MOUNTING HEIGHTS

CLINIC SERVICE SINKS (RIM)	30"
HOSE BIBB (CENTERLINE)	36"
ICE MAKER OUTLET BOX (CENTER OF BOX)	24"
JANITOR'S SINK FAUCET FITTINGS (CENTERLINE)	42"
LAVATORY OR SINK	
STANDARD HEIGHT (RIM)	31"
ADA ACCESSIBLE (RIM)	34"
CHILD HEIGHT (RIM)	24"
NON FREEZE WALL HYDRANT (AFG TO CENTERLINE)	18"
SHOWER HEAD	
MEN (CENTERLINE)	78"
WOMEN (CENTERLINE)	72"
SHOWER VALVE	
STANDARD HEIGHT - MEN (CENTERLINE)	48"
STANDARD HEIGHT - WOMEN (CENTERLINE)	42"
ADA ACCESSIBLE (CENTERLINE)	38" TO 48"
SURGEON'S SCRUB-UP SINK (FRONT RIM)	35"
TUB VALVE	
STANDARD HEIGHT (CENTERLINE)	32"
ADA ACCESSIBLE	CENTER BETWEEN GRAB BAR AND TUB RIM
URINAL	
STANDARD HEIGHT (RIM)	24"
ADA ACCESSIBLE (RIM)	17"
CHILD HEIGHT (RIM)	14"
WASHING MACHINE OUTLET BOX (RIM)	42"
WATER CLOSET	
STANDARD HEIGHT (RIM)	15"
ADA ACCESSIBLE (TOP OF SEAT)	17" TO 19"
CHILD HEIGHT (RIM)	10"
WATER COOLER OR DRINKING FOUNTAIN	
STANDARD HEIGHT (SPOUT)	41"
ADA ACCESSIBLE (SPOUT)	36"
CHILD HEIGHT (SPOUT)	30"

INSTALL PLUMBING FIXTURES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE ARCHITECTURAL DRAWINGS OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS. FINAL APPROVAL OF LOCATIONS BY ARCHITECT. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ANNOTATION

- (1) PLUMBING PLAN NOTE CALLOUT
- (1) PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES
- 1 EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CU 1 MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / P1 DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 / P1 SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

ABBREVIATIONS

ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BAS	BUILDING AUTOMATION SYSTEM
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BTU	BRITISH THERMAL UNIT
CP	CONDENSATE PUMP
CPVC	CHLORINATED POLYVINYL CHLORIDE
CU	COPPER
DI	DUCTILE IRON
DN	DOWN
DFU	DRAINAGE FIXTURE UNIT
DS	DOWNSPOUT
(E)	EXISTING
EMS	ENERGY MANAGEMENT SYSTEM
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
FD	FLOOR DRAIN
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FF	FINISHED FLOOR
FL	FLOW LINE
FLA	FULL LOAD AMPS
FLR	FLOOR
GPM	GALLONS PER MINUTE
HD	HEAD, HUB DRAIN
HZ	HERTZ
IE	INVERT ELEVATION
IN WC	INCHES OF WATER COLUMN
JB	JUNCTION BOX
J-BOX	JUNCTION BOX
KW	KILOWATT
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MH	MANHOLE
MIN	MINIMUM
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
NIC	NOT IN CONTRACT
ORD	OVERFLOW ROOF DRAIN
PDI	PLUMBING DRAINAGE INSTITUTE
PH/Ø	PHASE
PRV	PRESSURE REDUCING VALVE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SF	SQUARE FEET
SP	SUMP
SS	STAINLESS STEEL SANITARY SEWER, SOIL STACK
TDH	TOTAL DYNAMIC HEAD
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES, INC.
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
VCP	VITRIFIED CLAY PIPE
VFD	VARIABLE FREQUENCY DRIVE
VS	VENT STACK
VTR	VENT THROUGH ROOF
W/	WITH
W/O	WITHOUT
WC	WATER COLUMN
WS	WASTE STACK
WSFU	WATER SUPPLY FIXTURE UNIT
WVS	WASTE VENT STACK

PIPING SYMBOLS

- OXYGEN OUTLET
- NITROUS OXIDE OUTLET
- MEDICAL AIR OUTLET
- NITROGEN OUTLET
- MEDICAL VACUUM INLET
- FLOOR SINK (FS), SIZE & TYPE
- FLOOR DRAIN (FD), SIZE & TYPE
- ROOF DRAIN (RD), SIZE & TYPE
- BALL VALVE
- CONTROL VALVE
- SHUTOFF VALVE
- CHECK VALVE
- BALANCING VALVE WITH PRESSURE PORTS
- WATER METER
- STRAINER
- STRAINER WITH BLOWOFF
- RELIEF/SAFETY VALVE
- SOLENOID VALVE
- PRESSURE REDUCING VALVE
- GAS PRESSURE REGULATOR
- THERMOSTATIC MIXING VALVE
- PA PIPE ANCHOR
- EXPANSION JOINT
- BACKFLOW PREVENTER
- PRESSURE GAUGE
- THERMOMETER
- UNION
- FLANGE CONNECTION
- HOSE BIBB (HB)
- NON-FREEZING WALL HYDRANT (NW)
- MANUAL / AUTOMATIC AIR VENT OR VACUUM RELIEF VALVE
- PRESSURE / VACUUM SWITCH
- CLEANOUT
- CAP
- WALL CLEANOUT (WCO)
- FLOOR CLEANOUT (FCO)
- EXTERIOR CLEANOUT (ECO)
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- ELBOW UP WITH SHUT-OFF VALVE (SOV)
- ELBOW DOWN WITH SHUT-OFF VALVE (SOV)
- TEE UP WITH SHUT-OFF VALVE (SOV)
- TEE DOWN WITH SHUT OFF VALVE (SOV)
- "A" WATER HAMMER ARRESTER (WHA) WITH PDI SIZES, (A, B, C, D, & E)
- RECIRCULATION PUMP
- P-TRAP
- GAS COCK
- TRAP PRIMER
- TRAP PRIMER WITH DISTRIBUTION UNIT

PIPING LINETYPES

- CW DOMESTIC COLD WATER (CW)
- SCW SOFTENED COLD WATER (SCW)
- HW DOMESTIC HOT WATER (HW)
- HWR DOMESTIC HOT WATER RECIRC. (HWR)
- 140° DOMESTIC HOT WATER (140°)
- T TRAP PRIMER LINE (T)
- S SOIL PIPING - ABOVE FLOOR (S)
- S SOIL PIPING - BELOW FLOOR (S)
- W WASTE PIPING - ABOVE FLOOR (W)
- W WASTE PIPING - BELOW FLOOR (W)
- GW GREASE WASTE - ABOVE FLOOR (GW)
- GW GREASE WASTE - BELOW FLOOR (GW)
- CGWV COMBINATION GREASE WASTE AND VENT (CGWV)
- CWV COMBINATION WASTE AND VENT (CWV)
- ST STORM DRAIN - ABOVE FLOOR (ST)
- ST STORM DRAIN - BELOW FLOOR (ST)
- OST OVERFLOW STORM DRAIN - ABOVE FLOOR (OST)
- VBG VENT BELOW GRADE (VBG)
- VBF VENT BELOW FLOOR (VBF)
- ID INDIRECT DRAIN (ID)
- CDH CONDENSATE DRAIN - HIGH EFFICIENCY RTU (CDH)
- CD CONDENSATE DRAIN (CD)
- ACD AUXILIARY CONDENSATE DRAIN (ACD)
- SPD SUMP OR SEWAGE PUMP DISCHARGE (SPD)
- G NATURAL GAS (G)
- G NATURAL GAS ON ROOF (G)
- MPG MEDIUM PRESSURE NATURAL GAS (MPG)
- MPG MEDIUM PRESSURE NATURAL GAS ON ROOF (MPG)
- NPW NON-POTABLE WATER (NPW)
- LPG LIQUEFIED PETROLEUM GAS (LPG)
- WS WATER SERVICE (WS)
- DFP FIRE PROTECTION SPRINKLER DRY (DFP)
- FP FIRE PROTECTION SPRINKLER WET (FP)
- DSP FIRE PROTECTION STANDPIPE DRY (DSP)
- WSP FIRE PROTECTION STANDPIPE WET (WSP)
- PD CONDENSATE PUMP DISCHARGE (PD)
- V VENT PIPING (V)
- AW ACID WASTE - ABOVE FLOOR (AW)
- AW ACID WASTE - BELOW FLOOR (AW)
- AV ACID VENT (AV)
- GWS GRAY WATER (GWS)
- CA COMPRESSED AIR (CA)
- MA MEDICAL AIR (MA)
- MV MEDICAL VACUUM (VE)
- HE HELIUM (HE)
- IA INSTRUMENT AIR (IA)
- IV INSTRUMENT VACUUM (IV)
- N2 NITROGEN (N2)
- N2O NITROUS OXIDE (N20)
- O2 OXYGEN (O2)
- EV EVAC/WAGD (EV)
- CO2 CARBON DIOXIDE (CO2)
- AI MEDICAL AIR INTAKE (AI)
- VE MEDICAL VACUUM EXHAUST (VE)
- DA DENTAL AIR (DA)
- DV DENTAL VACUUM (DV)
- FW1 FILTERED WATER (FW1)
- FW2 FILTERED WATER W/ SCALE INHIBITOR (FW2)
- RO REVERSE OSMOSIS (RO)
- ROR REVERSE OSMOSIS REMINERALIZATION (ROR)

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	NEW
DEMOLISH	FUTURE

CALL OUTS

- ENLARGED PLAN CALLOUT
- NOT IN SCOPE

GENERAL NOTES:

1. PROVIDE A CONSTRUCTION RECORD SET OF "AS-BUILT" DOCUMENTS TO THE ARCHITECT REFLECTING ANY VARIANCES OF INSTALLED PIPING LOCATIONS OR EQUIPMENT CONTRARY TO THE CONSTRUCTION DOCUMENTS. REFER TO SPECIFICATIONS.
2. DRAWINGS ARE DIAGRAMMATIC ONLY AND REPRESENT THE GENERAL SCOPE OF THE WORK. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY THE ARCHITECT OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
3. PROVIDE TO THE ARCHITECT A COPY OF INSPECTION REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS, REFER TO SPECIFICATIONS.
4. INSTALLATION SHALL COMPLY WITH LEGALLY CONSTITUTED CODES AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
5. PLANS AND SPECIFICATIONS GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
6. VERIFY LOCATION AND DEPTH OF UTILITIES AT POINTS OF CONNECTION BEFORE START OF PIPING INSTALLATION.
7. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
8. DO NOT SCALE FLOOR PLANS FOR EXACT HORIZONTAL LOCATION OF PIPE ROUTING.
9. INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE.
10. VALVES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
11. INSTALL EXPOSED PIPING, WHERE NECESSARY, IN FINISHED AREAS TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE. INSTALL PIPING PARALLEL AND / OR PERPENDICULAR TO WALLS.
12. INSTALL VALVES AND APPURTENANCES A MAXIMUM OF 24" ABOVE CEILING IN ACCESSIBLE LOCATION WITHIN 24" OF ACCESS DOORS OR ACCESSIBLE CEILING TILES. PROVIDE PIPE AND FITTINGS TO INSTALL VALVES AND APPURTENANCES AT REQUIRED HEIGHT AND WITHIN 24" OF ACCESS DOORS OR ACCESSIBLE CEILING TILES.
13. INSTALL NO PLASTIC PIPE IN THE CEILING RETURN AIR PLENUM.
14. COORDINATE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
15. COORDINATE PIPING INSTALLATION WITH STRUCTURAL GRADE BEAMS, FOOTINGS, COLUMN PIERS, ETC. SLEEVE PIPING THROUGH GRADE BEAMS, FOOTING, ETC. WHERE REQUIRED AND AS NOTED ON PLANS. COORDINATE SLEEVE INSTALLATIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR AND GENERAL CONTRACTOR BEFORE CONCRETE IS INSTALLED.
16. CLEAN FAUCET AERATORS AND PIPE STRAINERS PRIOR TO TURNING BUILDING OVER TO THE OWNER.
17. PROVIDE TRAP PRIMERS WHERE REQUIRED BY LOCAL AUTHORITIES.
18. COORDINATE PIPE ROUTING AWAY FROM ELECTRICAL PANELS. DO NOT INSTALL PIPING OVER ELECTRICAL PANELS.
19. PAINT ALL EXPOSED GAS AND WATER PIPING USING RUST INHIBITOR PAINT. PAINT AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT AND / OR OWNER.
20. COORDINATE ALL ROOF PENETRATIONS WITH OTHER TRADES. MAINTAIN 10' MINIMUM CLEARANCE FROM ALL AIR INTAKES. MAINTAIN 2' CLEARANCE FROM ALL OTHER EQUIPMENT.
21. INSULATE PIPING ROUTED IN EXTERIOR BUILDING WALLS WITH MINIMUM 2" BATT INSULATION TO PREVENT FREEZING.
22. PROVIDE "HEAVY-DUTY" NO-HUB COUPLINGS ON STORM PIPING. INCLUDING CONNECTIONS TO ROOF DRAINS AND SANITARY PIPING 3" AND LARGER. SEE DIVISION 22 SPECIFICATIONS FOR MORE INFORMATION.
23. PROVIDE "HEAVY-DUTY" NO-HUB COUPLINGS ON SANITARY PIPING 3" AND LARGER. SEE DIVISION 22 SPECIFICATIONS FOR MORE INFORMATION.
24. PROVIDE TRANSITION ADAPTER COUPLINGS FOR CONNECTION OF PVC DWV TO CAST IRON AT SLAB ON GRADE. SEE DIVISION 22 SPECIFICATION FOR MORE INFORMATION.
25. FLOW CONTROL VALVES SHALL BE SIZE 1/2" AND SET AT 0.5 GPM UNLESS NOTED OTHERWISE.
26. WATER HAMMER ARRESTORS SHALL BE SIZE "A" UNLESS NOTED OTHERWISE.
27. PROVIDE VERTICAL LIFT SPRING LOADED CHECK VALVES IN HOT AND COLD WATER SUPPLIES FOR MOP SINK FAUCETS DOWNSTREAM OF SHUTOFF VALVES.
28. PROVIDE SIZE AND LENGTH OF HOT WATER FIXTURE SUPPLY PIPE FROM CIRCULATED HOT WATER BRANCH OR MAIN TO TERMINATION OF HOT WATER FIXTURE SUPPLY PIPE AT EACH FIXTURE PER 2015 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C404.3.1: FOR ½" HOT WATER FIXTURE SUPPLY PIPE SIZE TO INDIVIDUAL LAVATORIES, PROVIDE MAXIMUM LENGTH OF TWO FEET. FOR ½" HOT WATER FIXTURE SUPPLY PIPE SIZE TO INDIVIDUAL SINKS, PROVIDE MAXIMUM LENGTH OF 43 FEET. FOR 3/4" HOT WATER FIXTURE SUPPLY PIPE SIZE TO INDIVIDUAL SINKS, PROVIDE MAXIMUM LENGTH OF 21 FEET.

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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EXPIRES 12/31/2021

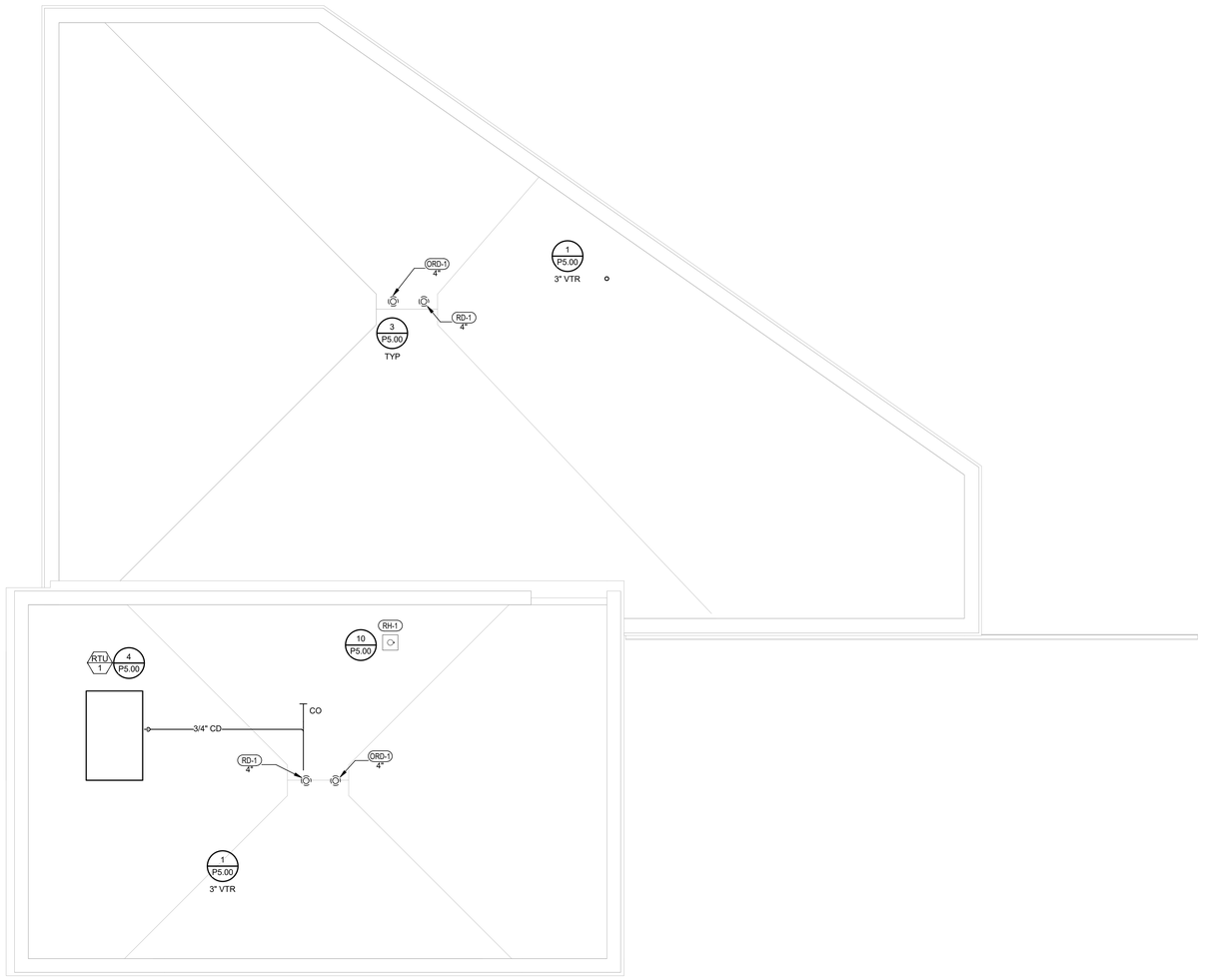
SHEET TITLE

PLUMBING GENERAL NOTES AND LEGEND

SHEET NUMBER

P0.00

BRADLEY E. CHAMBON



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

NORTH

BRADLEY E. CHAMBON

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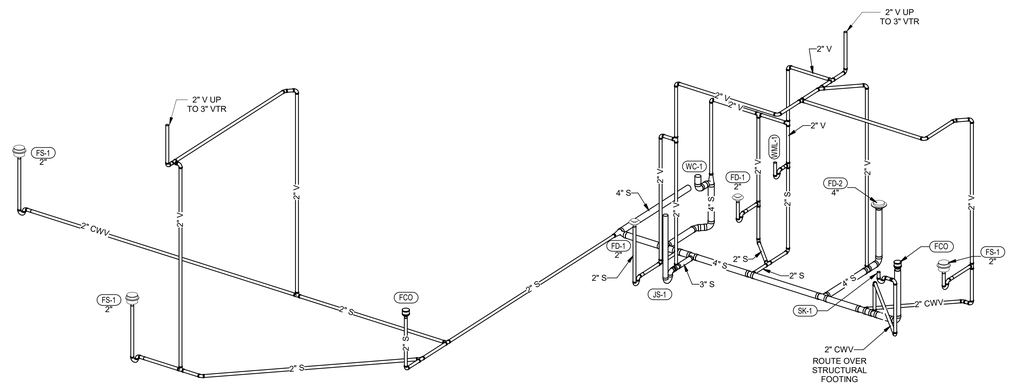
PLUMBING ROOF PLAN

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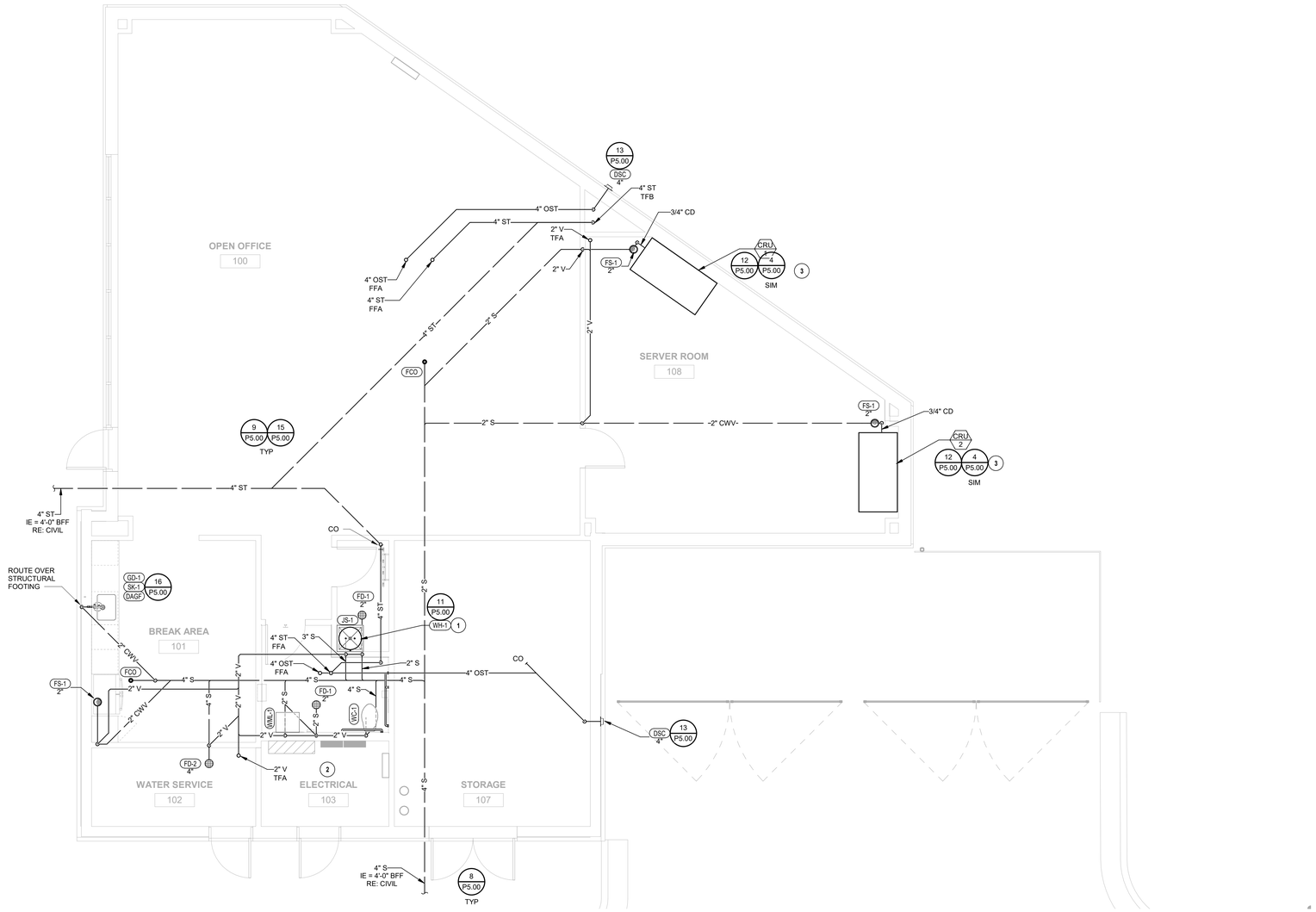
P1.01

PLUMBING PLAN NOTES:

1 DISCHARGE T&P RELIEF OVER MOP SINK WITH AHJ APPROVED AIR GAP.
2 DO NOT INSTALL PLUMBING PIPING OVER ELECTRICAL PANELS OR EQUIPMENT.
3 ROUTE 3/4" CD LINE FROM UNIT OUTLET TO NEARBY WALL, DROP TO 6" AFF, TURN AND RUN TO FLOOR SINK WITH AIR GAP. SECURE TO WALL AS REQUIRED. UNIT INTERNALLY TRAPPED, DO NOT TRAP CONDENSATE DISCHARGE LINE.



2 Plumbing Waste & Vent Riser Diagram



1 PLUMBING WASTE & VENT FIRST FLOOR PLAN
1/4" = 1'-0"

NORTH

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PLUMBING WASTE & VENT FIRST FLOOR PLAN

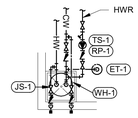
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P2.01

BRADLEY E. CHAMBON

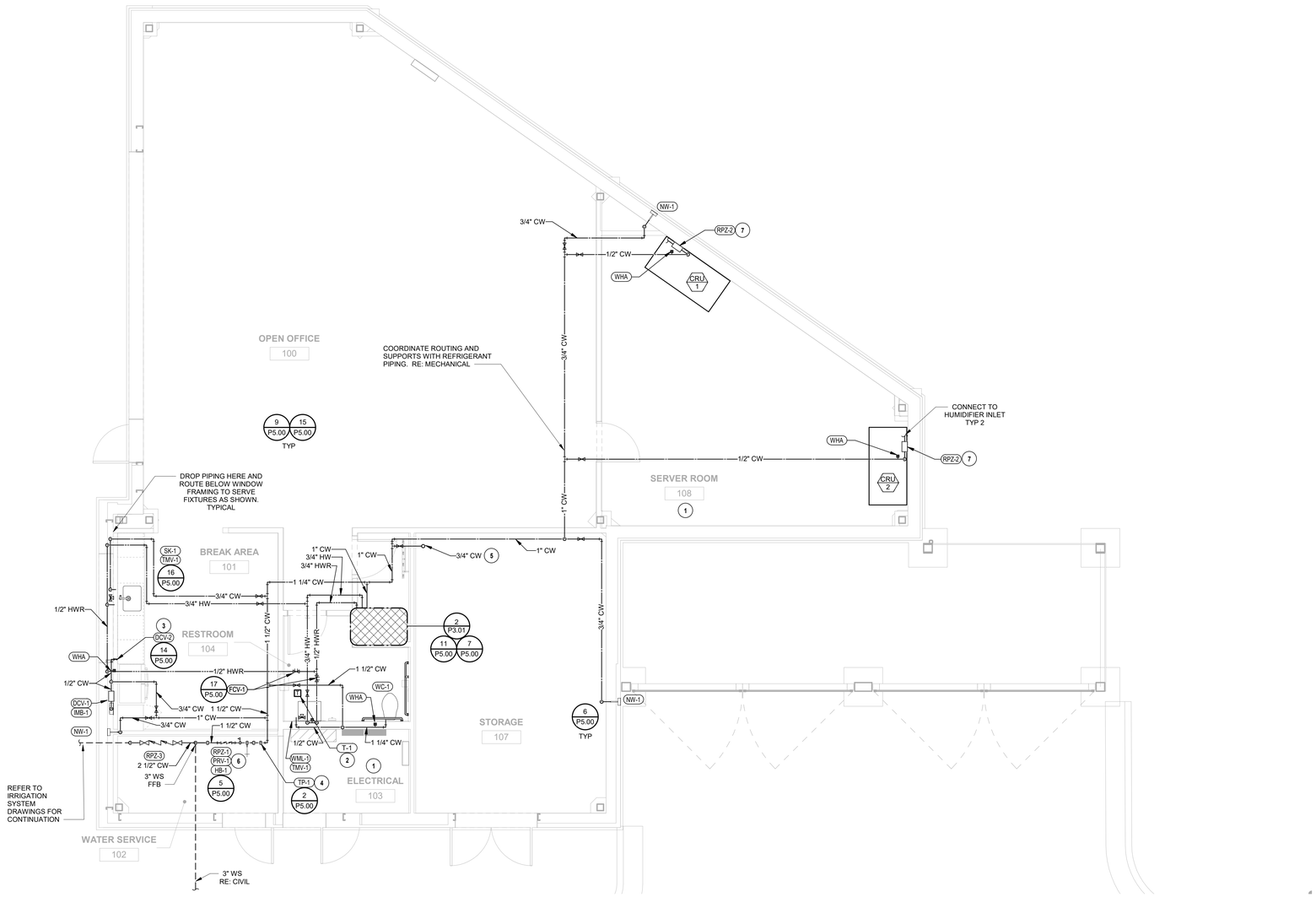
PLUMBING PLAN NOTES:

1. DO NOT INSTALL PLUMBING PIPING OVER ELECTRICAL PANELS OR EQUIPMENT.
2. FURNISH TRANSFORMER "T-1" TO ELECTRICAL FOR INSTALLATION ABOVE CEILING IN ACCESSIBLE LOCATION FOR CONTROL OF WATER CLOSET FLUSH VALVES, AND URINAL FLUSH VALVES FOR THIS ROOM. PROVIDE LOW VOLTAGE WIRING AS REQUIRED.
3. PROVIDE FOR FUTURE BEVERAGE CONNECTION. ROUTE DISCHARGE THRU WALL TO NEARBY FLOOR SINK.
4. CONNECT TRAP PRIMER TO FD-2. REFER TO 1/P2.01 FOR DRAIN LOCATION.
5. ROUTE CW UP TO ROOF HYDRANT.
6. ONCE WATER SERVICE MAINS ARE INSTALLED AND PRESSURES AT BUILDING TAP ARE KNOWN, CONTACT EOR OUTLET AND FALLOFF PRESSURES THROUGH PRV.
7. AIR GAP FITTING WITH INDIRECT DRAIN TO FLOOR SINK ONE PIPE SIZE LARGER THAN BACKFLOW PREVENTER DRAIN OUTLET.



2 WATER HEATER OVER JANITOR'S SINK PLAN
NTS

BASIS OF DESIGN FOR THE DOMESTIC WATER DISTRIBUTION, SIZING, AND PLUMBING FIXTURE SELECTION AS SHOWN IN THESE DOCUMENTS ARE BASED UPON A MINIMUM AVAILABLE WATER SERVICE PRESSURE OF 99 PSI AT THE POINT OF CONNECTION TO THE UTILITY WATER SERVICE PIPING. SHOULD AVAILABLE DOMESTIC WATER PRESSURE BE LESS THAN 99, AT MINIMUM 146 GPM, THEN CONTRACTOR SHALL INFORM ARCHITECT AND ENGINEER FOR ADDITIONAL REVIEW AND DETERMINATION IF A BOOSTER PUMP IS REQUIRED.



1 PLUMBING WATER & GAS FIRST FLOOR PLAN
1/4" = 1'-0"

NORTH

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.:	19050.02
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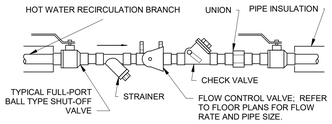
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PLUMBING WATER & GAS FIRST FLOOR PLAN

SHEET NUMBER

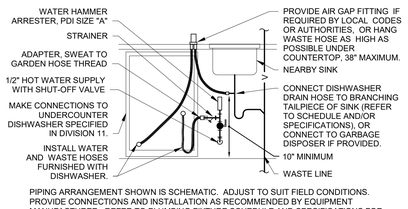
P3.01

BRADLEY E. CHAMBON



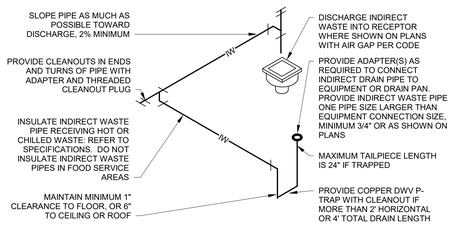
REFER TO SPECIFICATIONS, SCHEDULES, AND NOTES FOR MORE INFORMATION. MAKE CONNECTIONS AND PROVIDE INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS. ARRANGEMENT SHOWN IS SCHEMATIC: PROVIDE REDUCERS AND ADAPTERS AS REQUIRED.

17 FLOW CONTROL VALVE
NTS



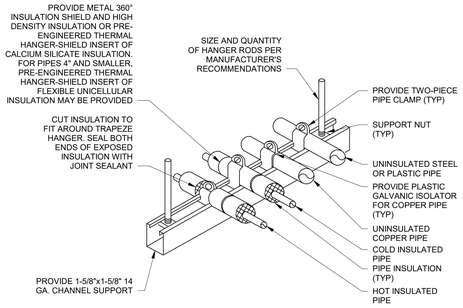
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS AND INSTALLATION AS RECOMMENDED BY EQUIPMENT MANUFACTURER. REFER TO PLUMBING FIXTURE SCHEDULE AND SPECIFICATIONS FOR ACCESSORIES SHOWN. IF SINK IS ADA, DO NOT ENCROACH ON ACCESSIBILITY ZONE.

