LSR7 Robotics, GiC & Phys Education: Construction Documents

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LSN: 901 NE Douglas St.,
Lee's Summit MO 64086

Project Number: 0121-0100
Issue Date: September 9, 2022

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LSN/LSW Index of Drawings

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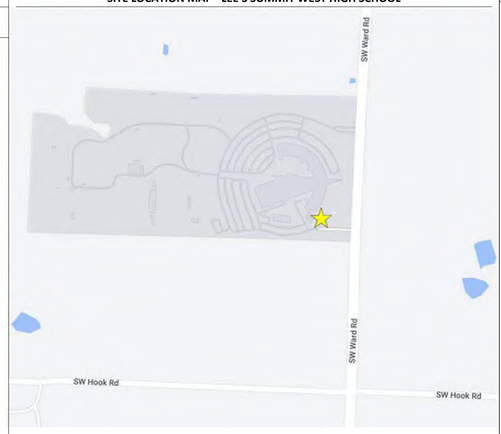
Volume 2

SITE LOCATION MAP - LEE'S SUMMIT WEST HIGH SCHOOL



SITE LOCATION MAP - LEE'S SUMMIT NORTH HIGH SCHOOL

General Notes:

1. THE INTENT OF THE CONTRACT DOCUMENTS IS TO INCLUDE ALL ITEMS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK BY THE CONTRACTOR. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL; PERFORMANCE BY THE CONTRACTOR SHALL BE REQUIRED ONLY TO THE EXTENT CONSISTENT WITH THE CONTRACT DOCUMENTS AND REASONABLY INFERABLE FROM THEM AS BEING NECESSARY TO PRODUCE THE INDICATED RESULTS.
2. ORGANIZATION OF THE SPECIFICATIONS INTO DIVISIONS, SECTIONS AND ARTICLES, AND ARRANGEMENT OF DRAWINGS SHALL NOT CONTROL THE CONTRACTOR IN DIVIDING THE WORK AMONG SUBCONTRACTORS OR IN ESTABLISHING THE EXTENT OF WORK TO BE PERFORMED BY ANY TRADE.
3. DRAWINGS, SPECIFICATIONS, GENERAL AND SUPPLEMENTARY CONDITIONS ARE ESSENTIAL PARTS OF THE CONTRACT. IN THE EVENT OF ANY DISCREPANCY BETWEEN A DRAWING AND FIGURES WRITTEN THEREON, THE FIGURES, UNLESS OBVIOUSLY INCORRECT, ARE TO GOVERN OVER SCALED DIMENSIONS. IN THE CASE OF ANY DISCREPANCY BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE SPECIFICATIONS ARE TO GOVERN. IF THERE IS A DISCREPANCY BETWEEN LARGE AND SMALL SCALE DETAILS, THE LARGER SCALE DETAILS ARE TO GOVERN. SUPPLEMENTARY CONDITIONS SHALL GOVERN OVER SPECIFICATIONS, DRAWINGS AND GENERAL CONDITIONS. THE CONTRACTOR SHALL ADVISE THE ARCHITECT OF ANY DISCREPANCIES OR CONFLICTS BETWEEN CONTRACT DOCUMENTS AS SOON AS THEY ARE DISCOVERED.
4. NOTWITHSTANDING THE ABOVE, IN THE CASE OF INCONSISTENCY BETWEEN DRAWINGS AND SPECIFICATIONS, OR WITHIN EITHER DOCUMENT NOT CLARIFIED BY ADDENDUM OR BY ARCHITECT'S SUPPLEMENTAL INSTRUCTION, THE BETTER QUALITY OR GREATER QUANTITY SHALL BE PROVIDED.
5. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS. IF DIMENSIONS APPEAR TO BE INSUFFICIENT OR INCORRECT, THE CONTRACTOR SHALL REQUEST CLARIFICATION FROM THE ARCHITECT.
6. WHENEVER CONTRACT DOCUMENTS REASONABLY IMPLY MATERIALS OR INSTALLATION AS NECESSARY TO PRODUCE THE INTENDED RESULTS, BUT DO NOT FULLY DETAIL OR SPECIFY SUCH MATERIALS, THE CONTRACTOR SHALL PROVIDE THE MATERIALS AND LABOR REQUIRED FOR INSTALLATION NONETHELESS.
7. PROVIDE ALL WORK INDICATED UNLESS SPECIFICALLY INDICATED AS "NOT IN CONTRACT" (NIC), "FURNISHED BY OTHERS" (FBO) OR "EXISTING".
8. CONTRACT DOCUMENTS ARE INTENDED TO CONVEY DESIGN INTENT ONLY. PROVIDE PRODUCTS COMPLETE WITH ACCESSORIES, TRIM, FINISH, FASTENERS, AND OTHER ITEMS NEEDED FOR A COMPLETE INSTALLATION AND INDICATED USE AND EFFECT.
9. THESE NOTES ARE NOT INTENDED TO LIMIT THE RESPONSIBILITIES OF THE CONTRACTOR AS DEFINED ELSEWHERE IN THE CONTRACT DOCUMENTS