16 RESIDENTIAL DISHWASHER CONNECTION
NTS



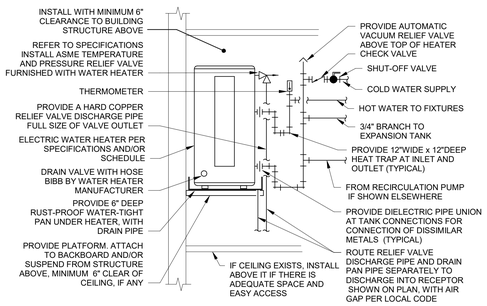
ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS, AND INSTALLATION OF HANGERS AND SUPPORTS. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. DO NOT COMBINE INDIRECT DRAIN PIPES WITH CONDENSATE DRAIN PIPES. DO NOT PROVIDE TRAP OR VENT ON INDIRECT DRAINS RECEIVING DISCHARGE UNDER PRESSURE.

FOOD SERVICE EQUIPMENT INDIRECT WASTE: INSTALL SEPARATE INDIRECT WASTE FROM DIFFERENT EQUIPMENT - DO NOT COMBINE. SECURELY ATTACH INDIRECT DRAINS TO THEIR EQUIPMENT WITH BRACKETS OR SPLIT RING PIPE CLAMPS - REFER TO SPECIFICATIONS. LOOSE, DANGLING, OR PIPES ON THE FLOOR SHALL NOT BE ACCEPTED. INSTALL INDIRECT DRAINS HIGH AS POSSIBLE TO FACILITATE CLEANING UNDER KITCHEN EQUIPMENT.



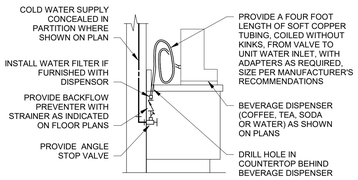
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITONS. REFER TO SPECIFICATIONS FOR MORE INFORMATION. PIPE AND CONDUIT OF ALL TRADES MAY BE COMBINED ON THE SAME SUPPORT CHANNEL. COORDINATE SUPPORT CHANNEL LENGTH WITH PIPING AND CONDUIT TO BE SUPPORTED. SUPPORT CHANNEL SPACING SHALL BE DETERMINED BY SMALLEST PIPE TO BE SUPPORTED. CHANNEL SUPPORT MAY BE USED AS A WALL BRACKET, ATTACH TO WALL WITH ANCHOR BOLTS PER SPECIFICATIONS. FOR HORIZONTAL INSULATED PIPING, ATTACH CLAMPS AS INDICATED ABOVE, FOR VERTICAL INSULATED PIPING, ATTACH CLAMPS TO THE PIPE AND SEAL INSULATION AT BOTH CLAMP ENDS.

15 TRAPEZE PIPE HANGER
NTS



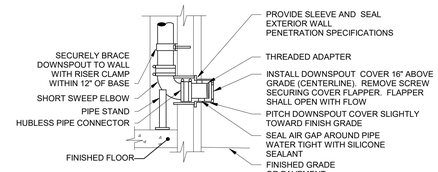
REFER TO SPECIFICATIONS, SCHEDULES AND NOTES FOR MORE INFORMATION. PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. VERIFY CONNECTION SIZES AND LOCATIONS PER MANUFACTURER'S REQUIREMENTS. REFER TO FLOOR PLANS FOR PIPE SIZES. PROVIDE SEISMIC STRAP OR BRACING IF/AS REQUIRED BY LOCAL AUTHORITIES AND/OR SEPARATE DETAIL. INSTALL WITH BOTTOM MINIMUM 6"-8" ABOVE FLOOR IF ABOVE JANITOR'S SINK; OTHERWISE HIGH AS POSSIBLE. PLATFORM SHALL BE PLYWOOD ON UNISTRUT FRAME BRACKETED AND ANCHORED TO WALL, AND/OR SUSPENDED FROM STRUCTURE ABOVE WITH THREADED ROD. POWER WIRING AND DISCONNECT SWITCH ARE SPECIFIED BY ELECTRICAL. INTERLOCK OF AQUASTAT WITH RECIRCULATION PUMP IS SPECIFIED BY ELECTRICAL IF REQUIRED.

14 BEVERAGE DISPENSER CONNECTION
NTS



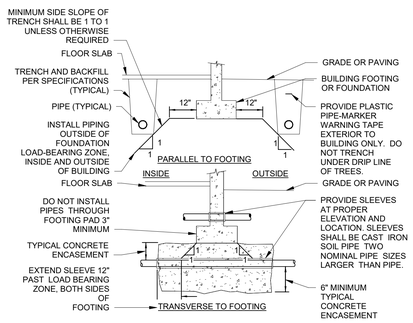
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS AND EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. AIR GAP ON INTERNAL WATER FILL DEVICE PROVIDES BACKFLOW PREVENTION. VERIFY IF LOCAL AUTHORITIES REQUIRE SUPPLEMENTAL PROTECTION.

13 DOWNSPOUT COVER
NTS



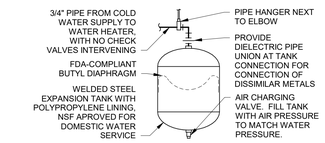
ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. RE: SPECIFICATIONS FOR DOWNSPOUT COVER, AND TYPE OF PIPE, FITTINGS, AND CONNECTORS.

12 INDIRECT WASTE INSTALLATION - IPC
NTS



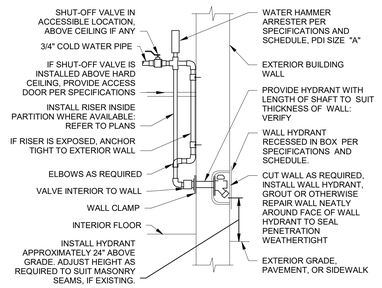
VERIFY EXCAVATION CONDITIONS (SOIL/ROCK) WITH GEOTECHNICAL REPORT AND/OR SITE INVESTIGATIONS. REFER TO SPECIFICATIONS FOR OTHER CONDITIONS. DO NOT INSTALL PIPES UNDER INTERIOR BUILDING SPREAD FOOTINGS OR PILE CAPS. COORDINATE WITH AFFECTED CONTRACTORS PRIOR TO THE START OF WORK.

11 ELECTRIC WATER HEATER OVERHEAD
NTS



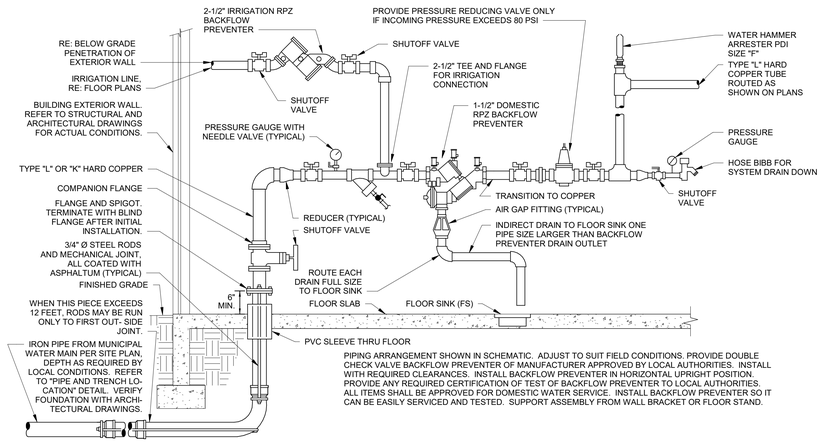
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION PROCEDURE. VERIFY PROPER OPERATION WHEN INSTALLED. PROVIDE SEISMIC STRAP OR BRACING WHEN REQUIRED BY LOCAL AUTHORITIES.

10 SANITARY ROOF HYDRANT
NTS



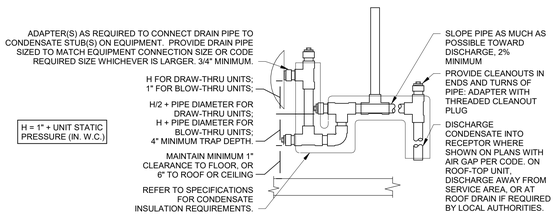
ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST AS REQUIRED TO SUIT FIELD CONDITIONS. INSTALL PER MANUFACTURER'S INSTRUCTIONS. IN NON-FREEZING CLIMATES, PIPE MAY BE INSTALLED CONCEALED IN EXTERIOR WALL RATHER THAN EXTERIOR TO WALL AS SHOWN. REFER TO PLANS FOR LOCATION.

9 PIPE HANGER DETAIL
NTS



PIPING ARRANGEMENT SHOWN IN SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE DOUBLE CHECK VALVE BACKFLOW PREVENTER OF MANUFACTURER APPROVED BY LOCAL AUTHORITIES. INSTALL WITH REQUIRED CLEARANCES. INSTALL BACKFLOW PREVENTER IN HORIZONTAL UPRIGHT POSITION. PROVIDE ANY REQUIRED CERTIFICATION OF TEST OF BACKFLOW PREVENTER TO LOCAL AUTHORITIES. ALL ITEMS SHALL BE APPROVED FOR DOMESTIC WATER SERVICE. INSTALL BACKFLOW PREVENTER SO IT CAN BE EASILY SERVICED AND TESTED. SUPPORT ASSEMBLY FROM WALL BRACKET OR FLOOR STAND.

8 PIPE AND TRENCH LOCATION
NTS

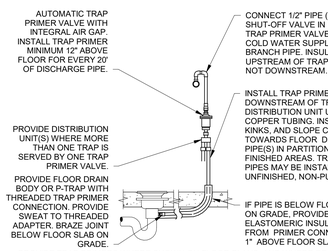


ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS AND INSTALLATION. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. AT MOTORIZED EQUIPMENT ABOVE CEILING, PROVIDE NEOPRENE TUBE AND STAINLESS STEEL SCREW CLAMPS FOR FLEXIBLE CONNECTION. FOR PIPE SIZE(S) REFER TO FLOOR PLANS, OR CODE REQUIREMENTS FOR HVAC UNIT TONNAGE. PROVIDE HANGERS OR SUPPORTS PER SPECIFICATIONS. DO NOT COMBINE CONDENSATE DRAIN PIPES WITH NON-CONDENSATE INDIRECT DRAINS.

7 SMALL EXPANSION TANK
NTS

6 WALL HYDRANT INSTALLATION
NTS

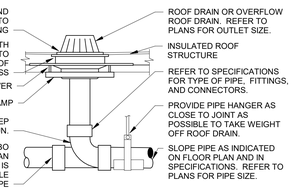
5 DOMESTIC WATER SERVICE ENTRY
NTS



PIPING ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS. RE: FLOOR PLANS FOR LOCATION.

REFER TO SPECIFICATIONS FOR INSULATION TYPES, INSULATION THICKNESSES, HANGER TYPES, HANGER ROD CONNECTIONS TO STRUCTURE AND HANGER SPACING.

4 CONDENSATE DRAIN INSTALLATION
NTS



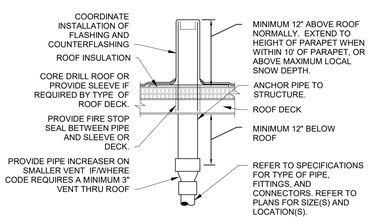
UNDERDECK CLAMP AND SUMP RECEIVER ARE NOT REQUIRED WHEN ROOF DRAIN BODY IS CAST INTO CONCRETE ROOF. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. INSULATE ROOF DRAIN SUMP AND PIPE PER SPECIFICATIONS. LOCATE DRAINS WHERE SHOWN ON ARCHITECTURAL PLANS. VERIFY WITH STRUCTURAL PLANS FOR ROOF LOW POINTS. COORDINATE WITH STRUCTURAL DRAWINGS REGARDING PROVISION FOR SUPPLEMENTARY STEEL FRAMING AROUND ROOF OPENING. COORDINATE ROOF DRAIN INSTALLATION WITH ARCHITECTURAL DETAILS AND ROOFING INSTALLATION. SET OVERFLOW DRAIN WEIR ELEVATION 2" ABOVE PRIMARY ROOF DRAIN WEIR ELEVATION.

3 ROOF DRAIN INSTALLATION
NTS

2 TRAP PRIMER IN/ON WALL
NTS

PROVIDE TRAP PRIMERS WHERE SHOWN ON FLOOR PLANS, AND WHERE REQUIRED BY LOCAL AUTHORITIES. PIPING ARRANGEMENT SHOWN IS SCHEMATIC; ADJUST TO SUIT FIELD CONDITIONS. REFER TO SPECIFICATIONS AND PLUMBING FIXTURE SCHEDULE FOR MORE INFORMATION. INSTALL TRAP PRIMER VALVE AND DISTRIBUTION UNIT PER MANUFACTURER'S RECOMMENDATIONS.

1 VENT THRU ROOF
NTS



LOCATE VTR MINIMUM THREE FEET FROM PROPERTY LINE, TEN FEET HORIZONTAL OR THREE FEET VERTICAL ABOVE ANY BUILDING OPENING OR FRESH AIR INTAKE, TWENTY FIVE FEET FROM ANY OPENING OR FRESH AIR INTAKE IN MEDICAL FACILITIES AND ONE FOOT FROM ANY VERTICAL SURFACE. REFER TO LOCAL CODES FOR OTHER VENT TERMINATION REQUIREMENTS. LOCATE VTR MINIMUM 18" FROM ADJACENT WALL, PARAPET, EXPANSION JOINT, ROOF DRAIN, EQUIPMENT CURB, OR OTHER ROOF FEATURE. OFFSET IN CEILING SPACE WHERE REQUIRED TO MEET THESE CONDITIONS. INSULATE LAST SIX FEET OF VENT PIPE INSIDE BUILDING PER SPECIFICATIONS.

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM

1850004412

EXPIRES 12/31/2021

SHEET TITLE

PLUMBING DETAILS

SHEET NUMBER

P5.00

BRADLEY E. CHAMBON

FIXTURE BRANCH CONNECTION SCHEDULE

FIXTURE	COLD WATER	HOT WATER	WASTE	VENT
DRINKING FOUNTAIN	1/2"		2"	2"
FLOOR DRAIN			2"	2"
JANITOR'S SINK	1/2"	1/2"	3"	2"
LAVATORY/HAND SINK	1/2"	1/2"	2"	2"
SINK	1/2"	1/2"	2"	2"
WATER CLOSET (FLUSH VALVE)	1 1/4"		4"	2"

NOTE: PIPE SIZES SHOWN ARE MINIMUM.

PLUMBING EXPANSION TANK SCHEDULE

MARK	MANUFACTURER	MODEL	TANK SIZE (GALLONS)	MIN. ACCEPTANCE VOLUME (GALLONS)	SERVICE	WEIGHT	NOTES
ET-1	AMTROL	ST-5	2	0.9	WH-1	22 lb	A

NOTES:

A. CHARGE TANK WITH AIR TO IDENTICAL PRESSURE AS STATIC DOMESTIC WATER PRESSURE.

RECIRCULATION PUMP SCHEDULE

MARK	MANUFACTURER	MODEL	LOCATION	GPM	HEAD (FT.)	CONNECTION SIZE	ELECTRICAL DATA VOLTS	PH	HP	NOTES
RP-1	BELL & GOSSETT	NBF-9U	WH-1	1	7	3/4"	120	1	1/18	A, B, C, D

NOTES:

A. ALL LEAD FREE CAST BRONZE BOOSTER.
B. PROVIDE WITH STRAINER UPSTREAM OF PUMP.
C. PROVIDE ADJUSTABLE, SURFACE MOUNTED AQUASTAT - HONEYWELL L6006C.
D. SET AQUASTAT TO SHUT OFF RECIRCULATION PUMP AT WATER HEATER SET POINT AND ON AT 10°F BELOW SET POINT.

ELECTRIC STORAGE WATER HEATER SCHEDULE

MARK	MANUFACTURER	MODEL#	AREA SERVED	TANK SIZE (GALLONS)	ELECTRICAL DATA VOLTS	PHASE	KW	RECOVERY (GPH)	WEIGHT	NOTES
WH-1	A.O. SMITH	#DEL-20	BLDG	20	208	1	6	26	241 lb	A, B, C, D

NOTES:

A. 93°F TEMPERATURE RISE WITH 140°F OPERATING TEMPERATURE
B. DUAL ELEMENT WIRED FOR NON-SIMULTANEOUS OPERATION
C. "LOW BOY" DESIGN
D. PROVIDE WITH A.O. SMITH # 160934 SHELF

PLUMBING FIXTURE SCHEDULE

FIXTURES IN THIS SCHEDULE OR THEIR APPROVED EQUIVALENT ARE PROVIDED BY THE PLUMBING CONTRACTOR. SUBMIT SHOP DRAWINGS ON EACH OF THESE ITEMS. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION AND INSTALLATION REQUIREMENTS. VERIFY ROUGH-IN REQUIREMENTS WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE PLUMBING FIXTURE MOUNTING HEIGHTS.

PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
DAGF	SIOUX CHIEF # 249. DISHWASHER AIR GAP MEETING ASSE 1021 WITH POLYPROPYLENE BODY, CHROME-PLATED BRASS CAP, 1/2" INLET HOSE BARB, AND 3/4" OUTLET HOSE BARB.
DCV-1	DOUBLE CHECK VALVE BACKFLOW PREVENTER: WATTS # SS007QT, MEETING ASSE 1015, 316 STAINLESS STEEL BODY, QUARTER TURN TEST COCKS, QUARTER TURN, FULL PORT BALL VALVES.
DCV-2	DUAL CHECK VALVE WITH ATMOSPHERIC PORT: WATTS # SD-3, MEETING ASSE 1022 AND NSF 18, 316 STAINLESS STEEL BODY, 3/8" INLET AND OUTLET, ATMOSPHERIC PORT, AND WYE PATTERN STRAINER. PROVIDE 3/4" INDIRECT DRAIN FROM ATMOSPHERIC PORT AND DISCHARGE TO DRAIN WITH AIR GAP.
DSC	DOWNSPOUT COVER: JAY R. SMITH # 1775, ROUND FABRICATED STAINLESS STEEL FRAME WITH FABRICATED SECURED PERFORATED STAINLESS STEEL HINGED COVER. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.
FCO	FLOOR CLEANOUT: JAY R. SMITH, CAST IRON BODY, FLASHING FLANGE WITH CLAMPING COLLAR, ABS PLUG, AND ADJUSTABLE, ROUND, SECURED, NICKEL BRONZE, TOP. # 4031L (-F-C), SCORIATED TOP FOR EXPOSED, FLUSH WITH FINISHED FLOOR, APPLICATION(S), # 4031L (-F-C-Y), STAINLESS STEEL MARKER FOR INSTALLATION IN CARPETED FLOOR AREA(S), # 4151 (-F-C), 1/8" RECESS FOR INSTALLATION IN TILED FLOOR AREA(S), # 4191 (-F-C), 1/2" RECESS FOR INSTALLATION IN TERRAZZO AND SIMILAR POURED FLOOR AREA(S). REFER TO SPECIFICATIONS FOR INSTALLATION.
FCV-1	FLOW CONTROL VALVE: FLOWDESIGN # ICSS "AUTOFLOW", SERIES 300 STAINLESS UNION BODY WITH NICKEL PLATED UNION NUT, STAINLESS STEEL PRESSURE COMPENSATING CARTRIDGE, MEETING NSF 61 ANNEX G, NAMEPLATE AND 1/2" VALVE BODY SIZE UNLESS SHOWN OTHERWISE ON PLANS. PROVIDE 0.5 GPM FLOW RATE CARTRIDGE UNLESS SHOWN OTHERWISE ON PLANS.
FD-1	FLOOR DRAIN: JAY R. SMITH # 2005L (-A), CAST IRON BODY AND CLAMPING COLLAR, ADJUSTABLE 6" ROUND NICKEL BRONZE STRAINER. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FD-2	EQUIPMENT FLOOR DRAIN: JAY R. SMITH # 2220L, CAST IRON BODY, 8-1/2" ROUND, LOOSE, MEDIUM DUTY, CAST IRON GRATE, SEDIMENT BUCKET, BOTTOM OUTLET, SEEPAGE PAN, AND MEMBRANE FLASHING CLAMP. PROVIDE TRAP PRIMER PORT IF TRAP PRIMER IS PROVIDED ON THE DRAWINGS. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS.
FS-1	FLOOR SINK: JAY R. SMITH # 3041C (-12), 6" DEEP CAST IRON BODY WITH ACID RESISTING ENAMELED INTERIOR, ANCHOR FLANGE WITH SEEPAGE HOLES, CLAMP COLLAR, WHITE ABS SEDIMENT BUCKET, AND 8-1/2" ROUND NICKEL BRONZE RIM AND HALF GRATE. USE CAULK JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
GD-1	GARBAGE DISPOSER: IN-SINK-ERATOR "BADGER 5XP" RESIDENTIAL DISPOSER WITH 3/4 H.P. MOTOR WITH POWER CORD, PLASTIC GRIND CHAMBER, GALVANIZED STEEL CUTTING ELEMENT, PERMANENTLY LUBRICATED UPPER AND LOWER BEARINGS AND SOUND DEADENING ENCLOSURE. TRIM: WASTE DISCHARGE KIT AND DISHWASHER TAILPIECE. ELECTRICAL REQUIREMENTS: 120-VOLT, 8.1 FULL LOAD AMPS.
HB-1	HOSE BIBB: PRIER PRODUCTS # C-158NP.75, ROUGH CHROME PLATED BRASS 3/4" FEMALE FIP INLET, 3/4" THREADED HOSE CONNECTION, METAL WHEEL HANDLE, AND ASSE 1011 INTEGRAL VACUUM BREAKER.
IMB-1	ICE MAKER BOX: GUY GRAY MODEL # BIM875, 20 GAUGE GALVANIZED STEEL BOX, 18 GAUGE STEEL FACEPLATE, BOTTOM INLET WATER SUPPLY WITH 1/2" x 1/4" COMPRESSION ANGLE STOP VALVE. TRIM: LOOP 4 FEET OF 1/4" TYPE "K" SOFT COPPER TUBING.
JS-1	JANITOR'S SINK: STERN-WILLIAMS # MTB-2424, 24" x 24" x 10" HIGH TERRAZZO BASIN WITH INTEGRAL STAINLESS STEEL DRAIN BODY. FAUCET: CHICAGO FAUCET # 897-CP FAUCET WITH WALL BRACE, INTEGRAL VACUUM BREAKER, PAIL HOOK, AND 3/4" MALE HOSE THREADED OUTLET. SECURE FAUCET IN WALL WITH BACKBOARD. TRIM: # BP TYPE 304, 20 GAUGE, STAINLESS STEEL WALL SURROUNDS, # T-35 THREE FOOT LONG REINFORCED HOSE WITH 3/4" CHROME COUPLING AND WALL HOOK, # V-70 EXTRUDED VINYL BUMPER GUARD, AND # T-40 24" STAINLESS STEEL MOP HANGER.
NW-1	NON-FREEZE WALL HYDRANT: PRIER PRODUCTS # C-634NBX1, SATIN NICKEL PLATED BRASS 1"-MALE INLET BY 3/4" FEMALE INLET, 3/4" THREADED HOSE CONNECTION, LOOSE KEY HANDLE, HYDRANT LENGTH AS REQUIRED FOR INSTALLED WALL THICKNESS, ADJUSTABLE WALL CLAMP, BRASS BOX WITH SATIN NICKEL PLATED FINISH AND INTEGRAL ASSE 1052 DOUBLE CHECK VACUUM BREAKER.
ORD-1	OVERFLOW ROOF DRAIN: JAY R. SMITH # 1080Y (-E0X-C-R-CID), 15" DIAMETER CAST IRON BODY, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, SUMP RECEIVER, HUBLESS OUTLET, FIXED EXTENSION – HEIGHT AS REQUIRED BY INSTALLED INSULATION THICKNESS, CAST IRON DOME BOLTED OR LOCKED DOWN AND 2" HIGH WATER DAM. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.
PRV-1	PRESSURE REDUCING VALVE: WATTS # LF223, BRONZE BODY, STAINLESS STEEL SEAT, STAINLESS STEEL BOLTS, INLET AND OUTLET SIZE AS SHOWN ON PLANS, 25 - 75 PSI REDUCED PRESSURE RANGE. SET OUTLET PRESSURE TO XX PSI WITH FLOW RATE OF YY GPM AT A FALL OFF PRESSURE OF ZZ PSI DIFFERENTIAL.
RD-1	ROOF DRAIN: JAY R. SMITH # 1010Y (-E0X-C-R-CID), 15" DIAMETER CAST IRON BODY, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, SUMP RECEIVER, HUBLESS OUTLET, FIXED EXTENSION – HEIGHT AS REQUIRED BY INSTALLED INSULATION THICKNESS, AND CAST IRON DOME BOLTED OR LOCKED DOWN. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.

PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
RH-1	ROOF NON-FREEZE POST HYDRANT: MAPA PRODUCTS # MPH-24FP FREEZE PROOF POST HYDRANT MEETING ASSE #1057 WITH BLACK POWDER COATED CAST ALUMINUM WEATHER-GUARD DOME HANDLE, STAINLESS STEEL SHROUD WITH WELDED STAINLESS STEEL FLANGE, UNDER DECK CLAMP, BRONZE GLOBE ANGLE VALVE, 3/4" HOSE CONNECTION, QUICK DISCONNECT WITH BUILT-IN VACUUM BREAKER, STAINLESS STEEL RESERVOIR.
RPZ-1	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # LFU009AQT, MEETING ASSE 1013, LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, 90°D SWIVEL UNIONS, QUARTER TURN BALL VALVES AND # 909AG AIR GAP FITTING.
RPZ-2	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # LF009QT-S, MEETING ASSE 1013, LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, QUARTER TURN BALL VALVES, BRONZE STRAINER, AND # 909AG AIR GAP FITTING.
RPZ-3	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # 957-NRS, MEETING ASSE 1013, 304 STAINLESS STEEL BODY AND SLEEVE, QUARTER TURN TEST COCKS, RESILIENT SEATED NON-RISING STEM GATE VALVES AND WATTS #77F-DI-FDA EPOXY COATED CAST IRON STRAINER AND # 957AG AIR GAP FITTING.
SK-1	SINK: ELKAY # ELUH211510, 23-1/2" x 18-1/4" x 10" DEEP, SINGLE COMPARTMENT, SELF-RIMMING, 18 GAUGE 304 STAINLESS STEEL FIXTURE WITH SATIN FINISH, SOUNDGAURD UNDERCOATING, AND CENTER REAR DRAIN SEAL. LIP OF SINK TO UNDERSIDE OF COUNTERTOP WITH SILICONE AND SECURE WITH MANUFACTURER'S MOUNTING BRACKETS. FAUCET: KOHLER # K-7509 "PURIST", HIGH ARCH GOOSENECK SWING SPOUT WITH SINGLE LEVER HANDLE, CHROME POLISHED IN COLOR. SINGLE HOLE INSTALLATION WITH CERAMIC DISC VALVES AND 1.5 GPM FLOW RATE. TRIM: McGUIRE # LF2165CC LEAD FREE BRASS WHEEL HANDLE ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, McGUIRE # 151M CUP STRAINER WITH 1-1/2" 17 GAUGE TAILPIECE, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP WITH BRASS CLEANOUT AND ESCUTCHEON. PROVIDE WITH "TMV-1" AS SCHEDULED.
T-1	TRANSFORMER: SLOAN # EL-154 120 VAC / 24 VAC, 50 VA. REFER TO ELECTRICAL DRAWINGS FOR WIRING OF TRANSFORMER.
TMV-1	THERMOSTATIC MIXING VALVE: POWERS # LFe480, SOLID LEAD FREE BRASS BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 2.2 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.5 GPM. SET TEMPERATURE TO 110F FOR DUEL TEMPERATURE LAVATORIES AND HAND SINKS, 100F FOR SINGLE TEMPERATURE LAVATORIES AND HAND SINKS AND 120F FOR SINKS. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
TP-1	TRAP PRIMER: PRECISION PLUMBING PRODUCTS # PR-500 "PRIME RITE", CORROSION RESISTANT BRASS BODY, "O" RING SEALS, 1/2" INLET AND OUTLET, AND INTEGRAL VACUUM BREAKER. INSTALL THE VALVE AT A MINIMUM OF 12" ABOVE FINISHED FLOOR.
TS-1	TIME SWITCH: INTERMATIC #ET1705CSPST, 7 DAY, ONE CIRCUIT-SINGLE POLE SINGLE THROW, ELECTRONIC TIME SWITCH OR EQUAL BY TORK. TIME SWITCH SHALL BE MOTOR RATED (1 H.P. @ 120 VOLT, SINGLE PHASE), MINIMUM OF 20 SET POINTS (14 ON/OFF CYCLES) AND BATTERY BACK UP. COORDINATE WITH DIVISION 16 FOR INSTALLATION AND INTERLOCK OF TIME SWITCH IN SERIES WITH THE AQUASTAT AND RECIRCULATION PUMP.
WC-1	FLOOR-MOUNTED WATER CLOSET (ADA ACCESSIBLE): AMERICAN STANDARD # 3043.001 "MADERA" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. MEETS DEFINITION FOR HIGH EFFICIENCY TOILET (HET). VALVE: SLOAN "OPTIMA – SLOAN MODEL" # 111 ES-S TMO 1.6 GALLON PER FLUSH EXPOSED, CHROME-PLATED, HARD WIRED, SENSOR OPERATED, DIAPHRAGM TYPE, FLUSH VALVE LESS TRANSFORMER WITH CHLORAMINE RESISTANT DIAPHRAGM AND PROTECTED ORIFICE, MANUAL OVERRIDE, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, AND SWEAT ADAPTER KIT. INSTALL FLUSH VALVE HANDLE ON THE WIDE SIDE OF THE STALL. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS STEEL BOLTS.
WHA	WATER HAMMER ARRESTER: PRECISION PLUMBING PRODUCTS, HARD DRAWN COPPER BODY WITH WROUGHT COPPER FITTINGS, PISTON TYPE WITH LUBRICATED EPDM "O" RING SEALS, MEETING ASSE 1010 OR PDI WH-201. PROVIDE PDI SIZES "A" THROUGH "F" AS SHOWN ON PLANS. PROVIDE SIZE "A" UNLESS SHOWN OTHERWISE ON THE PLANS.
WML-1	WALL-MOUNTED LAVATORY (ADA ACCESSIBLE): AMERICAN STANDARD # 0355.012 "LUCERNE" 20-1/2" X 18-1/4" RECTANGULAR WALL MOUNTED WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. FAUCET: PROVIDE WITH SLOAN # ETF-600-LT 4" CENTERSET, HARD WIRED, SENSOR OPERATED FAUCET LESS TRANSFORMER WITH "Y" STRAINER FILTERED SOLENOID VALVE AND 0.35 GPM AERATOR. TRIM: McGUIRE # 155A GRID DRAIN WITH TAILPIECE, McGUIRE # 2165CCLK LOOSE KEY COMPRESSION ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, CONCEALED ARM CARRIER WITH STANCHIONS TO FLOOR, PLUMBEREX "PRO-EXTREME" # X-4222 INSULATION KIT FOR WATER AND WASTE PIPES.

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

STATE OF MISSOURI
BRADLEY E. CHAMBON
NUMBER PE-028603
PROFESSIONAL ENGINEER

08/06/2021

BRADLEY E. CHAMBON
LICENSE # 028603

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

PLUMBING SCHEDULES

SHEET NUMBER

P6.00

BRADLEY E. CHAMBON

Division 22: PLUMBING

1. GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

All requirements under Division 01 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01, this section and division take precedence. Become thoroughly familiar with all its contents as to requirements that affect this division, section, or both. Work required under this section includes the brass body, non-corrosive appliances, transportation, services and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and equipment specified.

The specifications and drawings for the Project are complementary, and any portion of work described in one shall be provided as if described in both. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They convey the scope of work, indicating the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

2004 Edition		1995 Edition
1.	Division 21 – Fire Suppression	Division 15
2.	Division 22 – Plumbing	Division 15
3.	Division 23 – HVAC	Division 15
4.	Division 26 – Electrical	Division 16
5.	Division 27 – Communications	Division 16
6.	Division 28 – Electronic Safety and Security	Division 16

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations."

Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install, complete and ready for the intended use."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division."

Engineer: Where referenced in this division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, as defined in the General and/or Supplementary Conditions. When used in this division, Engineer means increased involvement by and obligations to the Engineer, in addition to involvement by and obligations to the Architect.

AHJ: The local code and/or inspection agency (Authority) Having Jurisdiction over the work.

NRTL: Nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. Nationally recognized testing laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Substitutions include Value Engineering proposals.

A Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

B Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the Engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, or both, by an NRTL, and acceptable to the AHJ over this project.

The term lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content of less than or equal to 0.25% per safe drinking water act as amended January 4, 2011 Section 1417.

C. PREBID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. MATERIAL AND WORKMANSHIP

Provide new material, equipment, and apparatus under this contract unless otherwise stated herein, of best quality normally used for the purpose in good commercial practice, and free from defects. Install material and equipment in accordance with the manufacturer's installation instructions. Model numbers listed in specifications or shown on the drawings are not necessarily intended to designate the required trim, written descriptions of the trim govern model numbers.

Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States or certified to meet the specified ASTM and ANSI standards.

Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the Architect and Engineer. Workmanship shall be the finest possible by experienced mechanics. Installations shall comply with applicable codes and laws.

The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal noise caused by rattling equipment, pipe, and piping and squeaks in rotating components shall not be acceptable. Materials and equipment shall be of commercial specification grade in quality. Light duty and residential grade equipment shall not be accepted unless otherwise indicated.

Remove from the premises waste material present as a result of his work, including cartons, crating, paper, stickers, and/or excavation material not used in backfilling, etc. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.

Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction. Provide all safety lights, guards, and warning signs required for the performance of the work and for the safety of the public.

E. MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

F. COORDINATION

Coordinate work with that of other trades so that the various components of the systems are installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. Components which are installed without regard to the above shall be relocated at no additional cost to the Owner.

Unless otherwise indicated, General Contractor shall provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the General Contractor with information where chases and openings will be required. Contractor shall keep informed as to the work of other trades engaged in the construction of the project and shall execute his work in such a manner as not to interfere with or delay the work of other trades.

Figured dimensions shall be taken in preference to scaled dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor shall be held responsible for errors which could have been avoided by proper checking and verification.

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the specifications or shown on the drawings are not intended to designate the required trim.

G. ORDINANCES AND CODES

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the following:

1. National Fire Protection Association (NFPA)
2. Underwriters Laboratories (UL)
3. Occupational Safety and Health Administration (OSHA)
4. American Society of Mechanical Engineers (ASME)
5. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
6. American National Standards Institute (ANSI)
7. American Society of Testing Materials (ASTM)
8. Other national standards and codes where applicable.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the attention of the Architect and Engineer for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for, and furnish certificates of inspection to Owner.

H. PROTECTION OF EQUIPMENT AND MATERIAL

Store and protect from damage equipment and material after delivery to job site. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment and material damaged by construction activities shall be rejected and Contractor shall furnish new equipment and material of a like kind at his own expense.

Keep premises broom clean of foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work.

Plug or cap open ends of piping systems while stored and installed during construction when not in use to prevent the entrance of debris into the systems.

Keep the manufacturer-provided protective coverings on floor drains, floor sinks and trench drains during construction. Remove coverings at the termination of the work and polish exposed surfaces.

I. SUBSTITUTIONS

Materials, products, equipment, and systems described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by the proposed substitution. The base bid shall include only the products from manufacturers specifically named in the drawings and specifications. To request a substitution, request the Substitution Request Form from the Architect or Engineer. Complete and send the Substitution Request From for each material, product, equipment, or system that is proposed to be substituted. The burden of proof of the merit of the proposed substitution is upon the proposer.

Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, Architect, and Owner the following:

1. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects unless stated otherwise in the substitution request.
2. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance service, and sourcing of replacement parts.
3. Proposed substitution has received necessary approvals of authorities having jurisdiction.
4. Same warranty will be furnished for proposed substitution as for specified Work.
5. If accepted substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.
6. Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation. No substitution will be considered prior to receipt of bids unless written request for approval to bid has been received by the Engineer at least ten (10) calendar days prior to the date for receipt of bids.

If the proposed substitution is approved prior to receipt of bids, such approval will be stated in an addendum. Bidders shall not rely upon approvals made in any other way. Verbal approval will not be given. No substitutions will be considered after the contract is awarded unless specifically provided in the contract documents.

J. SUBMITTALS

Assemble and submit for review shop drawings, material lists, manufacturer product literature for equipment to be furnished, and items required for coordination between trades under this contract. Provide submittals in sufficient detail so as to demonstrate compliance with these Contract Documents and the design concept. Prior to transmitting submittal, verify that the equipment submitted is mutually compatible and suitable for the intended use, will fit the available space, and maintain manufacturer recommended service clearances. If the size of equipment furnished makes necessary any change in location or configuration, submit a shop drawing showing the proposed layout.

Transmit submittals as early as required to support the project schedule. Allow for two weeks Engineer review time, plus to/from mailing time via the Architect, plus a duplication of this time for resubmittal, if required. Only resubmit those sections requested for resubmittal.

Submittals shall contain the project name, applicable specification section, submittal date, equipment identification acronym as used on the drawings, and the Contractor's stamp. The stamp shall certify that the submittal has been checked by the Contractor, complies with the drawings and specifications, and is coordinated with other trades. Manufacturer product literature shall include shop drawings, product data, performance sheets, samples and other submittals required by this division. Highlight, mark, list, or indicate the materials, performance criteria, and accessories that are being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

Submittals and shop drawings shall not contain the firm name, logo, seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

Separate submittals according to individual specification sections. Illegible submittals will be rejected and returned without review. Catalog data shall be prepared in booklet form, identified, indexed and tabbed in a 3-ring binder. Each item or model number shall be clearly marked and accessories indicated. Label the catalog data with the equipment identification acronym or number as used on the drawings and include performance curves, capacities, sizes, weights, materials, finishes, wiring diagrams, electrical requirements and deviations from specified equipment or materials. For equipment with motor starters or VFDs, include short circuit current ratings. Mark out inapplicable items. Shop drawings will be returned without review if the above mentioned requirements are not met.

Provide the quantity of submittals required by Division 01. If not indicated and hard-copy sets are provided, submit a minimum of six (6) copies. Refer to Division 01 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 01. Contractor shall notify the Architect and Engineer that the submittals have been posted. If electronic submittal procedures are not defined in Division 01, Contractor shall include the website, user name, and password information needed to access the submittals. For submittals sent by e-mail, Contractor shall copy the designated representatives of the Architect and Engineer. Contractor shall allow for the Engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal.

The checking and subsequent acceptance of submittals by the Engineer and/or Architect shall not relieve the Contractor from responsibility for deviations from the drawings and specifications, errors in dimensions, details, size of members, or quantities, omissions of components or fittings; coordination of electrical requirements; and not coordinating items with actual building conditions and adjacent work. Proceed with the procurement and installation of equipment only after receiving approved shop drawings relative to each item.

K. ELECTRONIC DRAWINGS

In preparation of shop drawings or record drawings, Contractor may, at his option, obtain electronic drawing files in AutoCAD or DXF format on CD-ROM disk, DVD disk, flash drive, or direct download, as desired, from the Engineer for a shipping and handling fee of $200 for a drawing set up to 12 sheets and $15 per sheet for each additional sheet. Contact the Architect for written authorization and Engineer for the necessary release agreement form and to specify shipping method and drawing format. In addition to payment, written authorization from the Architect and release agreement form the Engineer must be received before electronic drawing files will be sent.

L. RECORD DRAWINGS (AS-BUILT DRAWINGS)

During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings. Insert one set into each copy of the manual described below.

See Division 01 and General Conditions for additional information.

M. OPERATION AND MAINTENANCE INSTRUCTIONS

During the course of construction, collect and compile a complete brochure of equipment furnished and installed on this project. Include operational and maintenance instructions, manufacturer's catalog sheets, wiring diagrams, parts lists, approved submittals and shop drawings, warranties, and descriptive literature as furnished by the equipment manufacturer. Include an inside cover sheet that lists the project name, date, Owner, Architect, Engineer, General Contractor, Sub-Contractor, and an index of contents.

Submit three copies of literature bound in approved binders with index and tabs separating equipment types to the Architect, for Engineer's review, at the termination of the work. Paper clips, staples, rubber bands, loose-leaf binding, and mailing envelopes are not considered approved binders. Final approval of systems installed under this contract shall be withheld until this equipment brochure is received and deemed complete by the Architect and Engineer. Instruct workmen to save required literature shipped with the equipment itself for inclusion in this brochure.

Include record drawings as described above.

Refer to Division 01 for acceptance of electronic manuals for this project. For electronic manuals, refer to paragraph "Submittals" for requirements.

N. SPARE PARTS

Furnish to Owner, with receipt, the spare parts for faucet washers and O-rings, flushometer repair kits, and water closet tank repair kits for the fixtures furnished for this project.

O. TRAINING

At a time mutually agreed upon between the Owner and Contractor, provide the services of a factory trained and authorized representative to train Owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include, but not be limited to, an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the Architect stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The Contractor and the training provider shall sign the certification letter indicating agreement that the training has been provided.

Schedule training with Owner with at least 7 days advance notice.

P. WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects, occurring within the warranty period(s), as stated in the General Conditions and Division 01.

Warranty shall include a guarantee of free circulation of liquids throughout the system as intended without leaks, excessive noise, or water hammer.

Warranties shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2. GENERAL MATERIALS AND INSTALLATION

A. EXCAVATION AND BACKFILLING

Perform excavation and backfill required for installation of underground work under this contract. Trenches shall be of sufficient width. Crib or brace trenches to prevent cave-in or settlement. Do not excavate trenches close to columns and walls of new building without prior consultation with the Architect. Use pumping equipment if required to keep trenches free of water. Backfill trenches in maximum 6 inch layers of well-tamped dry earth in a manner to prevent future settlement.

Excavation as specified herein shall be classified as common excavation. Common excavation shall comprise the satisfactory removal and disposition of material of whatever substances and of every description encountered, including rock, if any, within the limits of the work as specified and shown on the drawings. Excavation shall be performed to the lines and grades indicated on the drawings. Dispose of excavated materials that are considered unsuitable for backfill and surplus of excavated material which is not required for backfill to the satisfaction of the Architect.

B. EXTERIOR UTILITY CONNECTIONS

Terminate domestic water, storm, and sewer lines at a point approximately five feet from the building wall, or as shown on the drawings. Make connection to the various services provided by others and coordinate connection requirements with civil engineer. Verify that installation will tie into the various services provided by others at the indicated invert elevation point prior to installation. If the installation will not tie into the indicated invert elevation point while maintaining proper fall, notify architect and civil engineer so that an alternative may be determined.

Provide service piping and accessories required to complete utility connections that are not furnished by the serving utility.

C. COINCIDENTAL DAMAGE

Repair streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in the course of the work. Repair materials shall match existing construction. Repair work shall meet all requirements of the Owner, local authorities having jurisdiction, and meet the satisfaction of the Architect.

D. CUTTING AND PATCHING

Conform to the requirements in Division 01. Cut walls, floors, ceilings, and other portions of the facility as required to install work under this division. Obtain permission from the Architect prior to cutting. Do not disturb structural members without prior approval from the Architect. Cut holes as small as possible. Patch walls, floors, and other portions of the facility as required by work under this division. Patching shall match original material and construction including fire ratings, if applicable. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the Architect.

E. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal piping, conduit, and rough-in except in unfinished areas and where otherwise shown.

F. SUPPORT SYSTEMS

Structural steel used for pipe supports, equipment supports, etc., shall be new and clean, and shall conform to ASTM designation A-36.

Support plumbing equipment and piping from the building structure. Do not support plumbing equipment and piping from ceilings, other mechanical or electrical components, and other non-structural elements.

G. ACCESS DOORS

Provide access doors for all concealed equipment where indicated or as required, except where above lay-in ceilings. Access doors shall be adequately sized for the devices served with a minimum size of 18 inches x 18 inches. Access doors must be of the proper construction for type of construction in which it is installed. Obtain Architect's approval of type, size, location, and color before ordering. Provide factory fabricated and assembled units, complete with attachment devices and fasteners ready for installation, concealed hinges, flush screwdriver-operated cam lock, and anchor straps. Provide access doors manufactured by Milcor, Titus, Zurn, or equal.

H. PENETRATIONS

Provide sleeves for pipes passing through above grade concrete or masonry walls, concrete floor or roof slabs. Sleeves are not required for core drilled holes in existing masonry walls, concrete floors or roofs. Provide 10 gauge galvanized steel sleeves for sleeves 6 inches and smaller. Provide galvanized, metal sleeves for larger than 6 inches. Schedule 40 PVC sleeves are acceptable for installation in areas without return air plenums.

Seal elevated floor, exterior wall and roof penetrations watertight and weathertight with non-shrink, non-hardening commercial sealant. Pack with mineral wool and seal both ends with minimum of 1/2 inch of sealant.

Seal around penetrations of fire rated assemblies. Coordinate fire ratings and locations with the architectural drawings. Refer to architectural specifications for fire stoppings. Provide a product schedule for UL listing, location, wall or floor rating and installation drawing for each penetration fire stop system.

Extend pipe insulation for insulated pipe through floor, wall and roof penetrations, including fire rated walls and floors. The vapor barrier shall be maintained. Size sleeve for a minimum of 1 inch annular clear space between inside of sleeve and outside of insulation.

Seal elevated concrete slab with water proof membrane penetrations with "wall pipes" and water proof sealant. Secure waterproof membrane flashing between "wall pipe" clamping flange and clamping ring. Provide cast iron "wall pipes" with integral waterstop ring manufactured by Josam, Jay R. Smith, Wade, Watts or Zurn.

Provide sleeves for horizontal pipe passing through or under foundation. Sleeves shall be cast iron soil pipe two nominal pipe sizes larger than the pipe served.

Provide Schedule 40 PVC pipe sleeves for vertical pressure pipe passing through concrete slab on grade. Sleeves shall be one nominal pipe size larger than the pipe served and two pipe sizes larger than pipe served for ductile iron pipes with restraining rods. Seal water-tight with silicone caulk.

Provide 1/2 inch thick cellular foam insulation around perimeter of non-pressure pipe passing thru concrete slab on grade. Insulation shall extend to 2 inches above and below the concrete slab.

I. FIRESTOPPING

Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with UL 2079 or ASTM E 814, or other NRTL acceptable to AHJ.

Manufacturers: Hilti, RectorSeal, Specified Technologies Inc., United States Gypsum Company, or 3M corp.

Through and Membrane Penetration Firestopping Systems Product Schedule: Provide UL listing, location, wall or floor rating, and installation drawing for each penetration fire stop system.

Where project conditions require modification to qualified testing and inspecting agency's illustrations for a particular firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Include qualifications data for testing agency.

J. ELECTRICAL WIRING

Line voltage wiring shall be provided by Division 26. Line voltage control and interlock wiring for plumbing systems shall also be provided by Division 26. Low voltage control wiring shall be provided by Division 23. Furnish wiring diagrams to Division 26 as required for proper equipment hookup. Coordinate with Division 26 the actual wire sizing amps for plumbing equipment (from the equipment nameplate) to ensure proper installation.

K. EQUIPMENT FURNISHED BY OTHERS

Provide necessary equipment and accessories that are not provided by the equipment supplier or Owner to complete installation of equipment furnished by others in locations as indicated on the drawings, specified herein, or both. Furnish and install roughed-in wastes, vents and water services. Provide final connection to kitchen equipment, furnished by others, in locations as indicated on the drawings. Provide accessory items that are required but not furnished with the equipment including traps, stop valves, P/P's, indirect drain from equipment to floor drains, and accessory items indicated or required for the proper operation of the complete system at the termination of the work.

Contractor shall be responsible for correct rough-in dimensions and shall verify same with Architect and/or equipment supplier prior to service installations.

L. SYSTEM TESTING AND ADJUSTING

Upon completion of each phase of the installation, test each system in conformance with local code requirements and as noted below. Furnish labor and equipment required to test each system installed under this contract. Assume all costs involved in making the tests and repairing and/or replacing any damages resulting therefrom.

Notify the Architect and the AHJ, three (3) working days prior to making plumbing system tests. Leave concealed work uncovered until the required tests have been completed, but if necessary due to construction procedure, tests on portions of the work may be made, and when satisfactory, the work may be concealed. Test piping before insulation is installed, and before backfill. Pipes, joints, flanges, valve stems, etc., shall be leak tight. Repair or replace system defects with new materials. Caulking of defective joints, cracks or holes will not be permitted. Repeat tests after defects have been eliminated. Make tests in the presence of the administrative authority and/or the Owner's authorized representative.

Upon completion of the systems installation, and prior to acceptance by the Architect and Engineer, make general operating tests to demonstrate that equipment and systems are in proper working order, and are functioning in conformance with the intent of the drawings and specifications. As a part of these tests, open every water outlet to ensure complete system flushing, remove and clean faucet aerators, clean strainers, light pilot lights, and operate every piece of equipment furnished under this contract to demonstrate proper functioning.

Test the drainage and vent system by plugging openings with test plugs, except those at the top of the stacks. Fill the system with water; test results will be satisfactory if the water level remains stationary for not less than one (1) hour. Subject the drainage and vent system to a pressure of at least ten (10) feet of water. If leaks develop, repair them and repeat the test.

Test the domestic water system by filling it with water and then isolating the system from its source. Keep the system closed for a period of twenty-four hours with no fixture being used. The pressure differential for this test period shall not exceed 10 psig. Test water piping to a 125 PSI hydrostatic pressure.

3. PLUMBING PIPING

A. PIPING MATERIALS

Materials specified or noted on the drawings are subject to the approval of local code authorities. Verify approval before installing any material or joining method.

Domestic Water (Cold, Hot and Hot Water Recirculation): Domestic water piping installed above the floor slab inside the building shall be Type "K" hard temper copper tube with wrought copper fittings and soldered connections made up with 95/5 solder. Brazed mechanically formed tee connections (T-drill) may be used in copper lines where approved by code; connection shall be brazed joints made with AWS A5.8, BAg Silver filler metal.

Underground domestic water piping 2 inch and smaller shall be Type "K" soft temper copper tubing with flared copper alloy fittings and connections, or Type "K" hard temper copper tubing with conventional wrought copper fittings and brazed joints made with AWS A5.8, BAg Silver filler meta. Install as few underground copper piping joints as possible. At building service entrance, no joints shall be installed under or within 5 feet of the building. Install domestic water piping below grade outside building at adequate depth to prevent freezing.

Underground domestic water piping 3 inch and larger shall be class 52 ductile iron meeting the requirements of ANSI / AWWA Standard C151/A21.51. Piping shall be double cement lined in accordance with ANSI / AWWA Standard C104/A21.4. Fittings shall have mechanical joints. At contractor's option, pipe bosses with embedded pre-engineered support strut or pre-engineered support struts with factory plastic bases. Two piece straps shall be captivated at the shoulder when attachment nut is tightened and designed for use with strut system. All nuts, brackets and clamps shall have the same finish as the channels. Support pipe with spacing as described above at a minimum 7 inches above the roof. Set supports on 18 inch x 18 inch x 3/16 inch thick roof walkway material compatible with actual roof material.

Supports On Floor: Support piping on roof with pre-engineered roof pipe supports manufactured by B-line, Erico, FNW, Miro or Portable Pipe Hangers: 4 inch x 4 inch x 12 inch long closed cell polyethylene blocks with embedded pre-engineered support strut or pre-engineered support struts with factory plastic bases. Two piece straps shall be captivated at the shoulder when attachment nut is tightened and designed for use with strut system. All nuts, brackets and clamps shall have the same finish as the channels. Support pipe with spacing as described above at a minimum 7 inches above the roof. Set supports on 18 inch x 18 inch x 3/16 inch thick roof walkway material compatible with actual roof material.

Supports On Floor: Support piping on floor with pipe hooks where required for ferrous pipe or insulated copper tube, shall be B-Line B3093 galvanized steel with pipe saddle, threaded shank for height adjustment and floor stand secured to the floor.

Below Ground Installation for Soil, Waste, and Storm: Install soil and waste piping to a uniform slope of not less than 1/8 inch per foot for piping 4 inch or larger, and not less than 1/4 inch per foot for piping 3 inch or smaller. Slope storm piping at 1/8 inch per foot. Lay pipe at uniform slope, free from sags, with hub end upstream. Make changes in direction from horizontal to vertical, at fixture branches and other branch connections with sanitary "tees" or short sweep "ells". Make changes in direction from vertical to horizontal or horizontal to horizontal with long radius fittings, long sweeping "ells", combination "Y and 1/8 bend" fittings, or 45 degree "ells" (1/8 bend fittings), 1/6 bend or 1/16 bend and "Y" fittings. Install pipe with the barrel of the pipe on firm, solid earth for its entire length, and excavate holes for the pipe bells. Lay pipe in a straight line and install with uniform bearing. Use wood with batten boards set not more than 24'-0" apart. Close open ends of pipe with a stopper when pipe laying is not in progress. Center spigots accurately in bells for uniform caulking. Provide a smooth and uniform invert in the system. Drilling or tapping of soil and waste lines, and saddle hubs and bends are not permitted. Locate and install soil and waste lines as indicated on the drawings. Determine exact locations in such a manner as to maintain proper clearance. Prior to installation of any building drain pipe, verify elevation of connection point of existing sewer service line or existing tenant connections indicated on the drawings. If the installation will not tie into the indicated invert elevation point while maintaining proper fall, notify Architect so that an alternative may be determined.

Above Ground Installation for Soil, Waste, and Storm: Install soil and waste piping to a uniform slope of not less than 1/8 inch per foot for piping 4 inch or larger, and not less than 1/4 inch per foot for piping 3 inch or smaller. Slope storm piping at 1/8 inch per foot. Lay pipe at uniform slope free from sags. Support pipe within 12 inches of each joint. Make changes in direction from horizontal to vertical, at fixture branches and other branch connections with sanitary "tees" or short sweep "ells". Make changes in direction from vertical to horizontal or horizontal to horizontal with long radius fittings, long sweeping "ells", combination "Y and 1/8 bend" fittings, or 45 degree "ells" (1/8 bend fittings), 1/6 bend or 1/16 bend and "Y" fittings. Provide a smooth and uniform invert in the system. Drilling or tapping of soil and waste lines, and saddle hubs and bands are not permitted. Locate and install soil and waste lines as indicated on the drawings. Determine exact locations in such a manner as to maintain proper clearance.

Plumbing Vent: Connect plumbing vent pipes to fixture drain pipes as indicated on the drawings or as required by the installation practices adopted and enforced by local codes official, and extend vent pipes full size through roof line. Connect pipe full size through roof with uniform slope so as to drain back by gravity to the drainage piping system. Vents passing through the roof shall be minimum 3 inch size except in tropical climates. Turn flashing down into stacks at least 2 inches, and extend flashing 24 inches in all directions from the pipe at the roof line. Vent lines shall be air and water tight.

Domestic Water: Arrange cold, hot, and hot water recirculation piping to drain at the lowest point in each system. Install at least one pipe union adjacent to all shutoff valves, at connection points of each piece of equipment, and elsewhere in the system where required to allow proper maintenance. Provide unions of same size as pipe in which they are installed, and allow for expansion and contraction where required by the installation. Where water piping occurs in exterior walls, hold pipe as close as possible to the interior face of wall and install insulation batt or other insulation (minimum R-8) between piping and the exterior wall face.

E. PIPING SANITIZATION

Sanitize the entire domestic water piping system (cold, hot, and hot water return) with a solution containing not less than 50 ppm available chlorine. Keep solution in the system for a minimum of 24 hours, with each valve being operated several times during the period. After completion, flush system with city water until chlorine residual is lowered to incoming city water level.

F. PIPE AND VALVE MARKERS

Provide manufacturer's standard pre-printed, semi-rigid snap-on or permanent adhesive, pressure-sensitive vinyl pipe markers. Pipe markers shall be color-coded complying with ANSA A13.1.

Install pipe markers on each plumbing piping system and include arrows to show normal direction of flow.

Locate pipe markers and color bands wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

Provide plastic laminate or brass valve tag on every valve, cock and control device in each plumbing piping system, exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibbs, and shut-off valves at plumbing fixtures and similar rough-in connections of end-use fixtures and units.

4. PLUMBING SPECIALTIES

A. WATER HAMMER ARRESTORS, AND TRAPS

Provide water hammer arrestors at valves or batteries of fixtures as indicated on the drawings to prevent water hammer. Arrestors shall be Josam, Sioux Chief, Smith, Precision Plumbing Products, Proflo, Wade, Watts, or Zurn, stainless steel bellows type, or O-ring sealed and lubricated acetal piston. Install water hammer arrestors per the Plumbing and Drainage Institute (PDI) WH-201 installation instructions. Installation of arrestors at batteries of fixtures precludes the requirement for individual air chambers at each battery fixture. Submit certification that water hammer arrestors comply with NSF 61 Annex G and/or NSF 372.

Provide water-seal traps on floor drains, fixtures and equipment with drain connections, including traps not furnished in combination with fixtures and equipment. Place trap as close to the fixture or drain as possible. Exposed traps in finished spaces shall be chrome-plated brass.

Provide conventional "P" type trap, water-sealed self-cleaning design. Full "S" traps or trap standards shall be used only where specifically called for on the drawings or elsewhere in this specification. Trap water seals shall not be less than 2 inches, and deep seal traps shall be provided where specified or indicated. Each trap not integral with the fixture or floor drain or installed below the base slab shall be provided with an accessible cleanout of adequate size. Provide trap primers where required by code and where indicated on the drawings.

B. CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS

Cleanouts, floor drains and roof drains shall be by one manufacturer if possible. Acceptable manufacturers are Josam, MIFAB, Sioux Chief, Smith, Wade, Watts, and Zurn. Provide long sweep fittings for cleanout extensions; short sweeps at start of runs or change in direction and combination wye and eight bend fittings in horizontal runs. Install cleanouts with a minimum of 18 inches clear all around; consult local codes for other requirements, for easy system maintenance. Install plug with Teflon joint compound.

Floor Drains: As scheduled on the drawings.

Floor Cleanouts: As scheduled on the drawings. Install cleanouts at points as noted on the drawings, at the building exit; at a minimum of every 50 feet in horizontal soil and waste lines; and at turns of pipe greater than 45 degrees cleanouts shall be full size of the pipe up to 4 inches, and 4 inch size for pipes larger than 4 inches. Determine the type of floor covering to be used at each floor cleanout location. Provide cleanouts with variations suitable for floor covering (carpet markers, recessed for tile and scoriated for unfinished floor). Rough-in and install each floor cleanout flush with the finished floor construction.

Roof Drains: As scheduled on the drawings. Provide with roof sump receiver, extension, secondary flashing clamps and underdeck clamps as required; provide expansion joints where required. Provide overflow roof drains where indicated on the drawings with inlet flow line 2 inches above the primary roof drain inlet.

C. VALVES, STRAINERS, HOSE BIBBS, AND UNIONS

Plumbing system valves shall be designed for 125 psi steam working pressure and 200 psi cold water pressure. Install valves on the hot and cold water lines at the water heater connections and other items of equipment, at branches from mains serving groups of fixtures, and at other places indicated or required by the installation to allow ease of future maintenance. Submit certification that valves, fittings and specialties comply with NSF 61 Annex G and / or NSF 372. Except for the following: Hose bibbs, hydrants, backflow preventers isolating irrigation or mechanical make-up systems, emergency mixing valves and trap primers.

Ball Valves 2 inch and Smaller (may be used in lieu of gate valves up to 2 inch): Class 150, two piece lead free cast bronze body, with sweat ends, chrome plated bronze ball with conventional port, 600 psi, blow-out proof stem by Apollo # 70-LF-200, Hammond # UP8501, Milwaukee # UPBA-150.

Gate Valves 2-1/2 inch and Larger: Class 125, non-rising stem, iron body flanged wedge gate with brass seats and stem by Apollo # 611, Hammond IR # 1138, Milwaukee # F-2882 or Nibco #619.

Cast Iron Pipe: Adjustable band hangers for 2 inch and smaller. Clevis hangers for 3 inch and larger shall be B-Line #B3100 galvanized steel clevis type. Riser clamps to support vertical pipe shall be B-Line #B3373 galvanized steel.

PVC Pipe: Adjustable band hangers for 3 inch and smaller. Clevis hangers for 4 inch and larger shall be B-Line #B3100 galvanized steel clevis type. Riser clamps to support vertical pipe shall be B-Line #B3373 galvanized steel.

Insulation Protection Shields: B-Line #B3151 of 18 gauge galvanized steel metal. Shield shall cover half of the circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

Hanger Spacing, Rod Sizes & Connectors: Connect rods to steel beams or joists with B-Line #B3031 or #B3033 beam clamps as required. Connect rods to concrete with B-Line #3014 malleable iron single type inserts with malleable iron nut. Connect rods in wood construction with B-Line #B3058 side beam connectors. Hang and support piping with spacing and rod sizes as follows:

Copper Tube: 1-1/2 inch and smaller - every 6 feet with 3/8 inch hanger rods; 2 inch - every 10 feet with 3/8inch hanger rods; 2-1/2 inch - every 10 feet with 3/8 inch hanger rods; 3 inch - every 10 feet with 1/2 inch rods, 4 inch - every 10 feet with 5/8 inch hanger rods. Support vertical copper tube every 10 feet.

Cast Iron Pipe

GENERAL NOTES

SPECIFICATION REFERENCES:

1. REFER TO DIVISION 27 SPECIFICATION SECTION "AUDIO-VIDEO SYSTEMS" AND RELATED DOCUMENTS AND SECTIONS FOR PRODUCT INFORMATION AND ADDITIONAL REQUIREMENTS.
2. CATEGORY AND FIBER CABLING SHALL BE INSTALLED, TERMINATED, AND TESTED PER DIVISION 27 SECTION "TELECOMMUNICATIONS REQUIREMENTS FOR AUDIO-VIDEO SYSTEMS".

GENERAL PATHWAY NOTES:

1. ALL BUILDING INFRASTRUCTURE, CONDUIT, AND PATHWAYS INCLUDING BUT NOT LIMITED TO CONDUIT, RACEWAYS, CABLE TRAYS, PEDESTALS, BACK BOXES, JUNCTION BOXES, FLOOR BOXES, DOORS, LIDS, AND COVERS ARE PER DIVISION 27 SECTION "COMMON WORK RESULTS FOR COMMUNICATIONS" UNLESS OTHERWISE NOTED WITHIN THIS DRAWING SERIES SET.
2. REFER TO "CONDUIT ROUTING AND SEPARATION" ON THIS SHEET FOR CONDUIT SPACING INFORMATION.
3. PROVIDE CONTINUOUS UNOBSTRUCTED CABLE PATH FOR ENTIRE LENGTH OF CABLE RUN. EXPOSED CABLING MAY REQUIRE CONDUIT TRANSITION(S) TO ACHIEVE A COMPLETE PATHWAY.
4. COORDINATE ANY CONFLICTS WITH APPROPRIATE DISCIPLINES.
5. REFER TO LIFE SAFETY PLANS FOR LOCATION OF FIRE- AND SMOKE-RATED WALLS AND FLOORS. PROVIDE LISTED FIRESTOPPING SYSTEMS FOR PENETRATIONS PER DIVISION 27 SPECIFICATION SECTION "COMMON WORK RESULTS FOR COMMUNICATIONS".

BOX SCHEDULE NOTES:

1. VERIFY QUANTITIES, LOCATIONS, AND MOUNTING WITH PLAN, DETAIL, AND EQUIPMENT VIEW DRAWINGS.
2. ALL BOXES SHOWN IN SCHEDULE ARE PER DIVISION 27 SECTION "COMMON WORK RESULTS FOR COMMUNICATIONS" UNLESS OTHERWISE NOTED WITHIN THIS DRAWING SERIES SET.
3. FIELD VERIFY MOUNTING CONDITIONS AND BOX SIZE PRIOR TO INSTALLATION.
4. WALL MOUNTED BOXES SHOWN AT SWITCH OR CONVENIENCE OUTLET HEIGHT SHALL MATCH MOUNTING HEIGHT OF ADJACENT BOXES ON WALL UNLESS OTHERWISE NOTED.
5. WALL MOUNTED TERMINATION GANG BOXES SHALL BE MOUNTED 18" A.F.F. TO CENTER OF DEVICE UNLESS OTHERWISE NOTED.
6. WALL MOUNTED TERMINATION NEMA AND MANUFACTURER SPECIFIC BOXES SHALL BE MOUNTED 16" A.F.F. TO BOTTOM OF DEVICE UNLESS OTHERWISE NOTED.
7. SURFACE MOUNTED BOXES SHALL BE PAINTED TO MATCH SURROUNDING FINISH.
8. COORDINATE ANY CONFLICTS WITH APPROPRIATE DISCIPLINES.