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Index of Drawings & General Project Notes

G001

CODE ANALYSIS:

Based on Building Code Summary
Prepared by: Clinton J. Armstrong

1.0 INTRODUCTION

1.1 SCOPE

This documentation outlines major fire and life safety issues affecting the design of the renovations and additions to Lee's Summit North High School. Fire and life safety criteria are summarized from the 2018 International Building Code (IBC) as adopted by the City of Lee's Summit, and with approval from the State of Missouri Fire Marshal (DFS), and the 2018 International Existing Building Code (IEBC).

The new building is a single story vocational shop building with (2) classroom spaces within. Vocational classroom areas do not have enough hazardous materials to be classified as Group H occupancy. These spaces have hazardous materials; however, each has quantities which do not exceed the maximums as permitted by IBC Tables 307.1 (1) and 307.1(2). Construction will take place in a single phase.

1.2 APPLICABLE CODES:

This code summary utilized the following codes as adopted by the City of Lee's Summit, Missouri and the DFS's office (with approval by DFS to be noted on code footprint): :

- 2018 International Building Code (IBC)
- 2018 International Existing Building Code (IEBC)
- 2018 International Plumbing Code (IPC)
- 2017 National Electrical Code (NEC)
- 2018 International Fire Code (IFC)
- 2018 International Mechanical Code (IMC)
- 2018 International Fuel Gas Code (IFGC)
- ICC/ANSI A117.1-2009, Accessible and Usable Buildings and Facilities.
- Referenced Standards within each of the above codes

2.0 CONSTRUCTION CLASSIFICATIONS:

2.1 OCCUPANCY GROUP CLASSIFICATIONS

- Vocational Shop — Group E (Section 305.1)

2.2 TYPES OF CONSTRUCTION CLASSIFICATION

- Type II-B (Section 602.2)

2.3 ALLOWABLE AREA AND HEIGHT (TABLE 504.3, 504.4, 506.2):

Type IIB Construction	Allowable
	Group E
Area/story (square feet)	14,500
Total area (square feet)	29,000
Height (feet)	55
Height (number of stories)	2

3.0 FIRE RESISTIVE OCCUPANCY AND USE SEPARATIONS:

3.1 USE SEPARATIONS
Fire resistive separations and enclosures are intended to address individual use hazards and are identified below.

Use/Occupancy

Service entrance conductors. — Encased in 2 inches of concrete, listed 2-hour electrical circuit protective system, or in a vault - NEC Article 230.6

Information technology equipment room (Not Data Closets) — Room is required to be separated with 1-hour fire resistant rated walls, floors and ceilings with protected openings; ducts extending through assembly are required to be provided with fire/smoke dampers - NEC Article 654.2

3.2 OCCUPANCY SEPARATIONS
The new construction is classified throughout as a Group E Occupancy. No occupancy separations are required except as follows:

- Group E to Group S-2: 1-hour

4.0 FIRE RESISTIVE REQUIREMENTS FOR ELEMENTS OF THE STRUCTURE

4.1 ACCEPTABLE MATERIALS
Structural elements Type II-B resistive buildings are limited to non-combustible materials (IBC Section 602.2).

Fire retardant plywood or other wood products are permitted as sheathing or applied directly on studs within non-bearing partitions where the required fire rating is 2-hour or less (IBC Section 603.1, Exception 1 & 7).

Interior wood products installed as part of wall or ceiling finishes are required to meet the following Flame Spread Index:

-Non-Sprinklered Buildings:
- Corridors and enclosures for exit access stairways and ramps: Class B
- Rooms and enclosed spaces: Class C

Incidental 2 x blocking is permitted if of fire retardant treated wood. Fire retardant treated plywood is permitted within 1-hour or 2-hour walls that are not part of a shaft. Specific instances should be evaluated individually.