GENERAL PANEL AND PLATE NOTES:

1. CUSTOM TERMINATION COVER PANELS AND PLATES SHALL BE PROVIDED PER SPECIFICATION SECTION "AUDIO-VIDEO SYSTEMS" REQUIREMENTS AND SHALL BE SIZED TO APPROPRIATELY SELF-TRIM THEIR CORRESPONDING BACK BOX.
2. ALL PANELS AND PLATES SHALL BE 1/8" THICK (MINIMUM) BLACK ANODIZED ALUMINUM WITH ENGRAVED OR LASER ETCHED LETTERING OF A CONTRASTING COLOR. DEFAULT ENGRAVED TEXT COLOR SHALL BE WHITE. UTILIZE 3/16" UPPER CASE LETTERING, SANS-SERIF FONT. VERIFY PLATE COLOR WITH ARCHITECT.
3. REINFORCE PLATE AND/OR INCREASE PLATE THICKNESS TO MINIMIZE DEFLECTION.
4. UTILIZE COUNTERSUNK SCREW HEADS. SCREWS HEADS SHALL MATCH PLATE COLOR.
5. ANY PANEL AND PLATE DETAILS OR INFORMATION RELATED TO TERMINATION PLATING CONTAINED IN THIS SET ARE INCLUDED FOR COMMUNICATION OF FABRICATION REQUIREMENTS AND ARE FOR CONCEPT ONLY. LAYOUTS DO NOT REFLECT SPECIFIC REQUIREMENTS FOR THIS PROJECT UNLESS SPECIFICALLY STATED AS SUCH. VERIFY SIZES OF ALL COMPONENTS AND BOXES PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
6. FIELD VERIFY THE SIZE OF ALL COMPONENTS AND BOXES PRIOR TO INSTALLATION. MODIFY PLATE SIZES IN THE CASE OF ALTERATIONS TO FIELD CONDITIONS.
7. REFER TO SPECIFICATIONS FOR SUBMITTAL AND ADDITIONAL PANEL AND PLATE REQUIREMENTS.

CABLE TERMINATION NOTES:

1. ALL AUDIO TERMINATIONS SHOULD COMPLY WITH RANE CORPORATION RANENOTE 110 REFERENCE FOR SOUND SYSTEM INTERCONNECTION. WWW.RANE.COM/NOTE110.HTML

EQUIPMENT RACK NOTES:

1. REFER TO SPECIFICATIONS FOR RACK LAYOUT SUBMITTAL REQUIREMENTS.
2. ANY RACK LAYOUTS OR INFORMATION RELATED TO EQUIPMENT RACKING CONTAINED IN THIS SET ARE FOR CONCEPT ONLY. VERIFY RACK LAYOUT FOR EQUIPMENT FURNISHED PRIOR TO SUBMITTAL OF SHOP DRAWINGS. REVISE AS REQUIRED FOR ALTERNATES ACCEPTED OR REJECTED.
3. IF THERE ARE DIFFERENCES IN EQUIPMENT RACKING INFORMATION TO THAT SHOWN ON THE SIGNAL FLOW DIAGRAMS, SIGNAL FLOWS SHALL TAKE PRECEDENCE.

LOUDSPEAKER INSTALLATION NOTES:

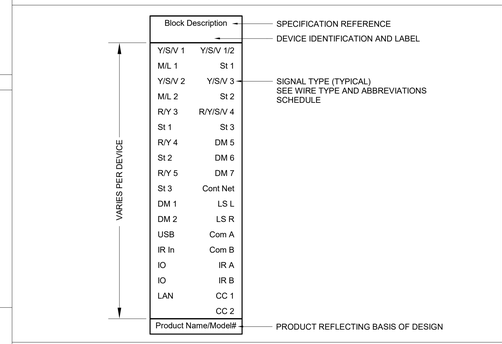
1. ANY STRUCTURAL DETAILS, STRUCTURAL MEMBER TYPES, SIZES, AND ATTACHMENT METHODS CONTAINED IN THIS SET ARE SHOWN FOR CONCEPT ONLY. FINAL DESIGN, INCLUDING DOCUMENTATION STAMPED BY STRUCTURAL ENGINEER (PROVIDED AS PORTION OF SHOP DRAWING REQUIREMENTS), SHALL BE MADE BY THE CONTRACTOR AND SHALL BE VERIFIED BY THE OWNER AND AV CONSULTANT.
2. REFER TO SPECIFICATIONS FOR ALL MOUNTING, INSTALLATION, ACCESS, AND SHOP DRAWING REQUIREMENTS.
3. EXPOSED LOUDSPEAKER CIRCUITS UTILIZING STRUCTURAL STEEL PATHWAYS SHALL BE ROUTED HIGH WITHIN TRUSS SPACE OR WHERE OTHERWISE PROTECTED FROM DAMAGE. ROUTING SHALL MINIMIZE CIRCUIT LENGTH BETWEEN LOUDSPEAKER AND EQUIPMENT RACK WHERE FEASIBLE. NEATLY BUNDLE CIRCUITS AND FASTEN SECURELY TO STRUCTURE TO ENSURE PROPER SUPPORT AND PROTECTION. TO MINIMIZE DAMAGE FROM TEMPORARY RIGGING ACTIVITIES ASSOCIATED WITH SPECIAL EVENT SUPPORT, AVOID ROUTING CIRCUITS IN AREAS PRONE TO THIS USE, I.E. BOTTOM CHORDS OF TRUSSES. AVOID CONTACT OR CONFLICT WITH OTHER BUILDING ELEMENTS SUCH AS LIGHTING FIXTURES & BALLASTS, DUCTS, RIGGING, AND SHARP EDGES. CABLE COLOR SHALL MATCH SURROUNDING ELEMENTS.

WIRE TYPE AND ABBREVIATIONS

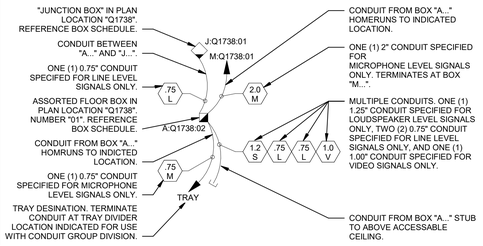
(NOTE 1)	ABBREVIATION DEFINITION OR SIGNAL TYPES	WIRE TYPE	(NOTE 2)
AB	AUDIO TRANSPORT OVER MANUF. PROPRIETARY (NON-IP) PROTO. - REQ. STP	CAT6 STP	90m
AEC	ACOUSTIC ECHO CANCELING SIGNAL	-	
AES	DIGITAL AUDIO OVER AES FORMAT - BALANCED	22 AWG	100m
	UNBALANCED	RG-6	1000m
AN	AUDIO TRANSPORT OVER IP STANDARD PROTOCOL REQUIRING STP	CAT6 STP	90m
CC	RELAY OR CONTACT CLOSURE CONTROL SIGNAL	22 AWG	
Com	CONTROL SIGNAL (RS232, RS422, RS485)	22 AWG	
	LOW CAPACITANCE CONTROL CABLE FOR LONG RUNS	(NOTE 3)	
Ctl	CONTROL SIGNAL OVER MANUF. PROPRIETARY PROTOCOL	(NOTE 3)	
D	DVI VIDEO SIGNAL	PREMADE	25'
DM	DIGITAL MEDIA AUDIO/VIDEO/CONTROL SIGNAL	CAT6 STP	90m
DP	DISPLAY PORT SIGNAL	PREMADE	3m
FW	FIREWIRE IEEE 1394	PREMADE	4.5m
GPIO	GPI/GPO/GPIO - GENERAL PURPOSE INPUT AND/OR OUTPUT	(NOTE 4)	
H	HDMI VIDEO/AUDIO SIGNAL	(NOTE 3)	
HDSDI	HD-SDI PER SMPTE 292M	RG-59	300'
		RG-6	370'
		RG-11	580'
IC	INTERCOM (PRODUCTION)	22 AWG	
IR	INFRARED CONTROL SIGNAL	PREMADE	
I/O	VARIABLE VOLTAGE CONTROL SIGNAL	22 AWG	
L	LINE LEVEL AUDIO SIGNAL	22 AWG	
LAN	ETHERNET	CAT6	90m
LS	LOUDSPEAKER LEVEL AUDIO SIGNAL 2/4/8/16OHM	(NOTE 4)	
LS70	LOUDSPEAKER LEVEL AUDIO SIGNAL 70V	(NOTE 4)	
M	MICROPHONE LEVEL AUDIO SIGNAL	22 AWG	
MADI	MADI SIGNAL PROTOCAL	RG-6	100m
		SMF	40km
MIDI	MIDI CONTROL SIGNAL	PREMADE	
MMF	MULTI-MODE FIBER	(NOTE 3)	
Mono	MONO AUDIO SIGNAL	22 AWG	
Phone	TELEPHONE SIGNAL	CAT3	
R	RGBHV VIDEO SIGNAL	PREMADE	25'
Ref	REFERENCE/SYNC/BLACK - BLACK BURST OR TRI-LEVEL SYNCHRONIZATION	RG-59	
RF	RADIO FREQUENCY	RG-58	IN RACK
	RF WIRELESS MIC ANTENNA (-5dB @ 800MHz NO AMP)	RG-8X	40'
	RF WIRELESS MIC ANTENNA (-5dB @ 800MHz NO AMP)	RG-213	65'
	RF WIRELESS MIC ANTENNA (-5dB @ 800MHz NO AMP)	RG-8/U	120'
SAT IF	SATELLITE INTERMEDIATE FREQUENCY SIGNAL (TYPICALLY L-BAND)	RG-59	IN RACK
		RG-6	DROP
		RG-11	DISTRO
SDI	SERIAL DIGITAL INTERFACE PER SMPTE 259M	PREMADE	950'
		RG-6	1150'
		RG-11	1850'
SMF	SINGLE-MODE FIBER	(NOTE 3)	2.5Km
SPDIF	DIGITAL AUDIO OVER S/PDIF	PREMADE	10m
St	STEREO AUDIO SIGNAL	PREMADE	5m
		22 AWG	
TLY	TALLY	24 AWG	
TB	THUNDERBOLT SIGNAL	PREMADE	3m
TC	TIMECODE	RG-59	
TIE LINES	MICROPHONE LEVEL	22 AWG	
	LINE LEVEL	22 AWG	
	LOUDSPEAKER LEVEL	(NOTE 4)	
	VIDEO	(NOTE 4)	
TPA	AUDIO SIGNAL OVER TWISTED PAIR	CAT6	90m
TPC	CONTROL SIGNAL OVER TWISTED PAIR	CAT6	90m
TPT	TELEVISION SIGNAL OVER TWISTED PAIR	CAT6	90m
TPV	VIDEO SIGNAL OVER TWISTED PAIR	CAT6	90m
TRIAX	TRIAX VIDEO CAMERA CABLE	RG-59/U	IN ROOM
		RG-11/U	2950'
TV	CABLE TELEVISION DISTRIBUTION SIGNAL	RG-59	IN RACK
		RG-6	DROP
		RG-11	DISTRO
		1/2" HARDLINE	TRUNK
USB	UNIVERSAL SERIAL BUS SIGNAL	PREMADE	
USB1	USB VERSION 1.0	PREMADE	5m
USB2	USB VERSION 2.0	PREMADE	5m
USB3	USB VERSION 3.0	PREMADE	5m
V	COMPOSITE VIDEO SIGNAL	RG-59	750'
		RG-6	900'
		RG-11	1200'
Y	COMPONENT VIDEO SIGNAL	RG-59	125'
		RG-6	200'
3GSDI	3G-SDI PER SMPTE 424M	RG-59	200'
		RG-6	250'
		RG-11	390'
6GSDI	6G-SDI	(NOTE 4)	
*	DENOTES PORTION OF ITEM		

NOTES	
	COMPLY WITH ALL MANUFACTURER REQUIREMENTS.
1	SIGNAL FLOW SIGNAL TYPE ABBREVIATION.
2	CABLE DISTANCE LIMITATION. CONTACT CONSULTANT FOR CONDITIONS OUTSIDE PARAMETERS.
3	REFER TO SPECIFICATION FOR WIRE TYPE.
4	REFER TO SIGNAL FLOWS FOR WIRE TYPE.

SIGNAL FLOW BLOCK LEGEND



PLAN BOX & CONDUIT EXAMPLE



NOTE: FOR TYPICAL BOXES, REFER TO TYPICAL BOX SCHEDULE FOR ADDITIONAL INSTRUCTIONS. FOLLOW CONDUIT REQUIREMENTS AS LISTED IN SCHEDULE AND ANY ADDITIONAL NOTES AS INDICATED ON PLANS.

AUDIO-VIDEO SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ABBREVIATIONS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

AUDIO

SIGNAL FLOW	PANEL/PLATE	DESCRIPTION
F3	F3	FEMALE 3-PIN XLR PANEL MOUNT CONNECTOR
M3	M3	MALE 3-PIN XLR PANEL MOUNT CONNECTOR
C3	C3	FEMALE COMBO 3-PIN XLR AND 1/4" PANEL MOUNT CONNECTOR
F4	F4	FEMALE 4-PIN XLR PANEL MOUNT CONNECTOR
M4	M4	MALE 4-PIN XLR PANEL MOUNT CONNECTOR
F5	F5	FEMALE 5-PIN XLR PANEL MOUNT CONNECTOR
M5	M5	MALE 5-PIN XLR PANEL MOUNT CONNECTOR
F3		FEMALE XLR CABLE MOUNT CONNECTOR (NUMBER BELOW SYMBOL INDICATES NUMBER OF PINS)
M3		MALE XLR CABLE MOUNT CONNECTOR (NUMBER BELOW SYMBOL INDICATES NUMBER OF PINS)
		1/4" 3-CONDUCTOR PANEL MOUNT CONNECTOR
		1/4" 3-CONDUCTOR CABLE MOUNT CONNECTOR
		1/8" 3-CONDUCTOR MINI PANEL MOUNT CONNECTOR
		1/8" 3-CONDUCTOR MINI CABLE MOUNT CONNECTOR
4		SPEAKON JACK, 2-CONDUCTOR BLANK, 4-CONDUCTOR SHOWN
4		SPEAKON PLUG, SIMILAR TO ABOVE
		MALE DT12 PANEL MOUNT CONNECTOR
		FEMALE DT12 PANEL MOUNT CONNECTOR

DATA

SIGNAL FLOW	PANEL/PLATE	DESCRIPTION
		ST FIBER PANEL MOUNT CONNECTOR
		ST FIBER CABLE MOUNT CONNECTOR
		LC FIBER PANEL MOUNT CONNECTOR
		LC FIBER CABLE MOUNT CONNECTOR
		HYBRID FIBER PANEL MOUNT CONNECTOR
		HYBRID FIBER CABLE MOUNT CONNECTOR
		UTP PANEL MOUNT CONNECTOR
		UTP CABLE MOUNT CONNECTOR
		RJ-45 STANDARD PANEL MOUNT CONNECTOR
		RJ-45 STANDARD CABLE MOUNT CONNECTOR
		RJ-11 PANEL MOUNT CONNECTOR
		RJ-11 CABLE MOUNT CONNECTOR

NOTE: REFER TO DIVISION 27 SECTION "TELECOMMUNICATIONS REQUIREMENTS FOR AUDIO-VIDEO SYSTEMS" FOR ADDITIONAL INFORMATION

AUDIO-VIDEO

SIGNAL FLOW	PANEL/PLATE	DESCRIPTION
		FEMALE RCA PANEL MOUNT CONNECTOR
		MALE RCA CABLE MOUNT CONNECTOR
		FEMALE PANEL MOUNT MULTIPIN CONNECTOR
		FEMALE CABLE MOUNT MULTIPIN CONNECTOR
		MALE CABLE MOUNT MULTIPIN CONNECTOR
		PATCH JACK PLUG

NOTE: PANEL & PLATE CONNECTORS ARE NOT SHOWN TO SCALE.

VIDEO

SIGNAL FLOW	PANEL/PLATE	DESCRIPTION
		BNC PANEL MOUNT CONNECTOR
		CABLE END BNC CONNECTOR
		75 OHM BNC TERMINATOR
		RGBHV HD-15 PANEL MOUNT CONNECTOR
		RGBHV HD-15 CABLE MOUNT CONNECTOR
		DVI PANEL MOUNT CONNECTOR
		DVI CABLE MOUNT CONNECTOR
		HDMI PANEL MOUNT CONNECTOR
		HDMI CABLE MOUNT CONNECTOR
		DISPLAYPORT PANEL MOUNT CONNECTOR
		DISPLAYPORT CABLE MOUNT CONNECTOR
		F-STYLE RF PANEL MOUNT CONNECTOR
		F-STYLE RF CABLE MOUNT CONNECTOR
		VIDEO PATCH PANEL JACK
M		TRIAX MALE
F		TRIAX FEMALE
M		SMPTE 304 MALE
F		SMPTE 304 FEMALE

CONTROL

SIGNAL FLOW	PANEL/PLATE	DESCRIPTION
		COM (DB-9) PANEL MOUNT CONNECTOR
		COM (DB-9) CABLE MOUNT CONNECTOR
		IR EMITTER
		USB TYPE A PANEL MOUNT CONNECTOR
		USB TYPE A CABLE MOUNT CONNECTOR
		USB TYPE B PANEL MOUNT CONNECTOR
		USB TYPE B CABLE MOUNT CONNECTOR
		USB TYPE C PANEL MOUNT CONNECTOR
		USB TYPE C CABLE MOUNT CONNECTOR

DEVICES AND CONNECTIONS

SIGNAL FLOW	DESCRIPTION
	CONNECTION TO CHASSIS GROUND
	RUBBER JACKETED EXTENSION CABLE
	PARALLEL CONNECTION OR CHANGE IN WIRE TYPE
	ANTENNA
	PATCH POINT. CONNECT TO PATCH PANEL PER SPECIFICATION REQUIREMENTS
A1 700	CONNECTION BUBBLE UPPER DESIGNATION REFERS TO CONNECTION LABEL. LOWER DESIGNATION REFERS TO THE SHEET NUMBER ON WHICH THE CONNECTION IS CONTINUED.
	EQUIPMENT / TERMINATIONS WITHIN A COMMON LOCATION AS LABELED.
	ALTERNATE OUTLINE

CONDUIT/CIRCUIT GROUP DIVISIONS

GROUP	DESCRIPTIONS	LEVEL	BANDWIDTH
A	CONTROL CIRCUITS	0-28 VOLT INTO <50 kOHMS	0 Hz TO 250 MHz
	DATA CIRCUITS	2 VOLT PEAK-TO-PEAK INTO 100 OHMS	0 Hz TO 500 MHz
	FIBER CIRCUITS		
L	LINE LEVEL AUDIO CIRCUITS	-30dBU TO +24dBu	20 Hz TO 20kHz
M	MICROPHONE LEVEL AUDIO CIRCUITS	BELOW -30dBu	20 Hz TO 20kHz
P	PRODUCTION INTERCOM COMMUNICATION CIRCUITS	-30dBU TO +24dBu	20 Hz TO 20kHz
S	SPEAKER LEVEL AUDIO CIRCUITS INCLUDING BOTH LOW IMPEDANCE AND HIGH IMPEDANCE (70 VOLT) TYPES	GREATER THAN +24dBu	20 Hz TO 20kHz
V	VIDEO CIRCUITS	1 VOLT PEAK-TO-PEAK INTO 75 OHMS	0 Hz TO 250 MHz
W	RF LEVEL CIRCUITS INCLUDING WIRELESS MICROPHONE, ANTENNA CABLE, SATELLITE, ASSISTED LISTENING SYSTEM, AND TV DISTRIBUTION	GREATER THAN +24dBu	5 MHz TO 3GHz

CONDUIT ROUTING AND SEPARATION

BOTH EMT

EMT	RIGID	M	L, P	W	S	V
M	-	ADJACENT	6"	12"	12"	12"
L, P	-	6"	ADJACENT	12"	12"	6"
W	-	12"	12"	ADJACENT	ADJACENT	6"
S	-	12"	12"	ADJACENT	ADJACENT	6"
V	-	12"	6"	6"	6"	ADJACENT
POWER CONDUIT UNDER 60A	-	24"	24"	24"	24"	24"
POWER CONDUIT 60A	-	36"	36"	36"	36"	36"
POWER CONDUIT 120A	-	48"	48"	48"	48"	48"
POWER CONDUIT 240A	-	RIGID	RIGID	RIGID	RIGID	RIGID
POWER CONDUIT 400A	-	RIGID	RIGID	RIGID	RIGID	RIGID

POWER IN RIGID

EMT	RIGID	M	L, P	W	S	V
M	-	ADJACENT	6"	12"	12"	12"
L, P	-	6"	ADJACENT	12"	12"	6"
W	-	12"	12"	ADJACENT	ADJACENT	6"
S	-	12"	12"	ADJACENT	ADJACENT	6"
V	-	12"	6"	6"	6"	ADJACENT
-	POWER CONDUIT UNDER 60A	4"	4"	4"	4"	4"
-	POWER CONDUIT 60A	8"	8"	8"	8"	8"
-	POWER CONDUIT 120A	12"	12"	12"	12"	12"
-	POWER CONDUIT 240A	24"	24"	24"	24"	24"
-	POWER CONDUIT 400A	48"	48"	48"	48"	48"

BOTH IN RIGID

EMT	RIGID	M	L, P	W	S	V
-	M	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
-	L, P	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
-	W	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
-	S	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
-	V	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
-	POWER CONDUIT UNDER 60A	1"	1"	1"	1"	1"
-	POWER CONDUIT 60A	2"	2"	2"	2"	2"
-	POWER CONDUIT 120A	4"	4"	4"	4"	4"
-	POWER CONDUIT 240A	8"	8"	8"	8"	8"
-	POWER CONDUIT 400A	16"	16"	16"	16"	16"

PLAN LEGEND

BOX AND PLAN SYMBOLS

- X## — WALL BOX. "X" INDICATES FUNCTION OF BOX (REFER TO BOX LABEL LEGEND). "##" INDICATES BOX DESIGNATION.
- X## — FLOOR BOX. SIMILAR TO ABOVE.
- X## — POKE THRU. SIMILAR TO ABOVE.
- AV X## — CEILING MOUNTED BOX. SIMILAR TO ABOVE.
- S S## — FLUSH MOUNTED CEILING LOUDSPEAKER. "S##" DESIGNATOR INDICATES LOUDSPEAKER IDENTIFICATION INFORMATION.
- S S## — PENDANT MOUNTED LOUDSPEAKER. "S##" DESIGNATOR INDICATES LOUDSPEAKER IDENTIFICATION INFORMATION.
- M X## — CEILING MOUNTED MICROPHONE. SIMILAR TO ABOVE. NO BACK BOX.
- C X## — CEILING MOUNTED CAMERA. SIMILAR TO ABOVE. NO BACK BOX.

TYPICAL BOX SYMBOLS

- YY — WALL BOX. "YY" INDICATES TYPE. REFER TO TYPICAL BOX SCHEDULE FOR ADDITIONAL INFORMATION AND AS INDICATED ON PLANS AND KEY NOTES.
- YY-F# YY — FLOOR BOX. CEILING BOX. SIMILAR TO ABOVE. "YY" INDICATES SYMBOL TYPE. "-F#" INDICATES UNIQUE IDENTIFIER.

NOTE: BLANK CELLS ON TYPICAL BOX SCHEDULE INDICATE INFORMATION PROVIDED ELSEWHERE.

CONDUIT LEGEND

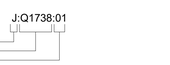
- # A — INDICATES ASSORTED SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # L — INDICATES LINE LEVEL SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # M — INDICATES MICROPHONE LEVEL SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # P — INDICATES PRODUCTION INTERCOM LEVEL SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # S — INDICATES LOUDSPEAKER LEVEL SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # V — INDICATES VIDEO SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- # W — INDICATES WIRELESS/RF SIGNALS ONLY. "#" SPECIFIES SIZE OF CONDUIT.
- .75 X — 0.75" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 1.0 X — 1" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 1.2 X — 1.25" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 1.5 X — 1.5" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 2.0 X — 2" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 2.5 X — 2.5" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- 3.0 X — 3" CONDUIT. X INDICATES SIGNAL TYPE, SEE ABOVE.
- CONDUIT PATH.
- X## — CONDUIT PATH CONTINUES ON TO DESTINATION AS INDICATED.
- CONDUIT STUB TO ACCESSIBLE PORTION OF CEILING. BUSH CONDUIT ENDS.
- CONDUIT STUB TO BELOW RAISED FLOOR IF PRESENT, OTHERWISE BELOW FLOOR SLAB. BUSH CONDUIT ENDS.
- CONDUIT IN/UNDER FLOOR/GROUND CONSTRUCTION
- EXPOSED CABLE PATH. NO CONDUIT.
- CABLE TRAY. SIZE AS INDICATED ON PLANS.

REFER TO BOX SCHEDULE FOR ADDITIONAL INFORMATION.

LABEL LEGEND

A	ASSORTED
B	BROADCAST
C	CONTROL
D	DSS SATELLITE
E	EXISTING
F	FUTURE / BY OTHERS
G	GAME CLOCK
J	JUNCTION / PULL BOX
K	CAMERA
L	LINE-LEVEL AUDIO
M	MICROPHONE-LEVEL AUDIO
P	PRODUCTION INTERCOM
R	EQUIPMENT RACK
S	LOUDSPEAKER-LEVEL AUDIO
T	TELEVISION DISTRIBUTION
V	VIDEO
W	WIRELESS / RF
DS	DIGITAL SIGNAGE
DV	DIRECT VIEW LED
FP	FLAT PANEL DISPLAY
LS	LOUDSPEAKER
PR	PROJECTOR
PS	PROJECTION SCREEN
TV	TELEVISION
VW	VIDEO WALL

LABEL STANDARD



CALL OUTS

- ENLARGED PLAN CALLOUT
- NOT IN SCOPE

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
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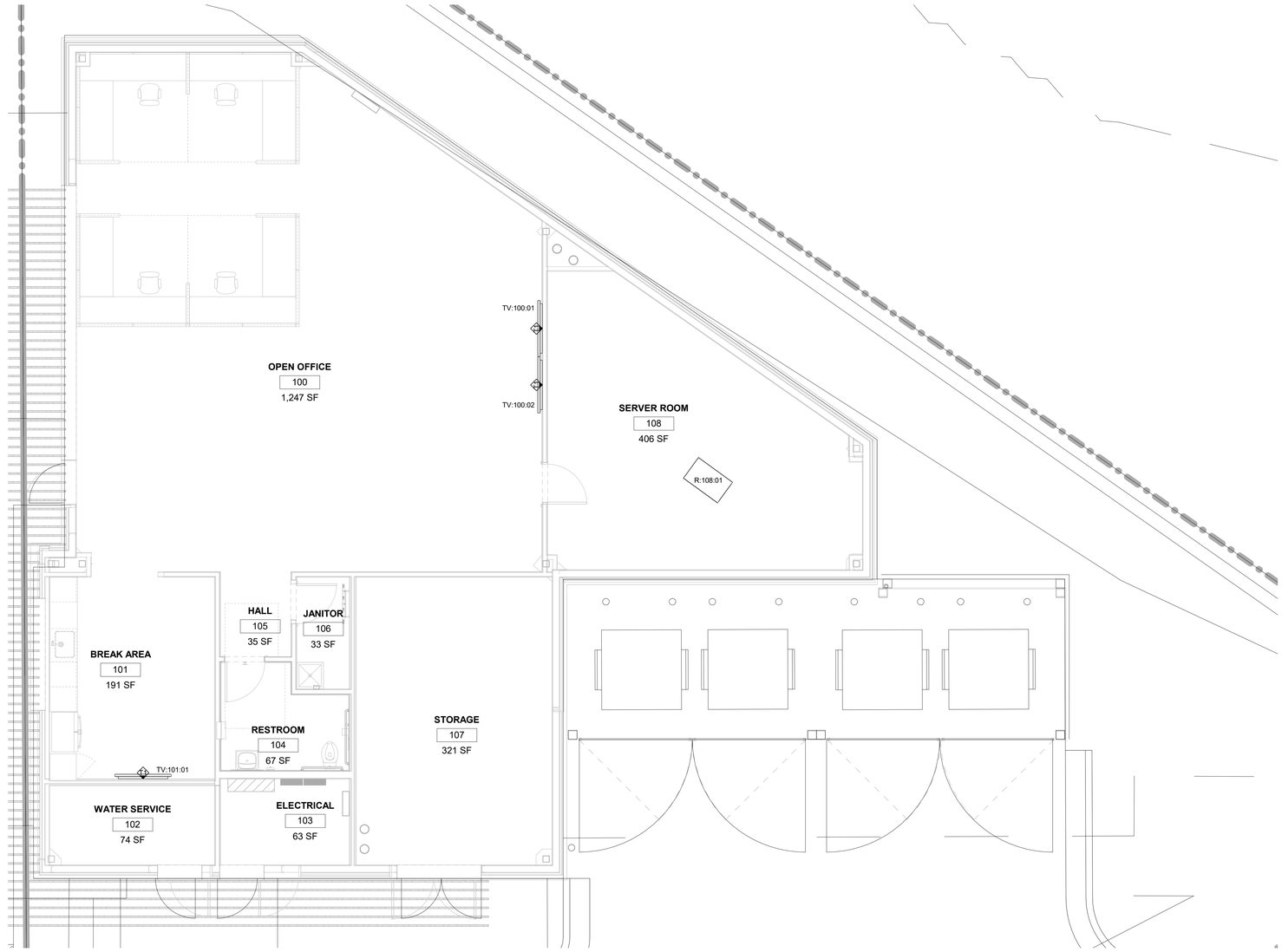
EXPIRES 12/31/2021

SHEET TITLE

AUDIO-VIDEO GENERAL NOTES AND LEGEND

SHEET NUMBER

TA0.00



1 AUDIO-VIDEO FIRST FLOOR PLAN
1/4" = 1'-0"

NORTH

PARAGON STAR

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EXPIRES 12/31/2021

SHEET TITLE

AUDIO-VIDEO FIRST FLOOR PLAN

SHEET NUMBER

TA1.01

AUDIO-VIDEO BOX SCHEDULE - TYPICALS

BOX FUNCTION		BOX PROPERTIES		MOUNTING CONDITION	MOUNTING HEIGHT	BOX COVER & INSERTS	FURNISHED BY	INSTALLED BY	PROVIDED BY	CONDUIT SIZE & QTY	CONDUIT DESTINATION	CONDUIT ROUTING
ID	DESCRIPTION	B.O.D. MANUF.	B.O.D. MODEL									
T1	ASSORTED CONNECTION WALL BOX	CHIEF	PAC 526	FLUSH - IN WALL	CENTER OF DISPLAY	PROVIDE	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	(1) 1.25" E.C.	SERVER ROOM 108	STUB UP TO TRAY

AUDIO-VIDEO FLAT PANEL DISPLAY SCHEDULE

ID	DISPLAY PROPERTIES			MOUNTING REQUIREMENTS			DISPLAY RESPONSIBILITY		NOTES
	SPEC NAME	B.O.D. MANUF.	B.O.D. MODEL	INSTALL HEIGHT AFF. (CENTER OF DISPLAY)	TYPE	FURNISHED BY	INSTALLED BY	PROVIDED BY	
TV:100:01	LCD COMMERCIAL DISPLAY	SAMSUNG	QB55R	60"	WALL - FIXED	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	FOR VIEWING OF SECURITY FEEDS. DIV. 27 AV CONTRACTOR NOT RESPONSIBLE FOR PROVIDING CONTENT. SIGNAL EXTENSION USING HDBASET TRANSMIT/RECEIVE PAIR REQUIRED FOR SIGNAL EXTENSION TO SECURITY SERVER.
TV:100:02	LCD COMMERCIAL DISPLAY	SAMSUNG	QB55R	60"	WALL - FIXED	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	FOR VIEWING OF SECURITY FEEDS. DIV. 27 AV CONTRACTOR NOT RESPONSIBLE FOR PROVIDING CONTENT. SIGNAL EXTENSION USING HDBASET TRANSMIT/RECEIVE PAIR REQUIRED FOR SIGNAL EXTENSION TO SECURITY SERVER.
TV:101:01	LCD COMMERCIAL DISPLAY	SAMSUNG	QB55R	60"	WALL - FIXED	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	OFE SIGNAGE DEVICE LOCATED BEHIND DISPLAY PROVIDED FOR VIEWING IN BREAK ROOM. DATA CONNECTIONS SHOWN ON TN DRAWINGS.

AUDIO-VIDEO EQUIPMENT RACK SCHEDULE

ID	RACK PROPERTIES		RACK UNITS	FURNISHED BY	INSTALLED BY	PROVIDED BY	NOTES
	B.O.D. MANUF.	B.O.D. MODEL					
R:108:01	MIDDLE ATLANTIC	BGR-4532	45	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	DIV. 27 AV CONTRACTOR	AV EQUIPMENT RACK TO SUPPORT DIGITAL SIGNAGE SYSTEMS AND FUTURE EQUIPMENT. RACK SHALL BE COORDINATED WITH NEIGHBORING TELECOM AND SECURITY EQUIPMENT. IN-ROOM LADDER RACK AND PATHWAYS FOR DIGITAL SIGNAGE SHALL BE PROVIDED BY DIV. 27 TELECOM CONTRACTOR. REFER TO TN DRAWINGS FOR ADDITIONAL INFORMATION.

PARAGON STAR

LOT 20 - HUB BUILDING

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EXPIRES 12/31/2021

SHEET TITLE

AUDIO-VIDEO SCHEDULES

SHEET NUMBER

TA4.01

TELECOMMUNICATIONS SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

V2.00

STANDARD MOUNTING HEIGHTS

TELECOM BACKBOARD (BOTTOM OF BACKBOARD)	4"
LADDER RACK IN TELECOM ROOMS (BOTTOM OF DEVICE)	90"
CABLE TRAY / CONDUIT AFC (BOTTOM OF PATHWAY)	3"(MIN)
LIGHT FIXTURE IN TELECOM ROOMS (BOTTOM OF DEVICE)	108"(MIN)
TELEPHONE WALL OUTLET (CENTERLINE)	48"
DATA WALL OUTLET	SAME AS ADJACENT DEVICE, UNO
TELEVISION OUTLET	REFER TO ARCH DRAWINGS
TMGB/TGB (CENTERLINE)	84"
WALL CLOCK (CENTERLINE)	84"
INTERCOM (CENTERLINE)	48"

USE THE DEFAULT MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ARE ABOVE FINISHED FLOOR (AFF) OR ABOVE FINISHED GRADE (AFG) TO BOTTOM OF OUTLET BOX. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ABBREVIATIONS

A	AMPERES
ADA	AMERICANS WITH DISABILITIES ACT
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS POINT
AV	AUDIO-VIDEO
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BBC	BACKBONE BONDING CONDUCTOR
BD	BUILDING DISTRIBUTOR
BDF	BUILDING DISTRIBUTION FRAME
BFC	BELOW FINISHED CEILING
C	CONDUIT
CAT	CATEGORY
CATV	COMMUNITY ANTENNA TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CD	CAMPUS DISTRIBUTOR
CMP	COMMUNICATIONS PLENUM JACKET
CMR	COMMUNICATIONS RISER JACKET
DAS	DISTRIBUTED ANTENNA SYSTEM
dB	DECIBELS
DEMO	DEMOLITION
(E)	EXISTING
EC	ELECTRICAL CONTRACTOR
ECIA	ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION
EMI	ELECTROMAGNETIC INTERFERENCE
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ER	EQUIPMENT ROOM
ETR	EXISTING TO REMAIN
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FD	FLOOR DISTRIBUTOR
FMC	FLEXIBLE METAL CONDUIT
FS	FIRE STOP SYSTEM
FLR	FLOOR
F/UTP	SCREEN TWISTED PAIR (SHIELDED)
GC	GENERAL CONTRACTOR
GYP	GYPSUM BOARD
HC	HORIZONTAL CROSS-CONNECT
HCM	HORIZONTAL CABLE MANAGER
HH	HAND HOLE
Hz	HERTZ
IMC	INTERMEDIATE METAL CONDUIT
IP	INTERNET PROTOCOL
ISP	INTERNET SERVICE PROVIDER
ISP	INSIDE PLANT CABLE
JB	JUNCTION BOX
J-BOX	JUNCTION BOX
LAN	LOCAL AREA NETWORK
LCC	LIMITED COMBUSTIBLE CABLE
LEC	LOCAL EXCHANGE CARRIER
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET
MAN	METROPOLITAN AREA NETWORK
MATV	MASTER ANTENNA TELEVISION
MC	MAIN CROSS-CONNECT
MDF	MAIN DISTRIBUTION FRAME
MFR	MANUFACTURER
MH	MAINTENANCE HOLE
MM	MULTIMODE
MPOE	MAIN POINT OF ENTRANCE
MPOP	MAIN POINT OF PRESENCE
MTD	MOUNTED
N/A	NOT APPLICABLE
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
nm	NANOMETER
NRTL	NATIONALLY RECOGNIZED TESTING LAB
OC	ON CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OSP	OUTSIDE PLANT
PBB	PRIMARY BONDING BUSBAR
PBX	PRIVATE BRANCH EXCHANGE
POE	POWER OVER ETHERNET
PON	PASSIVE OPTICAL NETWORK
POTS	PLAIN OLD TELEPHONE SERVICE
PSTN	PUBLIC SWITCHED TELEPHONE NETWORK
QTY	QUANTITY
RCDD	REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
RMC	RIGID METAL CONDUIT
RU	RACK UNIT
SBB	SECONDARY BONDING BUSBAR
SCS	STRUCTURED CABLING SYSTEM
SF	SQUARE FEET
SM	SINGLEMODE
SPECS	SPECIFICATIONS
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TBD	TO BE DETERMINED
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
TR	TELECOMMUNICATIONS ROOM
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UL	UNDERWRITER LABORATORIES, INC.
UPS	UNINTERRUPTIBLE POWER SUPPLY
U/UTP	UNSHIELDED TWISTED PAIR
V	VOLT(S)
VCM	VERTICAL CABLE MANAGER
W	WIRE
WAN	WIDE AREA NETWORK
WAO	WORK AREA OUTLET
WAP	WIRELESS ACCESS POINT
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION-PROOF

ANNOTATION

- 1 — TECHNOLOGY PLAN CALLOUT
- 1 — EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / T1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER. LOWER NUMBER INDICATES SHEET NUMBER
- 1 / T1 — SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINE-TYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF THE NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	———	NEW	———
DEMOLISH	— — — — —	FUTURE	- - - - - - - - - -

PATHWAYS

- W"xH" — WIRE MESH CABLE TRAY (W"=WIDTH, "H"=HEIGHT)
- VERTICAL CABLE TRAY
- (#) D" — UNDERGROUND CONDUIT ("#"=QUANTITY, "D"=CONDUIT DIAMETER)
- (#) D" — CONDUIT ("#"=QUANTITY, "D"=CONDUIT DIAMETER)
- CABLE SUPPORTS OR J-HOOKS
- (#) D" / FS — CONDUIT SLEEVE ("#"=QUANTITY, "D"=CONDUIT DIAMETER); UL FIRESTOP SYSTEM ASSEMBLY
- PB L"xW"xH" — PULL BOX ("L"=LENGTH, "W"=WIDTH, "H"=HEIGHT)
- SC — SPLICE

RISER DIAGRAMS

- FIBER OPTIC CROSS CONNECT
- COPPER UTP CROSS CONNECT
- P — 110-TYPE PROTECTOR BLOCK
- PATCH PANEL — PATCH PANEL
- SBB — SECONDARY BONDING BUSBAR (SBB)
- PBB — PRIMARY BONDING BUSBAR (PBB)
- TELECOMMUNICATIONS BACKBONE CABLING (REFER TO RISER DIAGRAM FOR MORE INFORMATION)

TELECOMMUNICATIONS ROOM

- LADDER RACK
- PBB — PRIMARY BONDING BUSBAR (PBB) - WALL ELEVATION VIEW
- SBB — SECONDARY BONDING BUSBAR (SBB) - WALL ELEVATION VIEW
- PBB/SBB - PLAN VIEW
- TELECOM BACKBOARD
- TWO-POST EQUIPMENT RACK
- FOUR-POST EQUIPMENT RACK
- EQUIPMENT CABINET (REFER TO PLAN NOTES ON ENLARGED PLANS FOR MORE INFORMATION)

TELECOMMUNICATIONS OUTLETS

SYMBOL	DESCRIPTION	CABLE(S)	DETAIL
▽ 1D	DATA WALL OUTLET	1	1/TN5.00
▽ 2D	DATA WALL OUTLET	2	1/TN5.00
▽ 3D	DATA WALL OUTLET	3	1/TN5.00
▽ 2D,TV	DATA WALL OUTLET BEHIND TV AND ADJACENT TO POWER	4	1/TN5.00
▽ 2D	DATA WALL OUTLET, ABOVE COUNTER	2	1/TN5.00
▽ 4D	DATA WALL OUTLET, ABOVE COUNTER	4	1/TN5.00
▽ 1D	SYSTEMS FURNITURE DATA OUTLET	1	2/TN5.00
▽ 2D	SYSTEMS FURNITURE DATA OUTLET	2	2/TN5.00
▽ 3D	SYSTEMS FURNITURE DATA OUTLET	3	2/TN5.00
▽ 4D	SYSTEMS FURNITURE DATA OUTLET	4	2/TN5.00
◢ 2D	MULTI-SERVICE FLOOR BOX WITH DATA AND POWER OUTLETS, SEE E-SERIES DRAWINGS FOR FLOOR BOX TYPE	2	3/TN5.00
◢ 4D	MULTI-SERVICE FLOOR BOX WITH DATA AND POWER OUTLETS, SEE E-SERIES DRAWINGS FOR FLOOR BOX TYPE	4	3/TN5.00
1D	DATA CEILING OUTLET	1	4/TN5.00
2D	DATA CEILING OUTLET	2	4/TN5.00
▽ W,1D	TELEPHONE, VoIP WALL OUTLET	1	5/TN5.00

SECURITY IP END-POINT DEVICES

REFER TO TY-SERIES DRAWINGS FOR SECURITY DEVICES

SYMBOL	DESCRIPTION	CABLE(S)	DETAIL
	CEILING SECURITY CAMERA	1	REFER TO TY-SERIES
	WALL SECURITY CAMERA	1	REFER TO TY-SERIES
EP	WALL MOUNT EMERGENCY PHONE	1	REFER TO TY-SERIES
EP	PEDESTAL STYLE EMERGENCY PHONE	1	REFER TO TY-SERIES

AUDIO-VIDEO IP END-POINT DEVICES

REFER TO TA-SERIES DRAWINGS FOR AV DEVICES

SYMBOL	DESCRIPTION	CABLE(S)	DETAIL
1D	AUDIO-VIDEO CONTROL PANEL OUTLET	1	REFER TO TA-SERIES
T# 1D	TELEVISION CEILING OUTLET	1	REFER TO TA-SERIES
1D	TELEVISION WALL OUTLET	1	REFER TO TA-SERIES
PB 1D	PROJECTOR CEILING OUTLET	1	REFER TO TA-SERIES

ROUGH-IN OUTLETS

ROUGH-IN ONLY SCHEDULE

SYMBOL	DESCRIPTION	BACK BOX	CONDUIT
R FF	FURNITURE FEED, WALL BOX ROUGH-IN	2-GANG BACKBOX WITH 2" GROMMET	(2) 2" EMT
FF	FURNITURE FEED, FLOOR BOX ROUGH-IN	REFER TO SCHEDULE IN SPECIFICATIONS	(2) 1-1/4" EMT
FF	FURNITURE FEED, POKE THROUGH ROUGH-IN	REFER TO SCHEDULE IN SPECIFICATIONS	EMT TO ACCESS CEILING
R S	AUDIO-VIDEO SPEAKER, CEILING ROUGH-IN	INSTALL AV PROVIDER'S SPEAKER BACK CAN	(1) 3/4" EMT
R S	AUDIO-VIDEO SPEAKER, WALL ROUGH-IN	INSTALL AV PROVIDER'S SPEAKER BACK CAN	(1) 3/4" EMT
R TV	AUDIO-VIDEO TELEVISION, CEILING ROUGH-IN	2-GANG BACKBOX WITH 2-GANG COVER PLATE	(2) 1-1/2" EMT
R TV	AUDIO-VIDEO TELEVISION, WALL ROUGH-IN	2-GANG BACKBOX WITH 2-GANG COVER PLATE	(2) 1-1/2" EMT
R AV	AUDIO-VIDEO PLATE, CEILING ROUGH-IN	2-GANG BACKBOX WITH 2-GANG COVER PLATE	(2) 1-1/2" EMT
R AV	AUDIO-VIDEO PLATE, WALL ROUGH-IN	2-GANG BACKBOX WITH 2-GANG COVER PLATE	(2) 1-1/2" EMT
R MP	AUDIO-VIDEO MICROPHONE, WALL ROUGH-IN	2-GANG BACKBOX WITH 2-GANG COVER PLATE	(2) 1-1/2" EMT
R EL	SECURITY ELECTRIFIED LOCK, ROUGH-IN	NA	(1) 3/4" EMT TO DOOR FRAME
R CR	SECURITY CARD READER, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 3/4" EMT
R RE	SECURITY REQUEST-TO-EXIT, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 3/4" EMT
R CAM	SECURITY CAMERA, CEILING ROUGH-IN	INSTALL SECURITY PROVIDER'S BACKBOX	(1) 1" EMT
R CAM	SECURITY CAMERA, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R IC	SECURITY INTERCOM, CEILING ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R IC	SECURITY INTERCOM, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R KP	SECURITY KEYPAD, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R PB	SECURITY PANIC BUTTON, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R MD	SECURITY MOTION DETECTOR, CEILING ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT
R MD	SECURITY MOTION DETECTOR, WALL ROUGH-IN	1-GANG BACKBOX WITH 1-GANG COVER PLATE	(1) 1" EMT

TELECOMMUNICATIONS RESPONSIBILITY MATRIX

Description	Future Package	Furnish: Construction Team	Furnish: Owner	Install: Construction Team	Install: Owner	Comments
General Communications						
Grounding and Bonding		X		X		
Hangers and Supports		X		X		
Conduits and Backboxes		X		X		
Underground pathways for utility entrance		X		X		
Firestops, Conduit Sleeves, and Sleeve Seals		X		X		
Structured Cabling						
Telecom Room Cabinets, Racks, Frames, and Enclosures		X		X		
Telecom Room Buildout (ex. backboard and ladder rack)		X		X		
Telecom Room Uninterruptible Power Supply (UPS)		X		X		
Telecom Room Power Strips		X		X		
Optical Fiber Patch Cables		X		X		
Copper Patch Cables		X		X		
Optical Fiber Backbone Cable and Connectivity		X		X		
Copper Backbone Cable and Connectivity		X		X		
Optical Fiber Horizontal Cable and Connectivity		X		X		
Copper Horizontal Cable and Connectivity		X		X		
Data Communications						
Router / Firewall	X					
Core Switch / Edge Switch	X					
Wireless Access Points	X					
Servers / Storage and Backup			X		X	
Laptops / Desktops / Copiers / Printers / Scanners			X		X	
Voice Communications						
VoIP Gateway / Analog handsets			X		X	
VoIP handsets			X		X	
VoIP Network licensing			X		X	

GENERAL NEW WORK NOTES

1. READ THE SPECIFICATIONS AND REVIEW DRAWINGS OF ALL DIVISIONS OF WORK. COORDINATE THIS WORK WITH ALL OTHER DIVISIONS OF WORK AND ALL SUBCONTRACTORS.
2. ALL WORK SHALL CONFORM TO THE APPLICABLE SPECIFICATIONS (DIVISION 26, DIVISION 27, DIVISION 28, ETC.) AND THE CUSTOMER PRE-ESTABLISHED STRUCTURED CABLING STANDARDS; SHOULD DIFFERENCES EXIST IN THE SPECIFICATIONS RELATING TO TECHNOLOGY AND THE CLIENT'S PRE-ESTABLISHED STANDARDS THE CONTRACTOR SHALL CONTACT THE LOW VOLTAGE ENGINEER FOR CLARIFICATION THROUGH THE RFI PROCESS.
3. FULLY COORDINATE ALL CABLE TRAY, FIRE STOP CONDUITS / SLEEVES, AND CONDUIT ROUTING WITH STRUCTURAL ELEMENTS. COORDINATE CABLE TRAY AND CONDUIT INSTALLATIONS WITH ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR, AND GENERAL CONTRACTOR PRIOR TO INSTALLATION. ROUTING IN CONCRETE SLAB OR UNDER SLAB (WHERE CONDUIT WOULD BE ON GRADE) REQUIRES THE USE OF WET LOCATION RATED CABLES.
4. ALL TELECOMMUNICATIONS CONTINUOUS PATHWAYS SHALL BE BONDED TO THE TELECOMMUNICATIONS BONDING BACKBONE; FOR CONDUITS, INSULATION BUSHINGS SHALL BE USED AT THE END OF THE CONDUIT THE FARTHEST AWAY FROM THE SERVING TR. A BONDING BUSHING SHALL BE USED AT THE END CLOSEST TO THE SERVING TR. CONTRACTOR TO REFER TO THE ANSI-STD-J 607 STANDARD FOR ADDITIONAL INFORMATION AS TO THE INSTALLATION OF THE TELECOMMUNICATIONS BONDING BACKBONE.
5. ALL FIRE RATED WALL / FLOOR ASSEMBLIES PENETRATED FOR TELECOMMUNICATIONS CABLING PATHWAYS SHALL BE FIRE STOPPED WITH THE APPROVED FIRE STOP SYSTEMS (F/S). ALL FIRESTOP SYSTEMS SHALL BE INSTALLED AS DIRECTED BY THE MANUFACTURER AND AS SPECIFIED IN DIVISION 07 07 84 00 - "FIRESTOPPING". FIRE STOP ASSEMBLY LOCATIONS ARE TO BE COORDINATED WITH CABLE TRAY PATHWAY TO TELECOMMUNICATIONS ROOM.
6. BACK BOXES AND CONDUIT LOCATIONS IN PRECAST CONCRETE WALLS SHALL BE COORDINATED WITH ARCHITECT, STRUCTURAL ENGINEER, AND GC PRIOR TO ORDERING THE PRECAST WALLS.
7. ROUTING OF CABLES SHALL BE CONCEALED. CABLES SHALL BE ROUTED IN CONDUIT IN EXPOSED AREAS. MINIMIZE AMOUNT OF EXPOSED CONDUIT BY EMBEDDING CONDUIT IN SLAB WHEN POSSIBLE. EMBEDDED CONDUITS AND PENETRATIONS OF STRUCTURE SHALL FOLLOW DETAILS IN STRUCTURAL DRAWINGS. WHEN CONDUITS CAN ONLY BE INSTALLED EXPOSED, NOTIFY ARCHITECT PRIOR TO START OF INSTALLATION OF CONDUITS. CABLES SHALL BE ROUTED IN CONDUIT WHEN ABOVE HARD CEILINGS. CONDUITS FOR ELEVATOR PHONES AND FIRE ALARM CONTROL PANEL SHALL BE CONTINUOUS (HOMERUN) FROM THE TELECOMMUNICATIONS ROOM TO THE APPLICABLE BOX / CABINET. CONTRACTOR SHALL SIZE AND PROVIDE CONDUITS TO MEET TIA-569.
8. TELECOMMUNICATIONS ROOMS SHALL BE DEDICATED FOR INFORMATION TECHNOLOGY USE (I.E. NO SHARED SPACE WITH A JANITOR, FIRE ALARM SYSTEM, ETC.) NO SERVICES SHALL PASS THROUGH THE SPACE UNLESS DEDICATED TO THE SPACE (NO PLUMBING, MECHANICAL, ELECTRICAL, FIRE, ETC.)

CALL OUTS

- ENLARGED PLAN CALLOUT
- NOT IN SCOPE

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

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REGISTRATION

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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EXPIRES 12/31/2021

SHEET TITLE

TECHNOLOGY GENERAL NOTES AND LEGEND

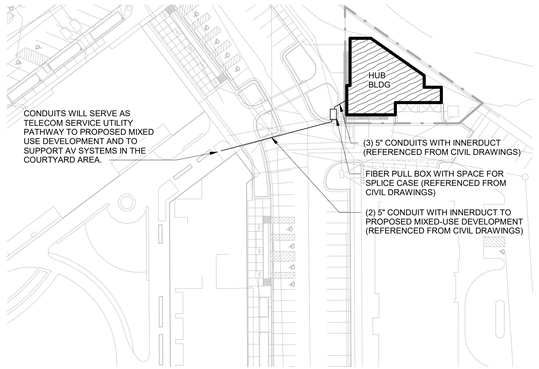
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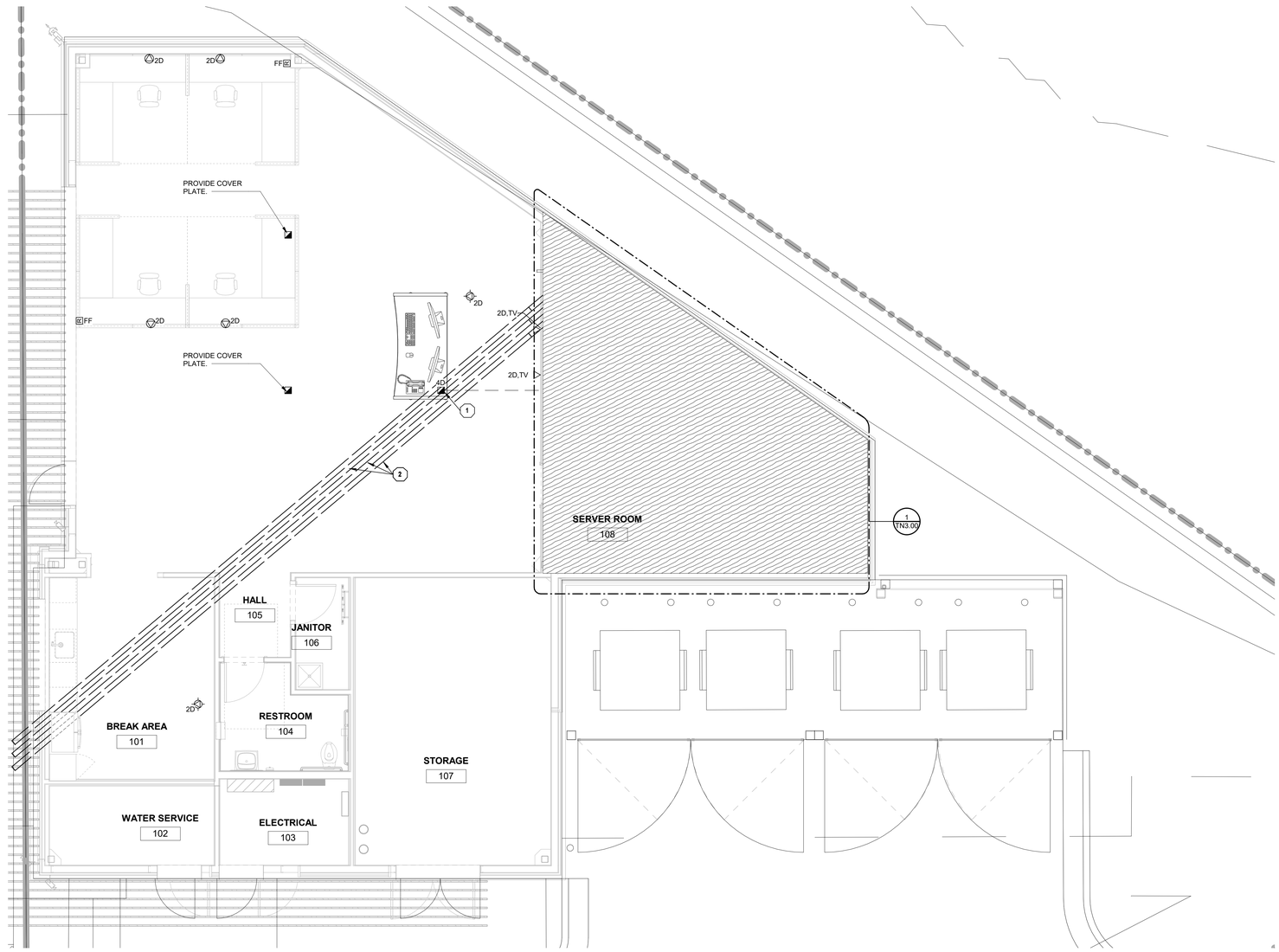
TECHNOLOGY PLAN NOTES:

1 SEE E-SHEETS FOR FLOOR BOX TYPE AND CONDUIT REQUIREMENTS. PROVIDE OSP CATEGORY 6 WHEN IN OR BELOW SLAB.

2 (3) 5" UNDERGROUND PVC CONDUITS. SEE CIVIL DRAWINGS FOR CONTINUATION BEYOND 5'-0" OUTSIDE THE BUILDING.



② TELECOM SITE PLAN
1" = 50'-0"



① TECHNOLOGY FIRST FLOOR PLAN
1/4" = 1'-0"

NORTH

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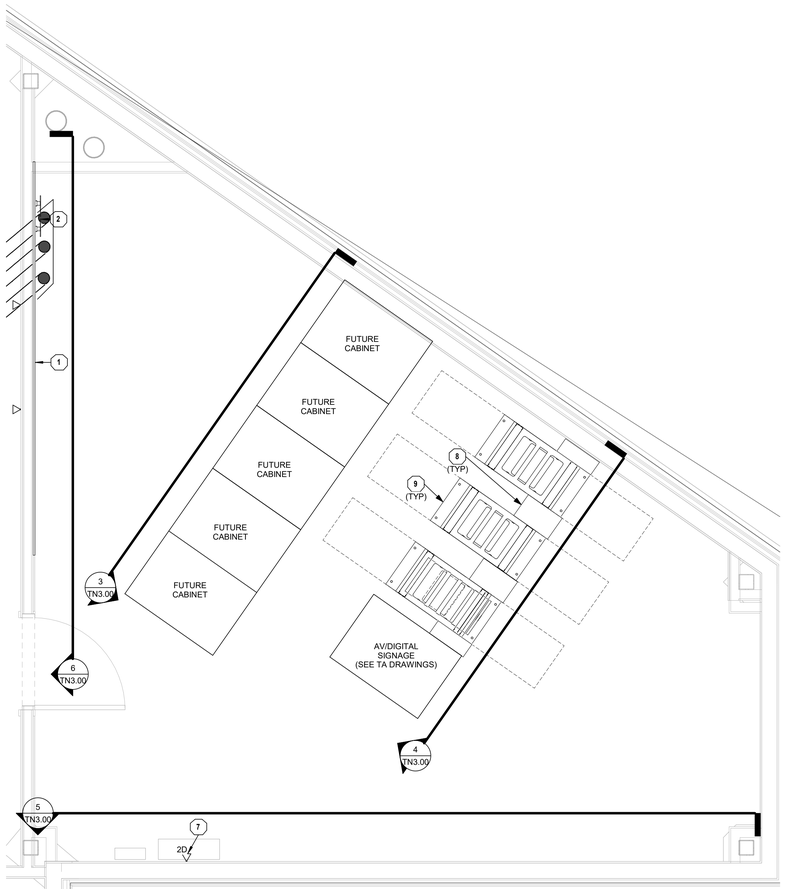
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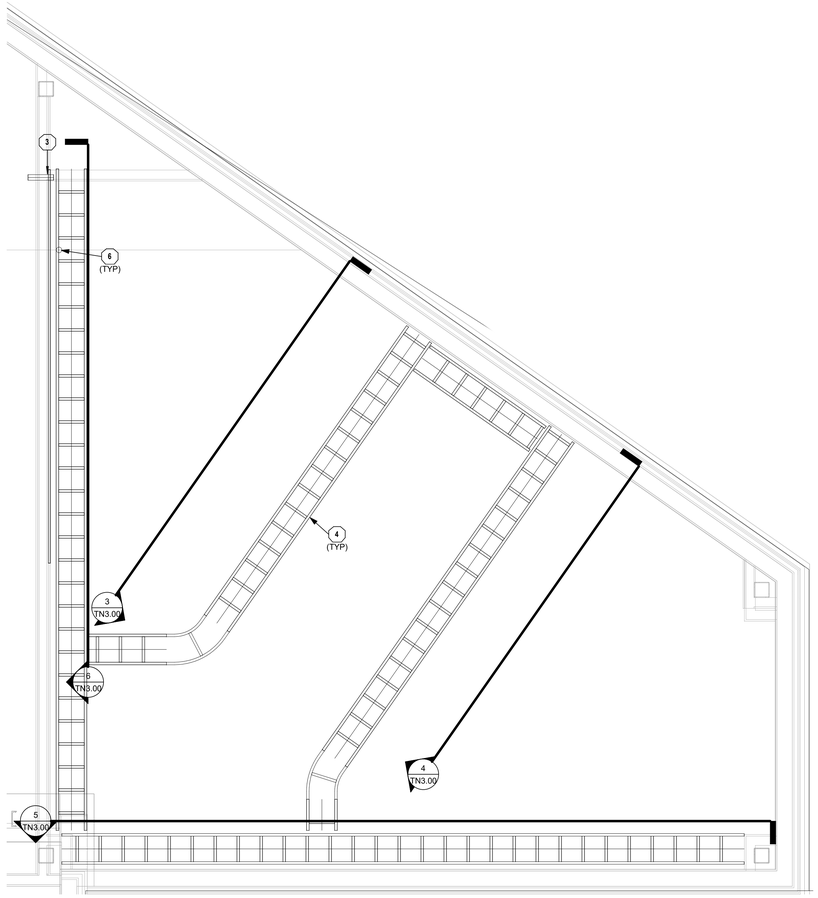
TECHNOLOGY FIRST FLOOR PLAN

SHEET NUMBER

TN1.01



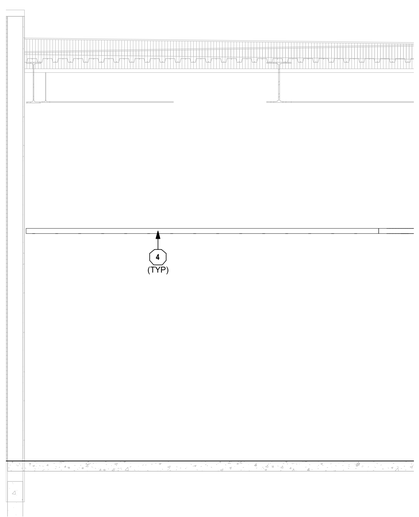
1 TECHNOLOGY ENLARGED PLAN - SERVER ROOM 108
1/2" = 1'-0"



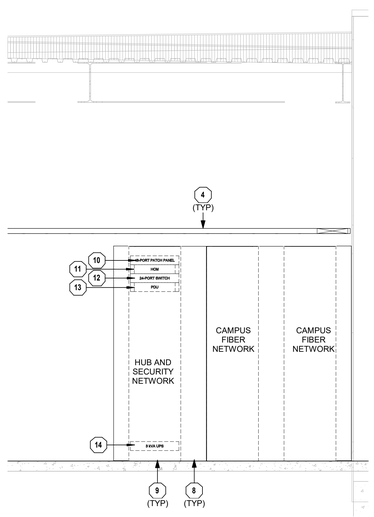
2 TECHNOLOGY ENLARGED RCP - SERVER ROOM 108
1/2" = 1'-0"

TECHNOLOGY PLAN NOTES:

1. PROVIDE TELECOMMUNICATIONS BACKBOARD.
2. PROVIDE PRIMARY BONDING BUSBAR. SEE 6/TN5.00 FOR PBB CONNECTIONS DIAGRAM.
3. PROVIDE SLEEVE(S). SEAL OPENINGS FOR FIRE SUPPRESSION SYSTEM.
4. PROVIDE LADDER RACK.
5. PROVIDE (3) 5" SERVICE ENTRANCE CONDUITS. SEAL OPENINGS FOR FIRE SUPPRESSION SYSTEM.
6. PROVIDE 2" CONDUIT PATHWAY TO THE ROOF FOR FUTURE ANTENNA. SEAL OPENING FOR FIRE SUPPRESSION SYSTEM. SEE 7/TN5.00 FOR DETAIL.
7. PROVIDE DATA FOR ACCESS CONTROL PANEL. COORDINATE FINAL LOCATION OF DATA OUTLET WITH ACCESS CONTROL PROVIDER PRIOR TO INSTALL.
8. PROVIDE VERTICAL CABLE MANAGER.
9. PROVIDE 4-POST RACK.
10. PROVIDE PATCH PANEL.
11. PROVIDE HORIZONTAL CABLE MANAGER.
12. NETWORK SWITCH. NETWORK SWITCH WILL BE SPECIFIED IN A FUTURE PACKAGE THAT WILL INCLUDE CAMPUS FIBER BACKBONE AND CAMPUS AREA NETWORK EQUIPMENT.
13. PROVIDE RACK MOUNT POWER STRIP. SPECS: INPUT NEMA L5-30P, OUTPUT (10) NEMA 5-20R.
14. PROVIDE UNINTERRUPTIBLE POWER SUPPLY (UPS). SPECS: 3 KVA, INPUT NEMA L5-30P, OUTPUT NEMA L5-30R.



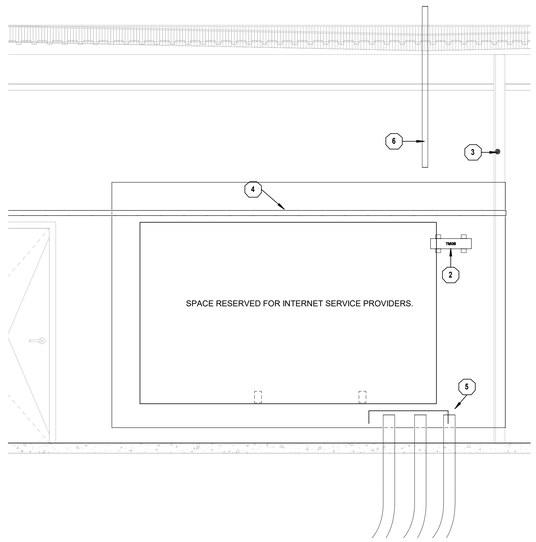
3 NORTHWEST RACK ELEVATION - SERVER ROOM 108
1/2" = 1'-0"



4 SOUTHEAST RACK ELEVATION - SERVER ROOM 108
1/2" = 1'-0"



5 SOUTH WALL ELEVATION - SERVER ROOM 108
1/2" = 1'-0"



6 WEST WALL ELEVATION - SERVER ROOM 108
1/2" = 1'-0"

NORTH

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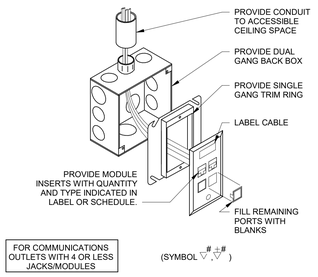
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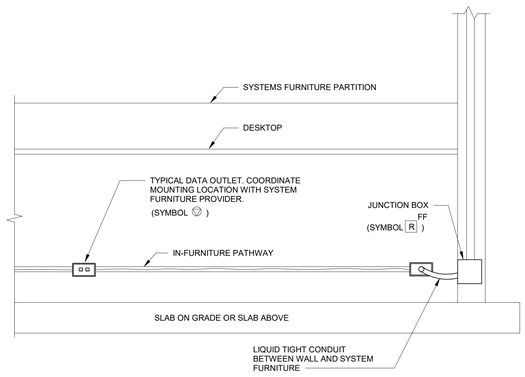
TECHNOLOGY ENLARGED PLANS

SHEET NUMBER

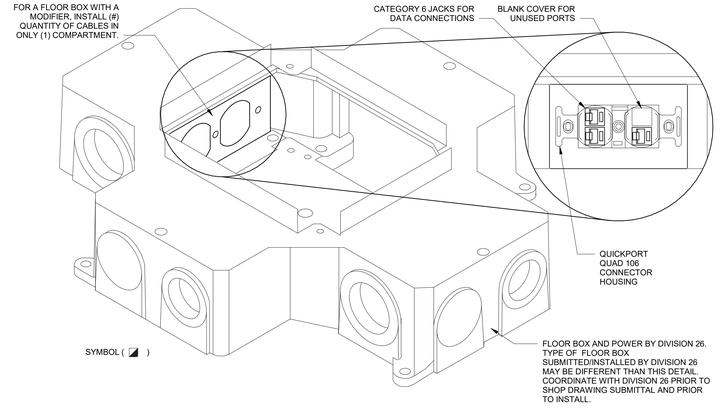
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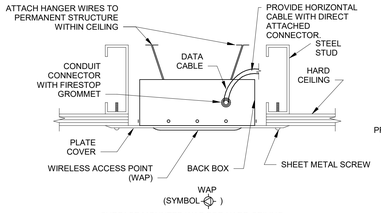
1 SINGLE GANG COMM OUTLET
NTS



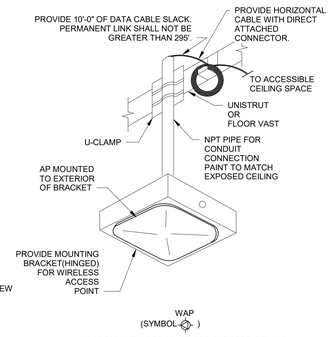
2 SYSTEMS FURNITURE
NTS



3 FLOOR BOX
NTS

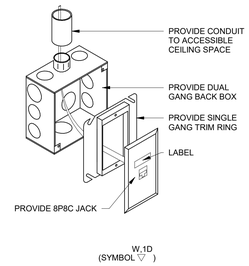


SURFACE MOUNTED WAP FOR HARD CEILING

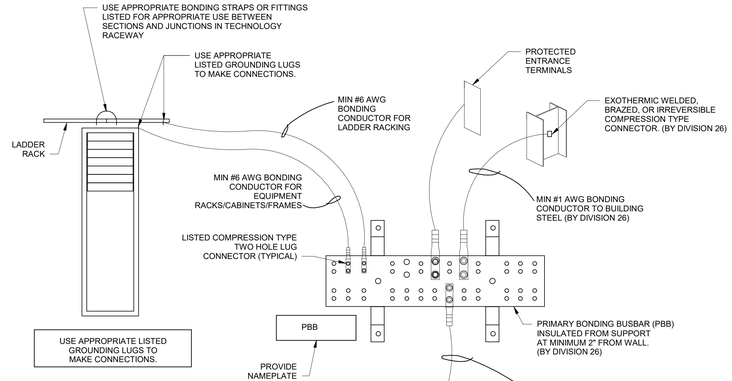


WAP MOUNTING BRACKET FOR EXPOSED CEILING

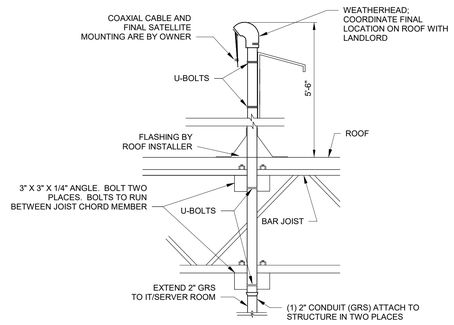
4 WIRELESS ACCESS POINT INSTALLATION
NTS



5 WALL PHONE OUTLET
NTS



6 PBB CONNECTIONS DIAGRAM
NTS



7 ROOF WEATHERHEAD DETAIL
NTS

PARAGON STAR

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SHEET TITLE

TECHNOLOGY DETAILS

SHEET NUMBER

TN5.00

SECTION 27A: COMMON WORK FOR COMMUNICATIONS

1. GENERAL

A. WORK INCLUDED

Provide common work for the technology sub-systems for this construction project, consisting of the following components:
1. Firestopping
2. Conduit
3. Outlet boxes
4. Floor boxes and poke-throughs
5. Cable supports
6. Identification of these components

Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. ensure that they are in compliance with the requirements stated or reasonably inferred by the contract documents.

B. REFERENCES

Contractor shall meet the following standards and guidelines (latest editions):
1. ANSI/TIA-569 "Commercial Building Standard for Telecommunications Pathways and Spaces
2. BICSI TDMM "Telecommunications Distribution Methods Manual"
3. BICSI ITSIMM "Information Technology Systems Installation Methods Manual"

C. SUBMITTALS

Preconstruction submittals. Product cutsheets for firestopping, cable tray, floor boxes, poke-throughs, and cable support. Shop drawings indicating proposed conduit routing, pull box sizes and locations, dimensioned floor box and poke-thru locations, and all firestopping locations with product information and UL system called out at each firestop location.

Post construction submittals: As-built 'record drawings' – preconstruction shop drawings updated with any minor changes made in the field. Operation & maintenance instructions for firestopping, cable tray, and floor boxes/poke-throughs.

Regulatory Requirements: Provide products listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose intended.

2. PRODUCTS

Firestop Materials: Fire stop materials (fill void or cavity) - caulks, putty, composite sheets, restricting collars and strips used to seal penetrations of conduits through fire-rated floors, walls and partitions. Minimum performance requirements: shall meet testing requirements of ASTM E-814 or UL 1479; shall be installed in accordance with the NRTL fire stop system appropriate for the specific application and in accordance with manufacturer's instructions. Acceptable manufacturers: STI, Hilti, and 3m.

Firestop Devices: for sleeves through a single penetration (wall or floor): shall meet testing requirements of ASTM e-814 or UL. 1479; shall be installed in accordance with the NTRL fire stop system appropriate for the specific application and in accordance with manufacturer's instructions. Acceptable manufacturers: EZ-path family of products by STI; Hilti firestop speed sleeve CP 653 series. On shop drawings, identify location of every fire- or smoke-rated wall and floor penetration for communications conduit and cabling, along with firestopping manufacturer, product, and ul listing for that particular type of penetration/system. For example: STI SSS intumescent sealant, UL CAJ1259. Acceptable manufacturers: STI, Hilti, and 3m.

Conduits for Communications: Conduit - minimum conduit size shall be trade size 1 inch; uon. Indicate location, size, and quantity of all conduits and sleeves on shop drawings, including through-floor penetrations for cable feeds to poke-through devices. Refer to Division 26 for approved conduit type and manufacturers.

Outlet Boxes for Communications: For new stud walls, telecommunications outlet boxes shall be double-gang, with a minimum size (uon) of 4-11/16 inch x 4-11/16 inch x 2-5/8 inch deep (including extension ring). Manufacturer shall be Raco 258/259, Randl T-55017, or equivalent from Emerson/Appleton or Thomas & Betts/Steel City.

For 6" or 8" deep masonry walls, telecommunications outlet boxes shall be 3-1/2" deep. Where drawings indicate single-gang faceplate, provide single-gang box, manufacturer Raco 695. Where drawings indicate dual-gang faceplate, provide dual-gang box, manufacturer Raco 696.

For ceiling telecommunications outlets (flush or above accessible ceiling as detailed on the drawings) – plenum-rated, dual-gang 4" square, 2-1/2" deep box, manufacturer shall be Raco 239, or equal from Emerson/Appleton or Thomas & Betts/Steel City.

For exterior locations, outlet boxes shall be aluminum die cast with 1" connection. Where drawings indicate single-gang faceplate, provide single-gang box, manufacturer Thomas & Betts ih03-3 or equal from Emerson/Appleton or Hubbell/Raco. Where drawings indicate double-gang faceplate, provide double-gang box, manufacturer Thomas & Betts 2ihd5-3 or equal from Emerson/Appleton Hubbell/Raco.

Where in-use weatherproof cover is indicated, provide flush mount cover, manufacturer Hubbell WP826MPHI or approved equivalent.

Cable Supports: Cable Supports (open-top hooks – a.k.a. j-hooks) used as horizontal pathways shall have a flat bottom and sufficient width to comply with the minimum bend radius of all cabling as required by the referenced standards and manufacturers recommendations. Manufacturer shall be B-line, Caddy, or pre-approved equal

Pull boxes: For interior applications only, communications pull boxes shall be NEMA 1 and sized per part 3 execution. Manufacturer shall be Hoffman, NEMA enclosures, Wiegmann, or approved equivalent.

Identification of Communications Systems: All firestopping locations shall have a custom adhesive label (approximately 3" x 5") on both sides of the penetration. Refer to Part 3 execution for more information. Conduit and pull box labels shall be mechanically-printed from a handheld labeler, with text 1/4" or 3/8" in height. Refer to Part 3 execution for more information.

1. EXECUTION

Installation Requirements: Unless otherwise stated, where installation requirements identified in drawings and specifications conflict with the manufacturer's recommendations, the more restrictive standard shall apply. Bring to the attention of the owner and engineer conflicts between manufacturer's instructions and construction documents.

Firestopping: Provide a label on both sides of all fire stop locations, indicating firestop manufacturer, installer and company, date installed, and UL system number with all relevant ratings indicated. Wherever cable tray routing encounters a rated wall, stop cable tray and provide firestop devices (sleeves) through rated wall. Capacity of firestop devices shall equal that of the cable tray. Wherever j-hook cable routing encounters a rated wall, provide firestop devices through rated wall. Capacity of firestop devices shall equal that of the installed cabling plus 25% spare capacity.

Conduit Requirements: Ream all conduit ends and fit them with an insulated bushing.
Minimum bend radius for conduits is 6 times the diameter for 2 inches conduits or less and 10 times the diameter for conduits greater than 2 inches. Provide an accessible pullbox between every two 90 degree bends (or equivalent) in a conduit run. Pullboxes shall be sized per the BICIS TDMM. Indicate proposed and final pullbox locations on shop and as-built drawings.

Underground conduits serving slab-on-grade floorboxes shall stub up directly into the serving telecommunications room, UON on the drawings. Indicate proposed and final routing on shop and as-built drawings.

Leave a pull cord in all conduit installed for this division.

Pathway Distribution: Provide conduit to support cabling from outlet location to overhead accessible ceiling space, cable tray, or communications room. Refer to drawings and part 2 for minimum conduit size and additional requirements. All installed conduits shall utilize 40% fill ratio, to include 25% spare capacity; upsize conduits as necessary to meet this requirement. Indicate size and proposed/final routing of all conduits on shop and as-built drawings.

Provide cable supports (i.e. j-hooks) to support cabling above accessible ceilings every 5 feet or less. J-hooks shall be properly sized for initial cable load, plus 25% spare capacity. cable supports are not allowed above inaccessible ceilings or exposed ceilings; provide appropriately-sized conduit at those locations. Indicate proposed/final routing of all j-hook cable routing on shop and as-built drawings.

Pull boxes: Place pull boxes in conveniently accessible locations. No directional changes shall be allowed in pull boxes. Conduits shall enter/exit the pullbox on the long ends.

Size pull boxes per the following (width x length x depth):

3/4" or smaller – 4" x 4" x 2-1/8"
1" – 4" x 16" x 3"
1-1/4" – 6" x 20" x 3"
1-1/2" – 8" x 28" x 4"
2" – 8" x 36" x 4"
2-1/2" – 10" x 42" x 5"
3" – 12" x 48" x 5"
4" – 16" x 60" x 8"

Labeling: Label all conduit with either "Telecom", "AV", or "Security" according to the intended system use of the installed or future cabling. For wall stub-up locations, label overhead only.
For conduits greater than 10', label both ends of conduit with far end location and room/number. Example – AV to AV Rack R01 (Room 029) FOR conduits that stub up directly into a communications room, label both ends of conduit with far end location and room/number. Far end label shall be inside floor box. Label pull boxes "telecom", "AB", or "Security" on the cover.

END OF SECTION 27A

DIVISION 27B: STRUCTURED CABLING SYSTEM

1. GENERAL INSTRUCTIONS

A. WORK INCLUDED

Provide complete structured cabling system and associated common work for this construction project, consisting of the following components:

1. Grounding and bonding
2. Racks and accessories
3. Termination blocks and patch panels
4. Patch cables
5. Uninterruptable power supplies and Power Strips
6. Horizontal copper cabling
7. Faceplates and connectors
8. System testing and other project close-out requirements

Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with the requirements stated or reasonably inferred by the contract documents.

B. REFERENCES

Contractor shall meet the following standards and guidelines (latest editions):
1. ANSI/TIA-568 "Commercial Building Telecommunications Cabling Standard"
2. ANSI/TIA-569 "Commercial Building Standard for Telecommunications Pathways and Spaces"
3. ANSI/TIA-606 "Administration Standard for Commercial Telecommunications Infrastructure"
4. ANSI/TIA-607 "Generic Telecommunications Bonding and Grounding for Customer Premises"
5. BICSI TDMM "Telecommunications Distribution Methods Manual"
6. BICSI ITSIMM "Information Technology Systems Installation Methods Manual"

C. SUBMITTALS

Preconstruction submittals: Product cutsheets. Shop drawings indicating common work components, such as proposed conduit routing, pull box sizes and locations, dimensioned floor box and poke-thru locations, and all firestopping locations with product information and UL system called out at each firestop location. Each outlet is also to have proposed outlet/jack label Identification.

Post construction submittals: As-built 'record drawings. preconstruction shop drawings updated with any minor changes made in the field. Operation & maintenance information. Structured cabling warranty certificate. Test results, per Part 3.

Regulatory Requirements: Provide products listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose intended. Provide the following to meet NEC requirements: unlisted entrance cables shall not be routed exposed in the building for more than 50 feet; extend entrance conduits in intermediate or rigid metal conduit into the telecommunications entrance room. Plenum-rated horizontal and backbone cables are required wherever routed in return-air plenum spaces. Wet-rated horizontal and backbone cables are required wherever routed in wet or damp locations (as defined in the NEC) and shall transition to plenum-rated cables wherever they enter a return-air plenum space; provide an appropriately-sized transition point enclosure.

Advanced Structured Cabling System Warranty: All components of the structured cabling system shall be covered by a manufacturer warranty for a period of at least 15 years. This warranty shall cover materials, equipment and workmanship, as well as the performance of the system for all current and future applications.

D. MANUFACTURERS

The following manufacturers are conditionally approved for the structured cabling system:
1. Belden
2. Commscope
3. Hubbell
4. Leviton
5. Ortronics
6. Panduit
7. Siemon

E. PRODUCTS AND MATERIALS

Grounding and Bonding: Provide a complete functioning telecommunications grounding and bonding system in compliance with the TIA-607 "Generic Telecommunications Bonding and Grounding for Customer Premises". Major components include: PBB mounted in the server room. TBC connects the PBB to the main electrical service ground. Equipment and pathway grounding and bonding connections, recommended by manufacturers or equipment installed under this section, and stipulated in the referenced standard. Manufacturer of conductors shall be Harger or approved equivalent from list of manufacturers on electrical sheet specifications. Manufacturer of ground bars, connectors, and terminals shall be Harger, Panduit or approved equivalent. Submit product information for approval.

Racks and Accessories: 4-Post Rack - height shall be approximately 7'-0". Mounting rails shall be spaced 19" wide. Ladder Rack – color shall be black. Width shall be 12" with rung space of 12". Provide vertical cable managers and horizontal cable managers as indicated on drawings. Submit product information for approval.

Termination Blocks and Patch Panels: Category 6 patch panels –modular panels shall be provided complete with mounting hardware, jacks, retainers, wire guides, designation strips, and etc. Provide port quantity to support number of communications modules/jacks at work area outlets plus 25% spare. Submit product information for approval.

Patch Cables: Provide Category 6 cable lengths and quantities as required to patch switches and work area equipment. Assume 100% port activation. Turn over to Owner prior to substantial completion. All components shall be from the manufacturer offering the advanced system warranty. Submit product information for approval.

Uninterruptable power supplies and Power Strips: See enlarged drawings for specifications. Submit product information for approval.

Horizontal Copper Cabling: Category 6 cabling – shall be 4-pair, plenum rated, color – Match painted ceiling in open office. Manufacturer shall be an approved cable vendor of the advanced system warranty manufacturer. Submit product information for approval.

Communications Faceplates and Connectors: Provide category 6 jacks, housed in a 4-port or 6-port faceplate; Faceplate material and color shall match electrical faceplates. Vacant ports in the faceplate shall be filled with the blank inserts matching faceplate color. Submit product information for approval.

F. EXECUTION

General: Unless otherwise stated, where installation requirements identified in drawings and specifications conflict with the manufacturer's recommendations, the more restrictive standard shall apply. Bring to the attention of the owner and engineer conflicts between manufacturer's instructions and construction documents.

Grounding and Bonding for Telecommunications: Provide and install an individual ground wire from each equipment rack/cabinet/frame in the room, as well as from the cable tray in the corridor and the ladder rack overhead. Where structural steel is available, install one individual ground wire from the TMGB/TGB. Where an electrical panel is located in the same room, install one individual ground wire from the TGB to the electrical panel ground bus.

Size conductors per the following table (Table 1 from TIA-607):
linear feet – awg size
less than 13' – awg 6
14-20' – awg 4
21-26' – awg 3
27-33' – awg 2
34-41' – awg 1
42-52' – awg 1/0
53-66' – awg 2/0
67-84' – awg 3/0
85-105' – awg 4/0
106-125' – 250 kcmil
126-150' – 300 kcmil
151-175' – 350 kcmil
176-250' – 500 kcmil
251-300' – 600 kcmil
Greater than 300' – 750 kcmil

Cabling System: The drawings indicate the general location of the provisions for the cables required for the building. Coordinate final locations with the Architect. All cable shall be run parallel and perpendicular to structure. Diagonal or shortest path runs shall not be accepted unless specified or shown on drawings. Cables running together in parallel shall be aggregated by type into single uniform bundles. Multiple parallel runs of cable shall not be accepted unless indicated in the drawings or these specifications.

Cables shall be supported by approved pathway along their entire length. Cable support devices shall be securely attached to the building structure. Do not use mechanical, electrical, plumbing systems, ceiling tiles, or ceiling support wires for cable support unless instructed to do so.

Maintain bend radii appropriate for the performance standard and type of cable. Cables shall not be installed or routed in any manner that violates the manufacturer's specifications. Minimum bend radius for cables during installation is 20 times the cable diameter. Minimum bend radius for cables following installation is 10 times the cable diameter.

Maintain continuous jacket integrity on all cabling up to the outlet.

Maintain cable twists to termination contacts to 1/4 inch or less.

Leave a minimum 5 foot service loop above the outlet and 10 feet of slack in the telecommunications room for all horizontal cabling.

Label all cables within 6 inches of each end with a machine printed labels using the scheme detailed on the drawing.

Label all patch panel ports and fiber cross connect positions with machine printed labels using the scheme detailed below.

Install all cabling according to BICSI cabling standards and practices.

Fully protect incoming conductors which are considered to have lightning exposure in accordance with NEC Chapter 8.

G. ACCEPTANCE TESTING

Operational testing: after installation of cables and connectors, demonstrate product capability and compliance with contract requirements. Test each signal path for end-to-end performance from each end of all pairs/strands installed. Remove temporary connections when tests have been satisfactorily completed. Horizontal copper cable procedures: inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bi-directional, category 6 tester. Test for faulty connectors, splices, and terminations. Test according to TIA TSB-67, transmission performance specifications for field testing of unshielded twisted-pair cabling systems. Link performance for UTP cables shall meet minimum criteria of TIA-568. Test reports are to include: wire map, length, insertion loss, next, PSNEXT, ELFEXT, PSLFEXT, return loss, propagation delay, and delay skew. Copies of all test reports, in both pdf and database format, shall be turned over to engineer and owner as a condition of final acceptance. Jack identification labels shall correspond to final as-built drawings.

Fiber optic cable procedures: visually inspect each fiber end face at 50x magnification. Refinish fibers with visible defects. perform end-to-end, bi-directional attenuation (loss) test for each multimode fiber strand at 850 and 1300 nanometers and for each single mode fiber strand at 1310 and 1550 nanometers. Conduct tests in accordance with TIA-526 standard and per test instrument manufacturer instructions. Demonstrate that measured link loss does not exceed the allowable "worst case" loss per the TIA-568 standard.

Cable test results shall include: project name, date of preparation, ID of work area outlet, date of test, contractor's name, media type, make/model/serial number of test equipment used, date of last calibration, names of test crew, serving telecom room number, category or type of cable being test, and test data specified above.

Grounding and bonding system testing: test all metallic ground/bonding wires install under this division. Test the grounding conductor and terminal connectors for total resistance between the equipment item being grounding and the main telecommunications grounding point in the room. This resistance shall be less than 0.10 ohms.

Invite Owner and Engineer to witness cable testing. Owner reserves the right to request the contractor conduct a random re-test of up to 5% of the cable plant to confirm documented test results. If more than 5% of these randomly tested cables do not pass, contractor shall correct the issue(s) and is responsible for retesting of 100% of the cable plant.

END OF SECTION 27B

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
1850004412
EXPIRES 12/31/2021

SHEET TITLE

TECHNOLOGY SPECS

SHEET NUMBER

TN6.00

SECURITY SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

STANDARD MOUNTING HEIGHTS

INTERCOM (OPERABLE PART)	48"
CARD READER (CENTER OR TOP WHERE OPERABLE PARTS EXIST)	44"
MOTION DETECTOR (WALL MOUNT)	90"
INTRUSION KEYPAD	54"

DEFAULT MOUNTING HEIGHTS SHOWN ABOVE WHERE NO CALL-OUT IS PROVIDED. MOUNTING HEIGHTS LISTED ARE ABOVE FINISHED FLOOR (AFF) OR ABOVE FINISHED GRADE (AFG). ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

USE THE DEFAULT MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ARE ABOVE FINISHED FLOOR (AFF) OR ABOVE FINISHED GRADE (AFG) TO BOTTOM OF OUTLET BOX. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ABBREVIATIONS

A	AMPERS
ACP	ACCESS CONTROL PANEL
ADA	AMERICANS WITH DISABILITIES ACT
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AV	AUDIO-VIDEO
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BD	BUILDING DISTRIBUTOR
BDF	BUILDING DISTRIBUTION FRAME
BFC	BELOW FINISHED CEILING
BR	BIOMETRIC READER
C	CONDUIT
CAT	CATEGORY
CC	CENTRAL CONTROL DOOR CONTROL SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CD	CAMPUS DISTRIBUTOR
CMP	COMMUNICATIONS PLENUM JACKET
CMR	COMMUNICATIONS RISER JACKET
(D)	REMOTE DEVICE AND ASSOCIATED CABLING
DAS	DISTRIBUTED ANTENNA SYSTEM
dB	DECIBELS
DCS	DOOR CONTROL SYSTEM
DEMO	DEMOLITION
DSP	DIGITAL SIGNAL PROCESSOR
DVR	DIGITAL VIDEO RECORDER
(E)	EXISTING DEVICE
EC	ELECTRICAL CONTRACTOR
ECIA	ELECTRONIC OMPONENTS INDUSTRY ASSOCIATION
EMI	ELECTROMAGNETIC INTERFERENCE
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ER	EQUIPMENT ROOM
ETR	EXISTING TO REMAIN
(F)	DOOR FRAME MOUNTED DEVICE
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FD	FLOOR DISTRIBUTOR
FMC	FLEXIBLE METAL CONDUIT
FOR	FIBER OPTIC RACK
FS	FIRE STOP SYSTEM
FLR	FLOOR
GC	GENERAL CONTRACTOR
GT	GUARD TOUR CARD READER
GYP	GYPSUM BOARD
HH	HAND HOLE
Hz	HERTZ
IC	INTERMEDIATE METAL CONDUIT
ICS	INTERCOM CONTROL SYSTEM
IP	INTERNET PROTOCOL
ISP	INSIDE PLANT CABLE
J-BOX	JUNCTION BOX
(K)	ELECTRICALLY OPERATED BY KEY
KP	KEY PAD
KVM	KEYBOARD VIDEO MOUSE SWITCH
LAN	LOCAL AREA NETWORK
LCC	LIMITED COMBUSTIBLE CABLE
LED	LIGHT-EMITTING DIODE
LPS	LOCK POWER SUPPLY
MATV	MASTER ANTENNA TELEVISION
MBS	MAINTENANCE BYPASS SWITCH
MDF	MAIN DISTRIBUTION FRAME
MFR	MANUFACTURER
MH	MAINTENANCE HOLE
MM	MULTIMODE
MPOE	MAIN POINT OF ENTRANCE
MPOP	MAIN POINT OF PRESENCE
MTD	MOUNTED
N/A	NOT APPLICABLE
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
nm	NANOMETER
NRTL	NATIONALLY RECOGNIZED TESTING LAB
NVR	NETWORK VIDEO RECORDER
OC	ON CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OSP	OUTSIDE PLANT
POE	POWER OVER ETHERNET
PON	PASSIVE OPTICAL NETWORK
QTY	QUANTITY
(R)	RELOCATED EXISTING DEVICE
RE	REMOVE EXISTING DEVICE AND INSTALL AT ANOTHER LOCATION, SEE (R)
RMC	RIGID METAL CONDUIT
RMS	REMOTE MONITORING STATION
RN	REMOVE EXISTING DEVICE AND REPLACE WITH NEW DEVICE
RU	RACK UNIT
SCS	STRUCTURED CABLING SYSTEM
SF	SQUARE FEET
SM	SINGLEMODE
SP	SCRAMBLE PAD
TBD	TO BE DETERMINED
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TR	TELECOMMUNICATIONS ROOM
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UL	UNDERWRITER LABORATORIES, INC.
UPS	UNINTERRUPTIBLE POWER SUPPLY
UPSDP	UNINTERRUPTIBLE POWER SUPPLY DISTRIBUTION PANEL
V	VOLT(S)
VCM	VERTICAL CABLE MANAGER
VCS	VIDEO CONTROL SYSTEM
VMS	VIDEO MANAGEMENT SYSTEM
W	WIRE
WAO	WORK AREA OUTLET
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION-PROOF

ANNOTATION

- 1 — SECURITY PLAN CALLOUT
- 1 — EQUIPMENT DESIGATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / T1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER. LOWER NUMBER INDICATES SHEET NUMBER
- 1 / T1 — SECTION CUT DESIGNATION

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINE-TYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF THE NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	———	NEW	———
DEMOLISH	— — — —	FUTURE	- - - - - -

SECURITY SYMBOLS

- AR — AREA OF REFUGE CALL BOX
- CR — PROXIMITY CARD READER
- CW X — CLIENT WORKSTATION WHERE X = NUMBER OF MONITORS (AC) ACCESS CONTROL (SM) SECURITY MANAGEMENT (TS) TOUCHSCREEN CONTROL (VS) VIDEO SURVEILLANCE
- DA — DOOR ANNUCATOR
- DB — DOOR BELL (PB) PUSH BUTTON (CH) CHIME
- DM — DOOR POSITION SWITCH ONLY SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- DL — DOOR POSITION SWITCH AND LATCHBOLT MONITOR SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- EL — ELECTRIFIED LOCKING DEVICE, REQUEST TO EXIT, DOOR POSITION SWITCH, AND LATCH BOLT MONITOR SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- EO — ELECTRIFIED LOOKING DEVICE SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- EP — EMERGENCY PHONE
- GB — GLASS BREAK DETECTOR
- IC — VIDEO INTERCOM (CR) WITH CARD READER (DS) DOOR STATION (RS) RECEIVING (MASTER) STATION (VS) VIDEO STATION
- IP — PHONE
- KP — KEYPAD (ID) INTRUSION DETECTION SYSTEM (AC) ACCESS CONTROL
- LC — LIGHTING CONTROL RELAYS
- MD — MOTION DETECTOR
- PL — PANIC ALARM THREE-COLOR INDICATOR LIGHT
- PB — PANIC/DURESS BUTTON
- RE — REQUEST-TO-EXIT PUSH PAD
- RO — REMOTE UNLOCK/OPEN BUTTON
- ML — MICROPHONE STATUS LIGHT, WALL MOUNT
- MP — MICROPHONE
- MS — MICROPHONE MUTE ILLUMINATED SWITCH
- S — SPEAKER (DOOR BELL)
- SP — PAGING SPEAKER
- VM — VAULT MONITOR
- WC — WATER CONTROL VALVE VALVE BY DIVISION 22, CONTROL BY DIVISION 28
- WT — WATCH TOUR

SECURITY CAMERAS

- FIXED CAMERA
- PTZ CAMERA
- 360 CAMERA
- 180 CAMERA
- TWO IMAGER CAMERA
- FOUR IMAGER CAMERA

MOUNTING TYPE SYMBOLS (APPLIES TO ANY SECURITY DEVICE SYMBOL)

- CEILING MOUNT
- WALL MOUNT
- POLE / BOLLARD MOUNT
- CORNER MOUNT
- PENDANT MOUNT
- WALL MOUNT PENDANT ARM
- PARAPET MOUNT

LABELING SCHEME

SECURITY DEVICES (TYPICAL)

A-XX-YY

- A: DEVICE SYMBOL
- XX: MODIFIER FOR SPECIAL OPERATION IF APPLICABLE
- YY: DEVICE TYPE

SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

SECURITY CAMERAS (TYPICAL)

C-XX / AA / ## AFF

- XX: CAMERA NUMBER (VIDEO INTERCOM STATION MAY HAVE CAMERA NUMBER)
- AA: CAMERA TYPE (SEE CAMERA SCHEDULE ON THIS PAGE)
- FOR WALL MOUNTED CAMERAS, HEIGHT ABOVE FINISHED FLOOR

SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

CAMERA SCHEDULE

TYPE	FORM FACTOR	DESCRIPTION	MOUNTING	LOCATIONS	IMAGER SIZE RESOLUTION	POWER	MODELS	COLOR	COMMENTS
01		FIXED VARIFOCAL	PENDANT SURFACE RECESSED	OUTDOOR /INDOOR	1/2.5" 5MP	POE	AXIS - P3247-LVE	WHITE	3.5-10 mm VARIFOCAL LENS, DAY AND NIGHT MODE, AND H.264 WITH SUN SHEILD FOR EXTERIOR APPLICATIONS
02		MULTI SENSOR 180°CAMERA	SURFACE PENDANT RECESSED	OUTDOOR /INDOOR	4/2.9" 8MP	POE	AXIS - P3807-PVE	WHITE	(4) SENSOR, 2.3 mm, VANDAL-RESISTANT, H.264, MOTION JPEG
03		IP PTZ CAMERA	PENDANT SURFACE	OUTDOOR /INDOOR	1/2.8" 2MP	HPOE	AXIS - Q6135-LE	WHITE	30X OPTICAL ZOOM PTZ CAMERA WITH IR ILLUMINATION
04		VIDEO INTERCOM IP CAMERA	SURFACE	OUTDOOR /INDOOR	1/2.7" 5MP	POE	AXIS - I8016-LVE	WHITE	CAMERA TYPE USED FOR SCHEDULING PURPOSES ONLY

CARD READER SCHEDULE

TYPE	FORM FACTOR	TECHNOLOGY	MOUNTING	LOCATIONS	READ RANGE	POWER	MODELS	COLOR	COMMENTS
01		13.56MHz PROXIMITY	SURFACE	INDOOR/ OUTDOOR	iCLASS: 3.1" MIFARE: 2.8"	AVG.100mA PEAK 170mA AT 12VDC	HID SIGNO 40	BLACK	iCLASS SIGNO READERS
02		13.56MHz PROXIMITY	MULLION OR SURFACE	INDOOR/ OUTDOOR	iCLASS: 3.1" MIFARE: 2.8"	AVG.100mA PEAK 170mA AT 12VDC	HID SIGNO 20	BLACK	iCLASS SIGNO READERS

GENERAL NOTES

1. CONTRACTOR SHALL SUPPORT ALL CABLE WITH APPROVED PATHWAY.
2. ALL CABLES SHALL BE ROUTED PARALLEL AND PERPENDICULAR TO THE BUILDING STRUCTURE, UNLESS OTHERWISE NOTED.
3. EXISTING DOOR HARDWARE AND OPENING CONDITIONS SHOULD BE EVALUATED PRIOR TO CONDUIT AND CABLING INSTALLATION AND COORDINATED WITH DIVISION 08.
4. PROVIDE CONDUIT SLEEVE WITH NYLON BUSHINGS FOR NON-RATED WALL PENENTRATIONS FOR COMMUNICATIONS CABLES. PATHWAYS SHALL BE SIZED FOR NO MORE THAN FORTY (40) PERCENT FILL.
5. PROVIDE CONDUIT SLEEVE WITH NYLON BUSHINGS FOR OVERHEAD CEILINGS THAT BLOCK ACCESS FOR MOVE/ADD/CHANGES TO CABLE PATHWAY, LIKE HARD GYPSUM CEILING. PATHWAYS SHALL BE SIZED FOR NO MORE THAN FORTY (40) PERCENT FILL.
6. PROVIDE UL LISTED FIRESTOP ASSEMBLY AT FIRE WALL PENETRATIONS FOR COMMUNICATIONS CABLES. MATERIAL AND INSTALLATION SHALL MAINTAIN THE RATED CAPACITY OF WALL AND MEET ALL APPLICABLE CODES.
7. CONTRACTOR SHALL COORDINATE ALL COMMUNICATIONS AND CABLING PATHWAYS WITH OTHER DIVISIONS (08, 21, 22, 23, 26, AND 27) PRIOR TO INSTALL OF DUCTWORK, PIPING, CONDUITS, AND ETC.
8. READ THE SPECIFICATIONS AND REVIEW THE DRAWINGS OF ALL DIVISIONS OF WORK. COORDINATE THIS WORK WITH ALL OTHER DIVISIONS OF WORK AND ALL SUBCONTRACTORS. PROVIDE ALL SUBCONTRACTORS WITH A COMPLETE SET OF BID DOCUMENTS.
9. FULLY COORDINATE ALL CONDUIT ROUTING WITH STRUCTURAL ELEMENTS. COORDINATE CONDUIT INSTALLATIONS WITH ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR, AND GENERAL CONTRACTOR PRIOR TO INSTALLATION. ROUTING IN OR UNDER THE SLAB FLOOR REQUIRES THE USE OF CABLE RATED FOR A WET ENVIRONMENT.
10. ALL WIRING SHALL BE INSTALLED COMPLETE AND UNSPLICED FROM THE SERVING EQUIPMENT PANEL TO DEVICE.

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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1850004412
EXPIRES 12/31/2021

SHEET TITLE

SECURITY GENERAL NOTES AND LEGEND

SHEET NUMBER

TY0.00

SECURITY PLAN NOTES:

1. INSTALL SECURITY CAMERA ON LIGHT POLE. COORDINATE 120VAC POWER WITH DIVISION 26 AND FIBER OPTIC CABLE WITH DIVISION 27. PROVIDE NEMA 4X ENCLOSURE WITH POWER SUPPLY AND FIBER TO COPPER MEDIA CONVERTER. REFER TO DETAIL 4/TY5.00 FOR ADDITIONAL REQUIREMENTS.
2. SITE TELECOMMUNICATIONS INFRASTRUCTURE INCLUDING CABLING, CONDUIT, AND PULL BOXES PROVIDED UNDER SEPARATE BID PACKAGE. CONFIRM FINAL LOCATIONS, SPECIFICATIONS, AND QUANTITIES WITH GENERAL CONTRACTOR.



1 SECURITY SITE PLAN
1" = 50'-0"

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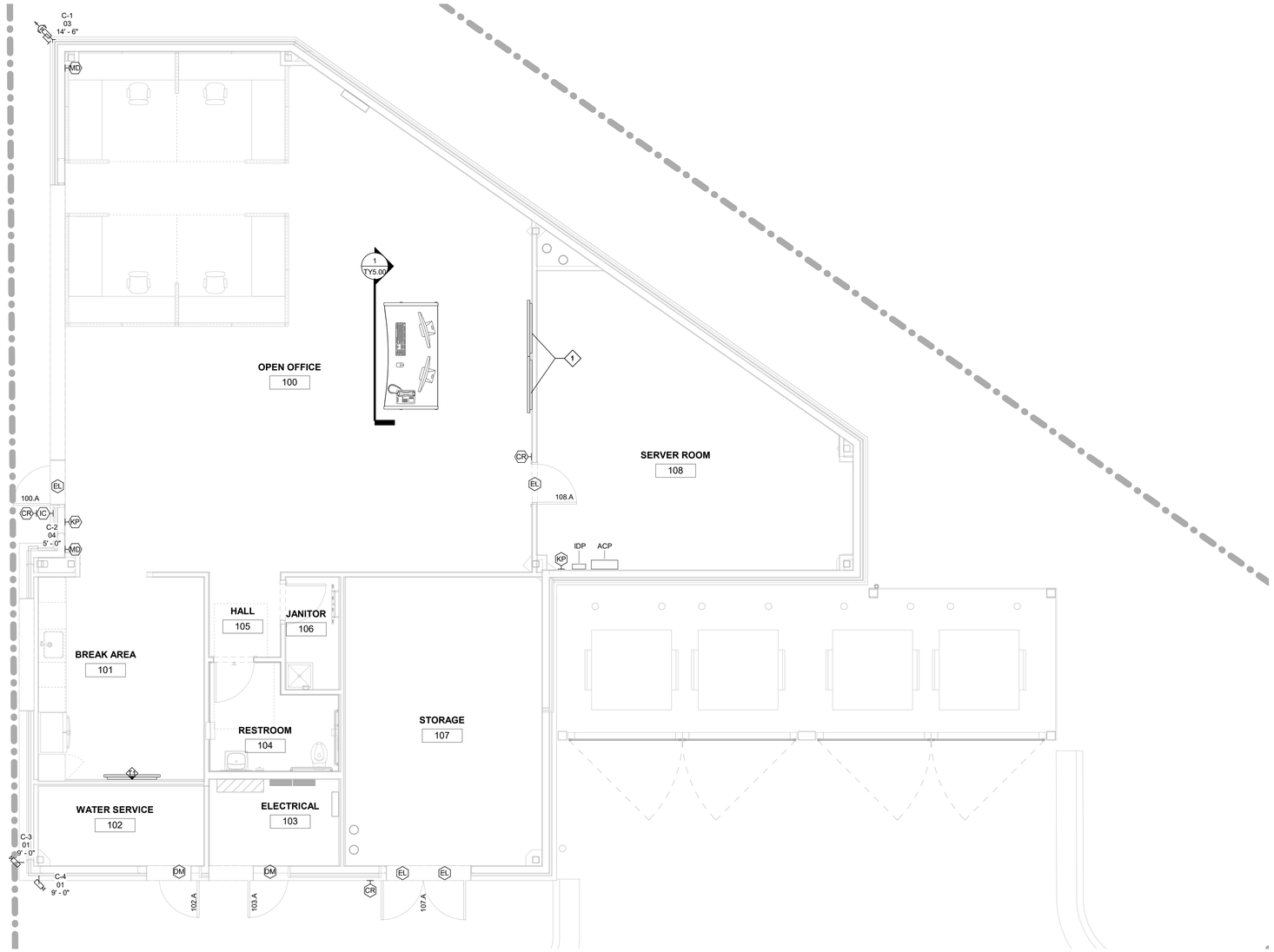
SECURITY SITE PLAN

SHEET NUMBER

TY1.00

SECURITY PLAN NOTES:

1 WALL MOUNT DISPLAY MONITORS BY AV CONTRACTOR. REFER TO TA SERIES SHEETS FOR ADDITIONAL REQUIREMENTS.



1 SECURITY FIRST FLOOR PLAN
1/4" = 1'-0"

NORTH

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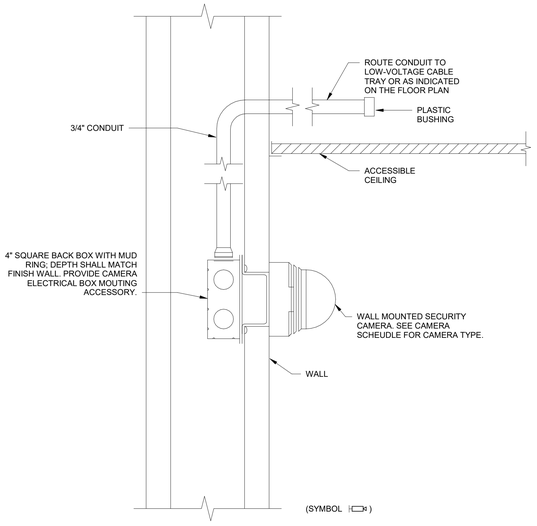
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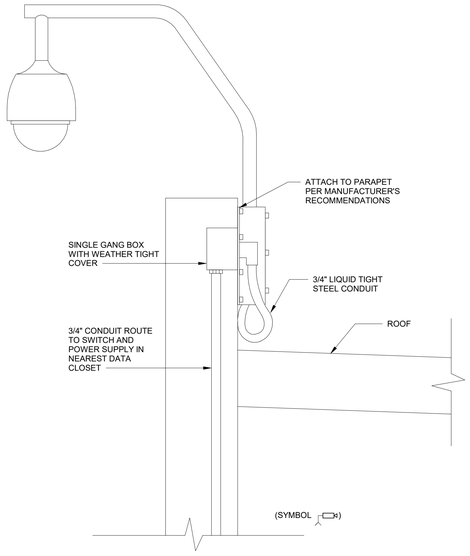
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SHEET NUMBER

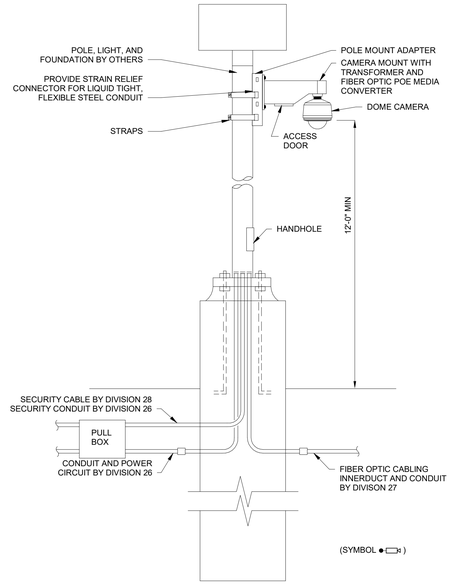
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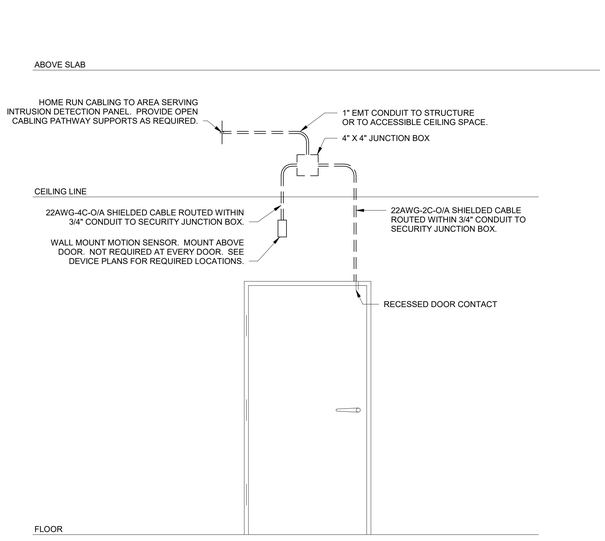
6 TYPICAL CAMERA INSTALLATION DETAIL - WALL MOUNT
NTS



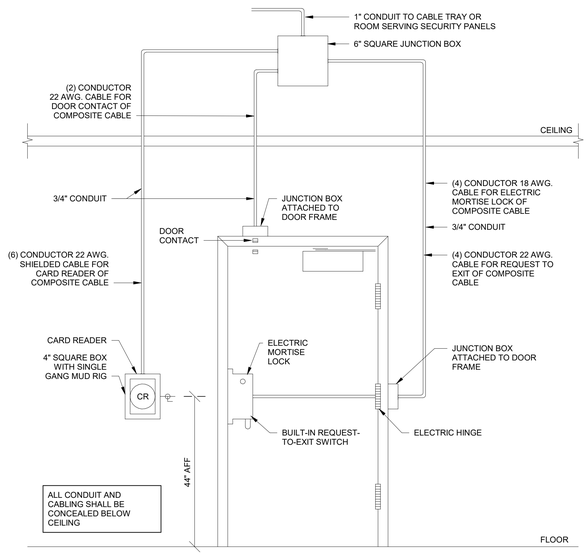
5 PARAPET MOUNT CAMERA
NTS



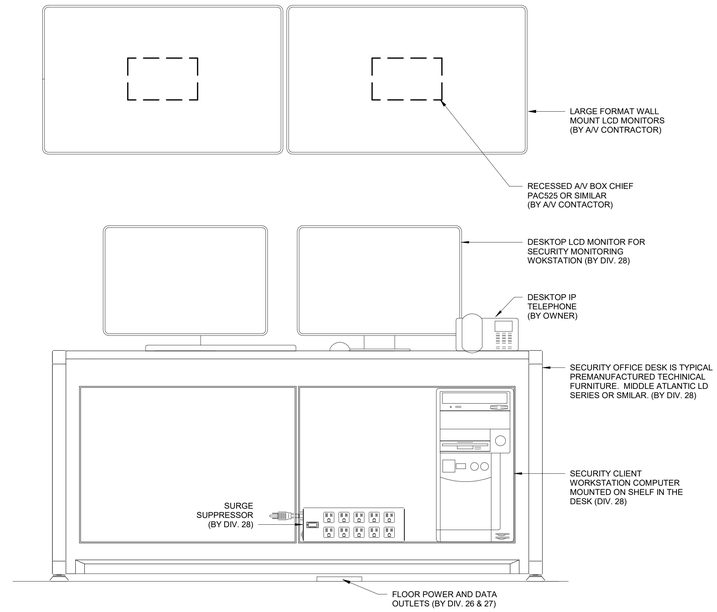
4 POLE MOUNT CAMERA
NTS



3 SINGLE DOOR WITH INTRUSION DETECTION
NTS



2 SINGLE DOOR WITH ELECTRIC MORTISE
NTS



1 TYPICAL SINGLE-OPERATOR SECURITY CONSOLE
NTS

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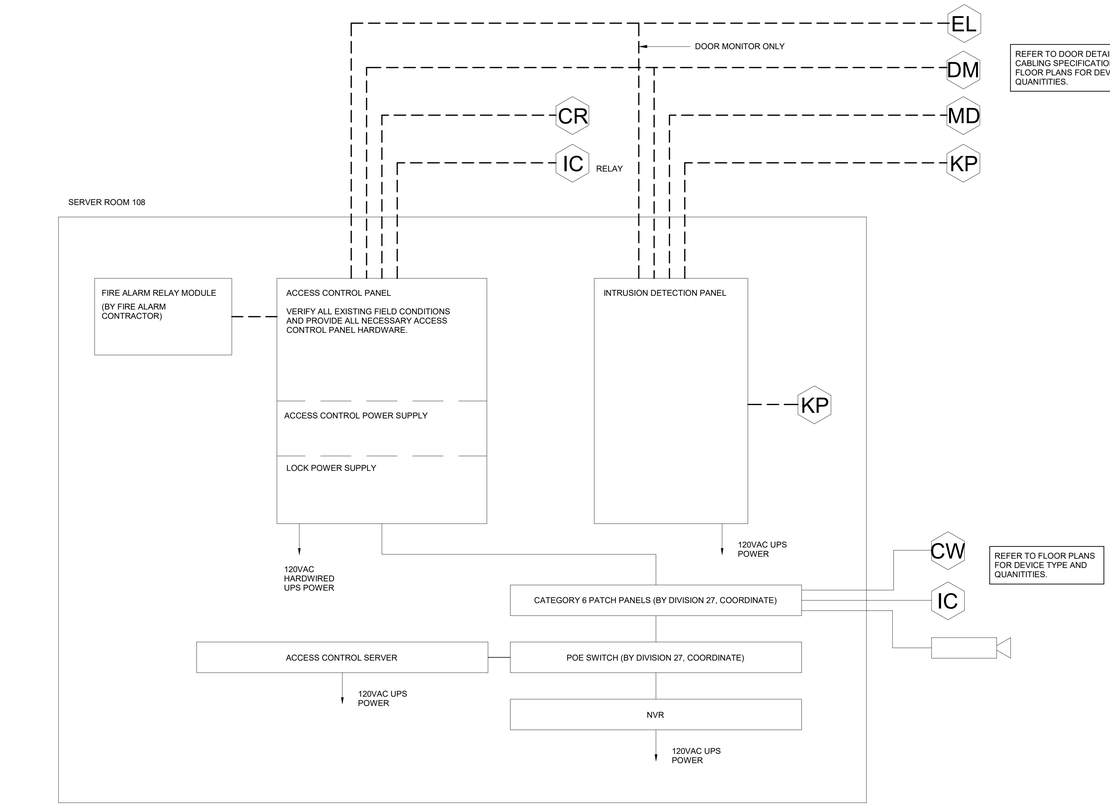
SECURITY DETAILS

SHEET NUMBER

TY5.00

SECURITY CAMERA SCHEDULE						
LOCATION	CAMERA NO.	TYPE	DESCRIPTION	MOUNTING INSTALL HEIGHT	SERVING ROOM	DETAIL REF. NO. TY5.00
HUB BUILDING	1	03	PTZ	174"	SERVER ROOM 108	4
HUB BUILDING	2	04	Video Intercom	60"	SERVER ROOM 108	5
HUB BUILDING	3	01	Fixed-5MP	108"	SERVER ROOM 108	5
HUB BUILDING	4	01	Fixed-5MP	108"	SERVER ROOM 108	5
SITE	101	03	PTZ	180"	SERVER ROOM 108	4
SITE	102	02	Multi-Sensor 180	144"	SERVER ROOM 108	4
SITE	103	02	Multi-Sensor 180	144"	SERVER ROOM 108	3
SITE	104	03	PTZ	180"	SERVER ROOM 108	4
SITE	104	03	PTZ	180"	SERVER ROOM 108	4
SITE	105	03	PTZ	180"	SERVER ROOM 108	4

SECURITY DEVICE SCHEDULE - HUB BUILDING			
SYSTEM	DEVICE	LOCATION	SERVING ROOM
ACS	HID Signo Reader 40	DOOR 100.A	SERVER ROOM 108
ACS	HID Signo Reader 40	DOOR 108.A	SERVER ROOM 108
ACS & IDS	Electric Lock, Monitor, and REX	DOOR 107.A	SERVER ROOM 108
ACS & IDS	Electric Lock, Monitor, and REX	DOOR 107.A	SERVER ROOM 108
ACS & IDS	Door Monitor	DOOR 103.A	SERVER ROOM 108
ACS & IDS	Door Monitor	DOOR 102.A	SERVER ROOM 108
ACS & IDS	Electric Lock, Monitor, and REX	DOOR 108.A	SERVER ROOM 108
ACS & IDS	Electric Lock, Monitor, and REX	DOOR 100.A	SERVER ROOM 108
IDS	Motion Detector - 90 Deg	OPEN OFFICE 100	SERVER ROOM 108
IDS	Keypad - IDS	OPEN OFFICE 100	SERVER ROOM 108
IDS	Motion Detector - 90 Deg	OPEN OFFICE 100	SERVER ROOM 108
ACS	Video Intercom - 2-Gang	DOOR 100.A	SERVER ROOM 108
ACS	Enclosure - 24"x36"x8"	SERVER ROOM 108	SERVER ROOM 108
IDS	Enclosure - 12"x16"x4.5"	SERVER ROOM 108	SERVER ROOM 108
IDS	Keypad - IDS	SERVER ROOM 108	SERVER ROOM 108
	HID Signo Reader 40	DOOR 107.A	SERVER ROOM 108



REFER TO DOOR DETAILS FOR CABLING SPECIFICATIONS AND FLOOR PLANS FOR DEVICE QUANITITIES.

REFER TO FLOOR PLANS FOR DEVICE TYPE AND QUANITITIES.

1 SECUIRTY SYSTEM DIAGRAM
NTS

PARAGON STAR

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SHEET TITLE

SECURITY SCHEDULES

SHEET NUMBER

TY5.01

SECTION 28: ELECTRONIC SECURITY SYSTEMS

1. GENERAL REQUIREMENTS

A. WORK INCLUDED

Furnish and install complete electronic security systems for this construction project, consisting of the following: access control system, video surveillance system and video intercom system.

Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with the requirements state or reasonably inferred by the contract documents.

Work is to be completed by certified installers of the system manufacturer that is being installed.

Work not included / related sections: Common work, such as raceways and backboxes, are by Division 26. Copper and fiber optic cabling for security cameras is by Division 27.

POE network switches and configuration are by Owner. Within 2 weeks after award of project, schedule a meeting or conference call with the owner's IT department to coordinate port counts, bandwidth, and other miscellaneous network requirements (such as IP addresses, MAC addresses, and firewall and VLAN settings).

Codes, standards and guidelines:

Follow the most current revisions of the following codes and standards:
1. NFPA 70 – national electric code
2. NFPA 101 – life safety code
3. NFPA 730 – guide for premises security
4. NFPA 731 – installation of electronic premises security systems
5. ANSI/BICSI 005-2013 – electronic safety and security system design and implementation best practices

BICSI electronic safety and security design reference manual definitions:

ESN – Electronic security network
ESC – Electronic security contractor, the primary contractor of this section, responsible for fully coordinating all electronic security system requirements with other divisions and sections, such as power, fire alarm, and pathways/other common work.
gb – gigabyte
KVM – keyboard, video, and mouse
NJATC – National Joint Apprenticeship and Training Committee
NVR – network video recorder
POE – power over Ethernet
RAID - redundant arrays of independent disks
RCDD – registered communications distribution designer, a BICSI designation
RTPM – registered telecommunications project manager, a BICSI designation

B. CONTRACTOR QUALIFICATIONS

Bidding contractor shall have a minimum of five continuous years in the business of integrating and installing electronic security systems. Bidding contractor shall be a certified installer by the equipment manufacturers whose products shall be incorporated into this project. Post-award certification will not be accepted. If requested by architect or owner, provide a reference list of 3 projects of similar size, scope, including client contact information.

C. SUBMITTALS

Pre-bid: Submit product substitution requests prior to bid questions deadline.

Bid: Submit pricing as described in bid form and contractor qualifications.

Pre-construction: Re-submit contractor qualifications, update if necessary. Include resume and contact information for project manager. Product cutsheets. Scaled shop drawings, per the following sub-section. Battery backup / ups calculations.

Project completion: Resubmit approved pre-construction submittals and shop drawings, updated with all changes during construction. Cable databases and test results. Operation and maintenance manuals for all pieces of equipment.

Shop drawings: Scaled floor plans indicating device locations and proposed cable / conduit routing. All device locations to be labeled with unique identifier. Enlarged floor plans and wall/rack elevations, with manufacturer components identified by part number. Schematic riser diagrams for each security sub-system with all devices shown and labeled with a unique identifier. Cable between headend equipment and devices shall be identified by cable type and manufacturer/part number.

2. MATERIALS AND INSTALLATION

A. PRODUCTS

Access control system (ACS): Provide a new access control system to provide a complete functioning system, consisting of the control and monitoring of electro-mechanical barriers that limits physical access to authorized persons to openings of a secured area.

Access Control system shall integrate with the following Electronic Security Systems:
a. Intercom System – Intercom stations shall be programmed to allow a (soft) button to release/unlock the door or gate adjacent to initiating intercom station.
b. Video Surveillance System (VSS) –
   1. Workstation(s) shall be programmed to display live video and recorded from Video Surveillance cameras.
   2. Provide the alarm-handling window with a command button that will display the camera associated with the alarm point.
   3. Display mouse-selectable icons representing each camera source, to select source to be displayed.

System shall consist of a PC-based Server, networked PC-based client workstation(s), and field-installed panels and devices, connected by an Owner-provided high-speed electronic data transmission network.

Security management software – LenelS2, Open Options, or AMAG. System license shall be for the entire access control system and shall support the number of doors/devices on the plans plus 25% spare. The software shall have a secured web-based or iOS/Android application option that allows basic functionality to be addressed via an iOS or Android mobile device with appropriate user login/password.

Access control system server – Provide a rack-mount server; manufacturer shall be the same as the access control system software, or off-the-shelf servers from DELL, HP, or Aberdeen that meet the minimum performance requirements of the ACS software. Submit proposed products in pre-construction submittal. Connect server to rack-mount UPS capable of providing (30) minutes of back-up power.

Access control client workstation – provide desktop PC with keyboard, mouse, and (2) 24" LCD monitor with minimum Quad HD (2560 x 1440) resolution. Manufacturer shall be the same as the video management software, or off-the-shelf computers from DELL, HP, or Aberdeen that meet the minimum performance requirements of the ACS and VSS client software. Connect workstation to desktop UPS capable of providing (30) minutes of back-up power.

Door Hardware Interface – Coordinate with Division 08 Sections that specify door and gate hardware required to be monitored or controlled by the ACS. The Controllers in this Section shall have electrical characteristics that match the signal and power requirements of door hardware. Integrate door hardware specified in Division 08 Sections to function with the controls and PC-based software and hardware in this Section.

Card readers – Readers shall operate at the 13.56 MHz frequency, and shall also be near-field communications (NFC) and Bluetooth compliant to enable the use of mobile phones as access credentials. a. Refer to schedule on contract drawings for approved manufacturer and model numbers.

Credentials – Credential cards shall be thin, flexible polyvinyl chloride (PVC) laminate that operate at the 13.56 MHz frequency. Provide (100) spare cards, delivered to Owner at time of Owner Training.

Cabling – utilize shielded, multi-pair conductors of sufficient wire gauge and pair count as recommended by the device manufacturers. Submit proposed cable cutsheets and indicate cable type on riser diagram shop drawing. Manufacturer shall be: Belden, Draka, General Cable, Tappan, West Penn Wire, or approved equivalent.

Intrusion Detection System: Provide a new intrusion detection system to provide a complete functioning system that is hard-wired, modular, and microprocessor-based, with intrusion sensors and detection devices to perform monitoring, alarm, and control functions. System components shall meet UL 609 standard for local burglar alarm units and systems. The intrusion detection system is sub-system of the access control system.

Program the system to perform in the following manner: alarms shall report to a third-party monitoring service via cellular connection. At any time, panic button activation shall trigger an alarm. While the system is armed, motion detectors and door monitors in multiple zones shall trigger an alarm. The system shall be armed and disarmed from keypads, and allow 90 seconds (or as stipulated by owner) for entry or exit through exterior doors. The system shall have multiple codes to disarm certain zones; coordinate exact codes, zones and function of codes with owner prior to installation. The system components shall be continuously monitored for normal, alarm, supervisory, and trouble conditions.

Intrusion detection control panel - manufacturer shall be Bosch 5512 Series.

Control panel capacity – provide quantity of control panels with sufficient capacity to accommodate 25% increase in load, devices, and zones. Control panel accessories – provide lockable NEMA 250 type 12 enclosure(s) to house intrusion detection control panel(s). Provide integral battery backup to power the system in the event of a power outage - a minimum of 6 hours in standby mode and 5 minutes in alarm mode; include power draw and battery calculations with pre-construction shop drawing submittal.

Keypad – provide keypad compatible with the intrusion detection panel. It shall have a minimum of a 2 line by 16 character backlit LCD, piezo-electrical sounder, and 16 keys on the key pad. Refer to plans for locations and quantity. Submit product cutsheet from same manufacturer of control panel.

Motion detector – shall be dual technology sensors that detect changes in microwave signals and a PIR sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern. It shall be listed and labeled by a qualified testing agency for compliance with SIA PIR-01. Manufacturer shall be Bosch.

Door position switch – shall be steel and DPDT. All door position switches shall be recessed, with 1" diameter, minimum ½" gap, and the color shall closely match the door frame. Manufacturer shall be Interlogix.

Cabling – utilize shielded, multi-pair conductors of sufficient wire gauge and pair count as recommended by the device manufacturers. Unshielded cable for intrusion detection communication bus wiring is acceptable. Submit proposed cable cutsheets and indicate cable type on riser diagram shop drawing. Manufacturer shall be: Belden, Draka, General Cable, Tappan, West Penn Wire, or approved equivalent.

Video surveillance system (VSS): Provide a complete and functioning video surveillance system, consisting of a minimum of video management software, ip cameras, network video recording capable of recording and storing video (motion) from all cameras at full resolution and 15 frames per second for a minimum of 30 days, unless otherwise noted on the contract drawings, with multiple hard drives in a Raid 5 configuration.

Video management software (VMS) – Manufacturers shall be: Genetec, Avigilon, Salient or Milestone.

Security cameras – Refer to schedule on contract drawings for approved manufacturer and model numbers. Alternative manufactures will be considered prior to bid only.

Network video recording servers (NVR) – provide rack-mount server(s) to record all cameras per specifications described in this section. Manufacturer shall be the same as the video management software, or off-the-shelf computers, servers, and storage components from DELL, HP, or Aberdeen that meet the minimum performance requirements of the VMS software. submit proposed products in pre-construction submittal. Connect server to rack-mount UPS capable of providing (30) minutes of back-up power.

Video management software server – provide rack-mount server(s) to manage all cameras per specifications described in this section. The VMS may reside on the recording server if the server meets the VMS manufacturer's performance requirements for both. The server shall be the same as the video management software, or off-the-shelf computers, servers, and storage components from DELL, HP, or Aberdeen that meet the minimum performance requirements of the VMS software. submit proposed products in pre-construction submittal. Connect server to rack-mount UPS capable of providing (30) minutes of back-up power.

Cabling: Copper and fiber optic cabling for security cameras provided by Division 27. Coordinate patch cables with Division 27.

4. EXECUTION

A. GENERAL REQUIREMENTS

Label devices, control panel(s), and associated cabling with identification number/room number as indicated on the drawings. Where drawings are silent, coordinate labeling scheme with owner prior to pre-construction submittals and indicate proposed identification/labeling on pre-construction shop drawings.

Wiring method (wall mounted devices): install wiring in conduit from wall-mounted devices to accessible ceiling space concealed in wall; continue wiring to control panel above accessible ceiling areas supported via j-hooks every 60" or less; provide overhead conduit (installed tight to structure) for all exposed ceiling areas and concealed conduit for all inaccessible (hard) ceiling areas.

Wiring method (ceiling devices): install wiring to control panel above accessible ceiling areas supported via j-hooks every 60" or less; provide overhead conduit (installed tight to structure) for all exposed ceiling areas and concealed conduit for all inaccessible (hard) ceiling areas.

Wiring within enclosures: bundle, lace, and train conductors to terminal points. use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

All cabling shall be labeled with a machine-printed label within 6 inches of each end. All cable labels shall be thermal-transfer type and utilize self-adhesive labels.

Cable terminations: cable connections to device and security panel shall be soldered or heat-shrunk from jacket to jacket. Exposed conductors, even within an enclosure or backbox, are not allowed.

Key all control panel enclosures the same and furnish three keys to owner at end of Owner training session.

Grounding: ground system components and conductor and cable shields to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Ground equipment in accordance with manufacturer and IEEE 1100.

B. ACCESS CONTROL AND INTRUSION DETECTION SYSTEM
Cabling by ESC. Division 27 contractor to provide network to access control panel.

ACS software – develop, install, and test software and databases for the complete and proper operation of systems involved. Assign software license to owner. The ESC is responsible for the entire programming and setup of the system such that no additional programming is required. Programming shall include the setup of all available features of the software, including preparing and installing graphic maps.

Coordination – Door electronic locking hardware by Division 8 contractor. ESC shall provide power supplies, cabling and terminations for the electronic locking hardware.

Testing – verify access control doors and detectors are working and auxiliary input and output devices are functioning properly. Verify access control doors and input and output devices are correctly identified within the system software.

C. VIDEO SURVEILLANCE SYSTEM
Video Security System: Camera category cabling (including patch cables) and fiber optic cabling by Division 27. Final terminations by ESC. Coordinate labeling scheme with structured cabling system contractor. Ensure exterior cameras are protected with in-line surge protection.

POE network switches are by owner – coordinate network requirements with owner's IT staff. Obtain patch cables from structured cabling system contractor and install as directed by owner.

VMS software – develop, install, and test software and databases for the complete and proper operation of systems involved. Assign software license to owner. The contractor is responsible for the entire programming and setup of the system such that no additional programming is required. Programming shall include the setup of all available features of the software, including preparing and installing graphic maps.

Coordinate field-of-view and lens/zoom for each camera with owner prior to installation. Program camera titles and on-screen placement as coordinated with owner.

Cleaning - clean video surveillance system components, including camera-housing windows, lenses, and monitor screens.

Testing – verify cameras are working and capturing intended field-of-view in focus. Verify cameras are correctly identified on the graphical map.

D. OWNER TRAINING

Demonstration - within two weeks of substantial completion, provide one 4-hour training session with owner to demonstrate the following:

Access Control/Intrusion Detection System: Arming/Disarming system, process to change keypad codes, add and remove access control credentials and personnel to the system, and assigning access control doors to personnel groups.

Video Surveillance System: Create live camera views, create, and archive recorded video clips, and playback recorded video.

Train owner's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment.

Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.

Adjusting: include in bid one additional site visit (outside of normal occupancy hours) within the first 12 months after substantial completion to adjust the system to suit actual occupied conditions.

END OF SECTION 28

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.: 19050.02
Date: 08/06/2021
Issued For: PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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1850004412
EXPIRES 12/31/2021

SHEET TITLE

SECURITY SPECIFICATIONS

SHEET NUMBER

TY6.00

FIRE PROTECTION GENERAL NOTES:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER AND/OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. SYSTEM DESIGN, INSTALLATION AND MATERIALS SHALL BE IN ACCORDANCE WITH APPLICABLE NFPA STANDARDS. SYSTEM SHALL ALSO MEET ALL APPLICABLE BUILDING CODES, FIRE CODES AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND INSURANCE CARRIER. VERIFY REQUIREMENTS PRIOR TO BID SUBMITTAL.
3. INFORMATION ON CONTRACT DOCUMENTS IS GENERAL INFORMATION AND FOR BID PURPOSES ONLY. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE FINAL SYSTEM DESIGN AND LAYOUT OF ALL COMPONENTS, COORDINATION WITH ALL OTHER TRADES, AND SYSTEM CALCULATIONS REQUIRED FOR APPROVAL BY THE AUTHORITY HAVING JURISDICTION, ENGINEER, AND OWNER'S INSURER.
4. THE CONTRACTOR SHALL FOLLOW THE ENGINEER OF RECORD'S SYSTEM DESIGN AND LAYOUT OF ALL COMPONENTS EXCEPT WHERE MODIFICATION TO THE DESIGN IS NECESSARY. MODIFICATIONS SHALL BE REFLECTED IN THE CONTRACTOR'S SHOP DRAWINGS AND CALCULATIONS.
5. DEVIATIONS FROM ENGINEER'S DESIGN WILL NOT BE CONSIDERED UNLESS A FORMALLY SUBMITTED RFI IS RECEIVED AND APPROVED.
6. THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND LABOR REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM AS INDICATED IN THE DRAWINGS AND SPECIFICATIONS.
7. PROVIDE ADDITIONAL MATERIALS AND LABOR REQUIRED DUE TO LACK OF COORDINATION OR TO MEET AUTHORITY HAVING JURISDICTION AND INSURANCE CARRIER REQUIREMENTS AT NO ADDITIONAL COST TO THE OWNER.
8. FORWARD COMPLETED CERTIFICATE OF COMPLETION AND CONTRACTOR MATERIAL TEST CERTIFICATES TO THE OWNER.
9. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

FIRE PROTECTION SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V2.02

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	NIC	NOT IN CONTRACT
AFG	ABOVE FINISHED GRADE	OC	ON CENTER
CD	CANDELA	PIV	POST INDICATOR VALVE
DI	DUCTILE IRON	PROVIDE	FURNISH AND INSTALL
ESFR	EARLY SUPPRESSION FAST RESPONSE	PRV	PRESSURE REDUCING VALVE
ETR	EXISTING TO REMAIN	RD	RETURN DUCT
FHC	FIRE HOSE CABINET	REV	REVISION
FP	FIRE PROTECTION	SD	SUPPLY DUCT
GC	CONTRACTOR	SF	SQUARE FEET
GPM	GALLONS PER MINUTE	TYP	TYPICAL
JBU-BOX	JUNCTION BOX	UNO	UNLESS NOTES OTHERWISE
MAX	MAXIMUM	V	VOLT(S)
MIN	MINIMUM	W	WATTS
N/A	NOT APPLICABLE	WP	WEATHERPROOF

ANNOTATION

- FIRE PROTECTION PLAN NOTE CALLOUT
- CONNECTION POINT OF NEW WORK TO EXISTING
- DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

FIRE SPRINKLERS

- UPRIGHT SPRINKLER
- PENDENT SPRINKLER
- CONCEALED SPRINKLER
- DRY PENDENT SPRINKLER
- DRY SIDEWALL SPRINKLER
- SIDEWALL SPRINKLER

FIRE SPRINKLER PIPING

- FIRE PROTECTION (FP)
- SHUTOFF VALVE
- CHECK VALVE
- BACKFLOW PREVENTER
- CAP
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- FIRE DEPARTMENT CONNECTION
- FIRE PUMP TEST HEADER
- INSPECTOR'S TEST CONNECTION / AUXILIARY DRAIN
- SPRINKLER RISER
- TOP BEAM CLAMP
- TRAPEZE HANGER

STANDARD MOUNTING HEIGHTS

AUDIBLE APPLIANCE (TOP OF APPLIANCE)	90"
FIRE ALARM ANNUNCIATOR PANEL (TOP OF DISPLAY)	60"
FIRE ALARM BELL (EXTERIOR) (CENTERLINE)	120"
FIRE ALARM CONTROL PANEL/UNIT (TOP OF DISPLAY)	60"
PULL STATION (TOP OF DEVICE)	48"
VISIBLE APPLIANCE (CENTERLINE)	84"

INSTALL DEVICES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF OR AFG, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

FIRE ALARM

- FACP — FIRE ALARM CONTROL PANEL/UNIT
- FACP — RECESSED FIRE ALARM CONTROL PANEL/UNIT
- FAAP — FIRE ALARM ANNUNCIATOR PANEL
- FAAP — RECESSED FIRE ALARM ANNUNCIATOR PANEL
- AMP — AMPLIFIER PANEL
- RPS — REMOTE POWER SUPPLY
- RT — REMOTE TEST STATION WITH INDICATING LIGHT
- RL — REMOTE INDICATING LIGHT
- PS — PRESSURE SWITCH LOW/HIGH
- FS — WATERFLOW ALARM SWITCH
- VT — CONTROL VALVE TAMPER SWITCH
- DH — MAGNETIC DOOR HOLD OPEN DEVICE
- CM — CONTROL MODULE
- MM — MONITOR MODULE
- K — FIRE DEPARTMENT KEY BOX
- PULL STATION
- F — FIREFIGHTER'S PHONE JACK
- HEAT DETECTOR (E INDICATES ELEVATOR RECALL)
- SMOKE DETECTOR (E INDICATES ELEVATOR RECALL)
- SINGLE STATION SMOKE DETECTOR
- PROJECTED BEAM SMOKE DETECTOR
- RD — DUCT MOUNTED SMOKE DETECTOR (SD=SUPPLY/RD=RETURN)
- CO — CARBON MONOXIDE DETECTOR
- AREA OF REFUGE 2-WAY COMMUNICATION SYSTEM
- F AW — WALL MOUNTED AUDIBLE NOTIFICATION APPLIANCE #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- ## — WALL MOUNTED VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA
- F AW ## — WALL MOUNTED AUDIBLE/VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- F #W — CEILING MOUNTED AUDIBLE NOTIFICATION APPLIANCE #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- ## — CEILING MOUNTED VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA
- AW ## — CEILING MOUNTED AUDIBLE/VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- END OF LINE RESISTOR
- ABORT SWITCH
- BELL

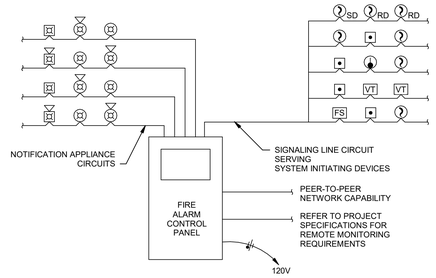
CALL OUTS

- ENLARGED PLAN CALLOUT
- NOT IN SCOPE

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING	NEW
DEMOLISH	FUTURE



RISER DIAGRAM IS SCHEMATIC IN NATURE. NOT ALL DEVICES ARE SHOWN. REFER TO PLANS FOR EQUIPMENT QUANTITIES AND LOCATIONS.

DUCT DETECTORS MAY HAVE INTEGRAL RELAYS FOR AIR HANDLING UNIT SHUT-DOWN AND FIRE/SMOKE DAMPER CONTROL. WIRING FOR THIS FUNCTION HAS NOT BEEN SHOWN. COORDINATE WITH MECHANICAL SYSTEM INSTALLER.

REFER TO PLANS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

3 FIRE ALARM RISER DIAGRAM - ADDRESSABLE SYSTEM (NON-VOICE)
NTS

PARAGON STAR

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REVISIONS

No.	Date	Description

REGISTRATION

CHRISTOPHER J. CULP
LICENSE # PE-2013037646

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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EXPIRES 12/31/2021

STATE OF MISSOURI
CHRISTOPHER J. CULP
NUMBER PE-2013037646
PROFESSIONAL ENGINEER
08/06/2021

SHEET TITLE

FIRE ALARM GENERAL NOTES AND LEGEND

SHEET NUMBER

FA0.00

CHRISTOPHER J. CULP

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW FIRE ALARM CONTROL PANEL. THE PANEL SHALL BE CAPABLE OF CONNECTING TO A PEER-TO-PEER NETWORK FOR COMMUNICATION WITH OTHER FIRE ALARM PANELS AT THE DEVELOPMENT.
2. PROVIDE DUCT MOUNTED SMOKE DETECTOR FOR FAN POWERED MECHANICAL AIR HANDLING EQUIPMENT SHUTDOWN. INSTALL DETECTOR PER MANUFACTURER'S RECOMMENDATIONS. REFER TO MECHANICAL SHEETS FOR EQUIPMENT AND DUCTWORK LAYOUT AND DETAILS.
3. PROVIDE LOW VOLTAGE WIRING FROM DUCT DETECTOR TO REMOTE TEST STATION. MOUNT REMOTE TEST STATION IN CEILING.
4. PROVIDE EQUIPMENT AND CONNECTIONS REQUIRED TO UNLOCK ACCESS CONTROL LOCKS UPON SIGNAL FROM FIRE ALARM CONTROL PANEL.
5. PROVIDE FIRE DEPARTMENT KEY BOX FOR FIRE DEPARTMENT ACCESS. PROVIDE EQUIPMENT AND CONNECTIONS NECESSARY TO MONITOR KEY BOX INTERNAL SUPERVISORY SWITCH(ES), AS REQUIRED.



1 FIRE ALARM FIRST FLOOR RCP
1/4" = 1'-0"

0 2' 4' 6'
SCALE: 1/4"=1'-0"

CHRISTOPHER J. CULP

PARAGON STAR

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STATE OF MISSOURI
CHRISTOPHER J. CULP
NUMBER PE-2013037646
PROFESSIONAL ENGINEER
08/06/2021

SHEET TITLE

FIRE ALARM FIRST FLOOR RCP

SHEET NUMBER

FA1.01

Division 28: FIRE ALARM SYSTEM

1. GENERAL INSTRUCTIONS

A. GENERAL REQUIREMENTS

All requirements under Division 01 (General Requirements) and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01 (General Requirements), this section and division take precedence. Become thoroughly familiar with all its contents as to requirements that affect this division, section, or both. Work required under this division includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and any portion of work described in one shall be provided as if described in both. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They convey the scope of work, indicating the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

Installation of devices shall be performed or supervised by a National Institute for Certification of Engineering Technologies (NICET) Level 2 or higher fire alarm technician. Submit copies of the certification for employees through shop drawing submittals.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

	2004 Edition	1995 Edition
1.	Division 21 – Fire Suppression	Division 15
2.	Division 22 – Plumbing	Division 15
3.	Division 23 – HVAC	Division 15
4.	Division 26 – Electrical	Division 16
5.	Division 27 – Communications	Division 16
6.	Division 28 – Electronic Safety and Security	Division 16

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations."

Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install, complete and ready for the intended use."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division."

Engineer: Where referenced in this division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, as defined in the General and/or Supplementary Conditions. When used in this division, Engineer means increased involvement by and obligations to the Engineer, in addition to involvement by and obligations to the Architect.

AHJ: The local code and/or inspection agency (Authority) Having Jurisdiction over the work.

NRTL: Nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. Nationally recognized testing laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the Engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, or both, by an NRTL, and acceptable to the AHJ over this project.

C. PREBID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. SCOPE OF WORK

The scope of work in this section includes fire alarm control panels, manual fire alarm pull station, automatic smoke detector, fire alarm notification appliances, air handling unit shutdown, and battery stand-by power.

E. CODES AND STANDARDS

Provide an integrated fire alarm system, which meets the current versions of NFPA 70, National Electrical Code; NFPA 72, National Fire Alarm Code; and all local building and fire codes. All fire alarm equipment shall be Underwriters Laboratory (UL) approved for the type and class of service performed.

F. SYSTEM DESCRIPTION

The fire alarm system shall be a non-coded manual and automatic fire alarm system with connections to a remote supervising station. Control panel shall be micro-processor based, with fully addressable alarm devices. The control panel shall be capable of connecting to a peer-to-peer network.

G. COORDINATION

Coordinate work with that of other trades so that the various components of the systems are installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. Components installed without regard to the above shall be relocated at no additional cost to the Owner.

H. SUBMITTALS

Upon being awarded a contract, submit to the Architect for approval, six (6) copies of manufacturer's shop drawings for equipment to be furnished under this contract, items requiring coordination between contractors, and sheet metal ductwork fabrication drawings. Before submitting shop drawings and material lists, verify that equipment submitted is mutually compatible and suitable for the intended use, and will fit the available space and allow ample room for maintenance. Highlight, mark, list or indicate the materials, performance criteria and accessories that are being proposed. Submit shop drawings as early as required to support the project schedule. Allow for two weeks Engineer review time plus mailing time plus a duplication of this time for resubmittal if required.

Submittals and shop drawings shall not contain the firm name, logo, seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

The checking and subsequent approval of such shop drawings by the Engineer shall not relieve the Contractor from responsibility for errors in dimensions, details, size of members, quantities, omissions of components or fittings; coordination of electrical requirements; or for coordinating items with actual building conditions. Proceed with the procurement and installation of equipment only after receiving approved shop drawings relative to each item.

Submit a detailed sequence of operation. Pre-printed, generic material will not be accepted and will be rejected. Highlight, mark, list or indicate the materials, performance criteria and accessories that are being proposed.

Submit [shop drawings showing fire alarm floor plans and a full tenant riser diagram][shop drawings showing fire alarm floor plans and a full building riser diagram]. Fire alarm floor plans and riser diagram shall show fire alarm control panel, annunciator, all fire alarm initiating devices and notification appliances. Show typical wiring diagrams of control panel/s, annunciator and each device and wiring connections required. Show all interfaces to other systems, such as temperature control systems, and security systems.

Where required by the AHJ, Contractor is responsible for obtaining a professional engineer or NICET stamp and signature on their shop drawing submittal. The Engineer is not responsible and will not provide this.

Shop drawings shall be produced using Computer Aided Design. Hand drawn documents will not be reviewed or approved.

Shop drawing scale shall match the Engineer's drawings where possible. Scale shall not be less than 3/32" = 1'-0".

Submit a bill of material and manufacturers product data for all devices and equipment.

Refer to Division 01 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 01. Contractor shall notify the Architect and Engineer that the shop drawings have been posted. If electronic submittal procedures are not defined in Division 01, Contractor shall include the website, user name and password information needed to access the submittals. For submittals sent by e-mail, Contractor shall copy the designated representatives of the Architect and Engineer. Contractor shall allow the Engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal and shall clearly indicate the materials, performance criteria and accessories being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

I. ELECTRONIC DRAWINGS

In preparation of shop drawings or record drawings, Contractor may, at his option, obtain electronic drawing files in AutoCAD or DXF format on CD-ROM disk, DVD disk, flash drive, or direct download, as desired, from the Engineer for a fee of $200 for a drawing set up to 12 sheets and $15 per sheet for each additional sheet. Contact the Architect for written authorization and Engineer for the necessary release agreement form and to specify shipping method and drawing format. In addition to payment, written authorization from the Architect and release agreement from the Engineer must be received before electronic drawing files will be sent.

J. RECORD DRAWINGS (AS-BUILT DRAWINGS)

During progress of the work in this division, Contractor shall maintain an accurate record of all changes made during the installation of the system. Upon completion of the work, accurately transfer all record information to three identical sets of the approved shop drawings. Insert one set into each copy of the manual described below.

See Division 01 and General Conditions for additional information.

K. QUALIFICATIONS

The manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum three years documented experience. The installer shall be a company specializing in installing the products specified in this section with minimum three years documented experience, be a bonded and licensed contractor and merchant of electronic automated fire alarm systems, and employ full-time factory-trained installers and technicians. The equipment manufacturer's service department shall be fully stocked in standard parts and components and engaged in the maintenance of fire alarm systems. On-the-premises service shall be available within 4 hours of notification, 7 days a week, 24 hours a day. Furnish service and maintenance of fire alarm system for one year from date of substantial completion.

L. WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design, or material for a period of 12 months from date of Substantial Completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects, occurring within the warranty period(s), as stated in the General Conditions and Division 01.

All corrective software modifications made during warranty periods shall be updated on all user documentation and on user and manufacturer archived software disks.

Warranties shall include labor and material, including travel expenses. Make repairs or replacements without any additional costs to the Owner, and to the satisfaction of the Owner, Architect, and Engineer.

Perform the remedial work promptly, upon written notice from the Engineer or Owner.

At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period and any actions the Owner must take in order to maintain warranty status. Each warranty instrument shall be addressed to the Owner and state the commencement date and term.

2. MATERIALS AND INSTALLATION

A. MANUFACTURERS

Subject to compliance with requirements, provide products manufactured by the following manufacturers: Notifier or Engineer approved equal.

B. FIRE ALARM CONTROL PANEL

The fire alarm system shall be a microprocessor-based system designed specifically for fire applications. The system shall be UL listed under Standard 864 (Control Units for Fire-Protective Signaling Systems). Modular construction with a flush mounted enclosure. Peer-to-peer network capability shall be provided.

Power Supply: Provide two separate and reliable power supplies. The control panel shall receive 120 Vac power via a dedicated branch circuit of the building's electrical system. Each shall have adequate capacity for the system. The fire alarm contractor shall submit battery calculations for review and approval. The calculations shall indicate each device and the load required in stand-by and alarm mode. The secondary power system shall be a battery-operated emergency power supply and charger with capacity for operating system in standby mode for 24 hours followed by alarm mode for 5 minutes.

System Supervision: Automatically detects and reports open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification appliance circuits. Alarm, supervisory and trouble signals shall be monitored by the supervising station over a Digital Alarm Communicator Transmitter (DACT), or other approved method.

Initiating Device Circuits: Provide circuitry, which meets the performance requirements during abnormal conditions, based upon the style and class of the circuitry selected. Initiating device circuits shall be Class B.

Notification Appliance Circuits: Provide circuitry, which meets the performance requirements during abnormal conditions, based upon the style and class of the circuitry selected. Notification appliance circuits shall be Class B.

Signaling Line Circuits: Provide circuitry, which meets the performance requirements during abnormal conditions, based upon the style and class of the circuitry selected. Signaling line circuitry shall be Class B.

Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.

Digital Alarm Communicator Transmitter (DACT): Electrically supervised, capable of transmitting alarm, supervisory and trouble signals over telephone lines to remote station receiver. The installing contractor shall select the appropriate DACT equipment based on the available communication methods. Coordinate with General Contractor to ensure proper connections are provided for communication to and from the DACT. Two (2) separate communication methods are required and shall not be subject to a common failure within the scope of work identified within these contract documents. Unless noted otherwise, the installing contractor shall utilize two (2) of the following communication methods:

1. Copper wire (POTS) telephone line for fire alarm use as required by NFPA 72.
   Exception: If two (2) POTS telephone lines are utilized per NFPA 72, additional communication methods are not required.
2. Building 10/100 Base network (LAN), DSL modem, or cable modem.
3. GSM cellular networks in the area including 2G, 3G and 4G. The transmitter shall automatically detect and choose the best network in the area based on signal strength and immediately self-adjust for operation as necessary.
4. Other alternative method complying with the performance requirements of NFPA 72 for 'Communication Methods for Supervising Station Alarm Systems that is acceptable to the Authority Having Jurisdiction and the Engineer of Record. Approval of any alternative methods must be obtained from the Engineer of Record via an RFI prior to submitting bids for the scope of work.

Provide trouble acknowledge, drill, and alarm silence switch.

The control panel shall have dedicated alarm, supervisory and trouble LED's and dedicated alarm, supervisory and trouble acknowledge switches.

Lamp Test: Manual lamp test function causes each LED to function at fire alarm control panel.

Drill Sequence of Operation: Manual drill function causes alarm mode operation as described above.

Addressable systems shall have silent walk test, history logging for a minimum of 400 events, 80 character LCD display.

C. SEQUENCE OF OPERATIONS

Trouble Sequence of Operation: System or circuit trouble places system in trouble mode, which causes the following system operations:

1. Visible and audible trouble alarm indicated at fire alarm control panel.
2. Trouble signal transmitted to supervising station.
3. Manual acknowledge function at fire alarm control panel silences audible trouble alarm; visible alarm is displayed until initiating failure or circuit trouble is cleared.
   Supervisory Sequence of Operation: The activation of any sprinkler valve tamper switch or duct-mounted smoke detector places system in supervisory mode, which causes the following system operations:

1. Visible and audible supervisory alarm indicated by address at fire alarm control panel and remote annunciator panel (if provided).
2. Supervisory signal transmitted to supervising station.
3. Duct-mounted smoke detectors shall shutdown their respective unit upon detection of smoke and remain down until manually reset.
4. Fan-powered terminal units that are less than 2,000 cfm and are not provided with duct detection shall shutdown when its respective air handling unit is shutdown.
5. Manual acknowledge function at fire alarm control panel and remote annunciator panel silences audible supervisory alarm; visible alarm is displayed until device is returned to its normal position/supervisory condition is cleared.

Alarm Sequence of Operation: Actuation of an alarm initiating device places system in alarm mode, which causes the following system operations.

1. Audible notification appliances shall sound until silenced by the alarm silence switch at the control panel.
2. All visible alarm notification appliances shall display a continuous synchronized pattern until reset by the Alarm Reset Switch.
3. Alarm signal transmitted to supervising station.
4. All fan-powered air-handling equipment shall shutdown and remain down until the fire alarm control panel is reset.
5. The alarm LED shall flash on the control panel until the alarm has been acknowledged at the control panel. Once acknowledged, this same LED shall latch on and the custom label for the address in alarm shall be displayed on the alphanumeric LCD readout. A subsequent alarm received from another address after acknowledged shall flash the alarm LED on the control panel showing the new alarm information.
7. A pulsing alarm tone shall occur within the control panel until acknowledged.

D. INITIATING DEVICES

Manual Pull Station: Provide semi-flush, non-coded type, double action manual pull station.

Smoke Detector (Photoelectric type): Device shall have visible indication of detector actuation, self-restoring, plug-in with an integral addressable module indicating the detector status. Photoelectric detectors shall have sensitivity between 0.5 and 3.5 percent/foot smoke obscuration.

Duct Mounted Smoke Detector: Photoelectric detector along with a standard, relay or isolator detector mounting base. Provide for variations in duct air velocity between 100 and 4000 feet per minute. Protect the measuring chamber from damage and insects. Provide an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. Provide drilling templates and gaskets to facilitate locating and mounting the housing. Provide remote alarm LEDs and remote test stations as shown on the plans. Provide duct detection and shutdown for air distribution systems exceeding 2,000 cfm.

E. NOTIFICATION APPLIANCES

Alarm Horn: Surface type fire alarm horn. Sound rating: 90 dB at 10 feet.

Visible Alarm Notification Appliances (Strobes): Strobes shall be xenon or equivalent, unfiltered or clear filtered white light, intensity as indicated on drawings, flash rate range from 1 to 3 Hz, a maximum pulse duration of 0.2 sec with a maximum duty cycle of 40 percent. Strobe shall meet all requirements of the Americans with Disabilities Act.

Audible/Visible Alarm Notification Appliances (Horn/Strobes): Combination units shall provide a common enclosure for the fire alarm audible and visible alarm appliances and be UL listed for its purpose. Minimum audible level and strobe intensity shall meet all requirements for separate appliances.

Provide flush or recessed devices unless otherwise noted.

F. AUXILIARY DEVICES

Monitor Module: Addressable microelectronic module providing a system address for alarm initiating devices for wired applications with normally open contacts. Include address setting means on the module.

Control Relay Module: Provide intelligent control relay modules. The control relay module shall provide one form "C" dry relay contact rated at 2 amps at 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system firmware.

Fire Department Key Box: By Knox Company. Provide with an internal switch to indicate a supervisory condition at the fire alarm control panel when the lid is removed.

G. FIRE ALARM WIRE AND CABLE

Fire Alarm Power Branch Circuits: Building wire as specified in Division 26.

Signaling Line, Initiating Device, and Notification Appliance Circuits: Power limited fire-protective signaling cable, solid copper conductor, 300 Volts insulation, suitable for temperature, conditions and location installed. Minimum wire size for initiating device circuits, control circuits and notification appliance circuits shall be determined by calculations and manufacturer's requirements or recommendations. Wire and cable shall be twisted and shielded if recommended by the system manufacturer. Initiating, notification, and control circuits shall be sized based on 20 percent additional power consuming devices. The conductors shall meet the requirements of NEC Article 760.

All wiring provided on this project shall be UL listed for the intended use. All wiring including wiring to existing modified devices and appliances shall be new.

3. EXECUTION

A. GENERAL

Install, program, and test all new equipment identified in this contract and revise existing equipment as noted.

The installation supervisor shall be on the job site during the entire installation. The installation supervisor shall maintain marked up copies of the drawings at the job site showing as-built conditions. These drawings shall be updated daily and available for Owner review.

Provide all required conduit and all associated hardware and install (pull), connect, and test all cable for a complete fire alarm system. Install all wiring in accordance with the guidelines of these specifications and documents as well as the NFPA codes and standards listed in these specifications.

B. INSTALLATION

Install all wiring in conduit. Minimum allowable conduit size shall be 3/4 inch. Size the conduit so that conduit fill does not exceed 75 percent of NFPA 70 maximum fill requirements. Cables in vertical risers shall not exceed 50 percent of NFPA 70 maximum fill requirements. Conduit installation shall be as required by the Contractor's layout and as described in these specifications. All conduit field routing shall be acceptable to the Owner. Routing not acceptable shall be rerouted and replaced without expense to the Owner.

Conceal all wire, cable, conduit, and raceways in walls, ceiling spaces, electrical shafts, or closets in finished areas except as specifically noted otherwise. Conduit and raceways may be exposed in unfinished areas or where specifically approved by the Owner.

Except as otherwise specified or indicated on the drawings, Install all conduit parallel or perpendicular to dominant surfaces with right angle turns made of symmetrical bends or fittings. Except where prevented by the location of other work, a single conduit or a conduit group shall be centered on structural members.

Locate conduit at least six inches from hot water or steam pipes and from other hot surfaces. Conduit shall not block access to any existing equipment or fixtures.

Label all conduits and junction boxes as specified in Division 26.

Terminate all wiring at devices or panels using terminal connectors for screw type terminals. All terminal connectors for conductors shall be pre-insulated ring type or pre-insulated spade type. Pre-insulated terminal connectors shall include a vinyl sleeve, color coded to indicate conductor size. Pre-insulated terminal connectors shall include a metallic support sleeve bonded to the vinyl-insulating sleeve and designed to grip the conductor insulation.

Mount end-of-line device in box with last device or separate box adjacent to last device in circuit for conventional hardwired Class B initiating and notification appliance circuits.

Securely fasten conduit to all boxes and cabinets. Threads on metallic conduit shall project through the wall of the box to allow the bushing to butt against the end of the conduit. The locknuts both inside and outside shall then be tightened sufficiently to bond the conduit securely to the box. Conduit shall enter cabinets from the bottom and sides only.

Install manual stations with operating handle 48 inches above floor unless noted otherwise on drawings.

Install ceiling mounted initiating devices in areas with exposed structure tight to underside of floor/roof deck.

Do not install smoke detectors in a direct air flow nor closer than 3 feet (1 meter) from an air supply diffuser or return air opening.

Install wall mounted visible and audible/visible notification appliances with visible element (strobe) between 80 inches and 96 inches above finished floor unless noted otherwise on drawings.

Install wall mounted audible devices with the top of the device at least 90 inches above finished floor or 6 inches below the ceiling, whichever is lower, unless noted otherwise on drawings. If combination devices are installed, they shall be installed per the visible signal device requirements.

Make conduit and wiring connections to equipment provided by others.

Provide strobe synchronization as required per NFPA 72.

A. FIELD QUALITY CONTROL

Systems shall be checked and tested in accordance with the instructions provided by the manufacturer to ensure that the system functions as required and is free of grounds, opens, and shorts. Each device shall be tested. Smoke detectors shall be tested with products of combustion.

Upon completion of the system installation and before the date of final acceptance, a factory-trained technician shall perform all necessary tests and adjustments and shall file a Letter of Certification and a Certificate of Completion (NFPA 72) with the Owner indicating that the system functions and conforms to the specifications.

Test in accordance with NFPA 72 and local fire department requirements.

B. MANUFACTURER'S FIELD SERVICES

Include services of factory trained and certified technician to supervise installation, adjustments, final connections, and system testing as performed by the Contractor's factory-trained technicians.

The equipment supplier's factory trained technician shall train the Owner's personnel in the proper use and maintenance of the system. Training sessions shall be conducted as needed, not to exceed a total of 2 sessions, with each session lasting a maximum of 4 hours each.

C. ACCEPTANCE TESTING

Upon completion of the system installation, a factory-trained technician shall perform all necessary tests and adjustments in the presence of the Owner's designated personnel.

END OF SECTION 28

PARAGON STAR

LOT 20 - HUB BUILDING

3151 NW PARAGON PKWY

Project No.:	19050.02
Date:	08/06/2021
Issued For:	PERMIT SET

REVISIONS

No.	Date	Description

REGISTRATION

CHRISTOPHER J. CULP
LICENSE # PE-2013037646

PROJECT TEAM

ARCHITECT	FINKLE+WILLIAMS ARCHITECTURE
CIVIL	GBA
LANDSCAPE	HOERR SCHAUDT / LAND3
FOUNDATIONS	BSE STRUCTURAL ENGINEERS
STRUCTURAL	BSE STRUCTURAL ENGINEERS
PLUMBING	HENDERSON ENGINEERS
MECHANICAL	HENDERSON ENGINEERS
ELECTRICAL	HENDERSON ENGINEERS
FIRE PROTECTION	HENDERSON ENGINEERS
CONTRACTOR	FOGEL ANDERSON

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EXPIRES 12/31/2021

STATE OF MISSOURI
CHRISTOPHER J. CULP
NUMBER PE-2013037646
PROFESSIONAL ENGINEER

08/06/2021

SHEET TITLE

FIRE ALARM SPECIFICATIONS

SHEET NUMBER

FA2.01

CHRISTOPHER J. CULP