4.2 STRUCTURAL, INTERIOR, AND EXTERIOR ELEMENTS
Passive fire resistance for the structural frame insures that stability of the building, as a whole, can be maintained during the anticipated fire condition. The structural frame is defined as columns, as well as trusses, girders, and beams, having direct connection to columns. Beams and trusses not having direct connection to columns are considered secondary elements. Depending on where they occur, these secondary elements may be classified as an element of either a roof or floor assembly for purposes of determining fire resistance requirements.

Restrained versus unrestrained designations: All fire resistive assemblies should be viewed as unrestrained, except where the Structural Engineer has demonstrated otherwise.

Exterior walls provide exposure protection based on fire separation distances.

New construction will be required to follow seismic, wind, snow, and dead-end line loads as required for new buildings. Any new construction that affects existing structural conditions by more than five percent, that portion of the existing structure is required to be brought up to current code.

The following fire resistive requirements are documented from IBC Table 601 and other applicable sections.

FIRE RESISTANCE RATING REQUIREMENTS (TABLE 601)

BUILDING ELEMENT	Type IIB
Structural Frame	0
Walls:	
Exterior Bearing Walls	0
Exterior non-bearing walls per Table 602	0
Interior Bearing Walls	0
Interior non-bearing walls	0
Floor Assembly, including secondary beams and trusses.	0
Roof Assembly, including secondary beams and trusses	0

FIRE RESISTANCE RATED CONSTRUCTION

Building Element	Fire Resistance/Code Section
Corridors	0-hour – IBC Section 1020.1, Exception 1.
Other permanent partitions	0-hour - IBC Table 601
Roof covering	Class C - Table 1505.1
Projections (e.g., canopies)	0-hour, non-combustible – Section 705.2.1

5.0 FIRE RESISTANCE RATINGS

5.1 OPENINGS IN EXTERIOR WALLS (TABLE 705.8)

Distances (x) to Center Line of Street or Property Line	Non-Rated Openings as Percent Area of Exterior Wall
10' < x <15'	45%

This table assumes the building is considered as non sprinklered - Section 705.8.1

5.2 OPENINGS IN FLOORS/CEILING AND ROOF/CEILING ASSEMBLIES

Ceilings	Where the ceiling is part of a fire resistive floor/ceiling or roof/ceiling assembly, HVAC duct openings are required to be provided with ceiling type fire dampers – Section 716.6.2
Roofs	Roofs may have unprotected openings – Section 712.4

5.3 PENETRATIONS

Roofs	Roofs may have unprotected penetrations – Section 712.4

6.0 FIRE RESISTIVE INTERIOR FINISHES

6.1 WALL AND CEILING FINISHES SECTION 803

Flame Spread Classifications

WALL& CEILING FINISH	
Flame spread 0-25, smoke developed 0-450	Class A
Flame spread 26-75, smoke developed 0-450	Class B
Flame spread 76-200, smoke developed 0-450	Class C

Maximum Flame Spread Class (Table 803.13)

Occupancy Group	Vertical Exits and Exit Passageways	Exit Access Corridors and Other Exit Ways	Room or Enclosed Spaces
E	A	B	C

6.2 FLOOR FINISH

Rooms, exit stairs, exit passageways, rated and non-rated corridors	Material complying with DOC FF-1 "pill test" (CPSC 16 CFR 1030)

6.3 PLENUMS

Plenums are defined as any space used for air movement – IMC Section 602.1

Exposed materials within plenums are required to have a flame spread index of 25 & a smoke developed rating of 50 – IMC Section 602.2

For requirements on wiring, plastic sprinkler piping, & pneumatic tubing see Section 602.2, Exceptions of the IMC

Use of corridor as plenum	Use of corridor as a source of make-up air for exhaust systems that open directly onto such corridors is permitted provided make-up air rate is less than supply of outdoor air to the corridor – Section 1020.5, Exception 1 Corridors are permitted to serve as supply, return, exhaust, relief, or ventilation because the corridors are not required to be rated – Section 1020.5.1

6.4 FOAM PLASTIC (E.G., RIGID INSULATION)

Required to have a flame spread rating of 75 or less & a maximum smoke developed rating of 450 – Section 2603.3

Required to be separated from the building interior by a thermal barrier of 15 (½ inch regular gypsum board or other material that will limit the average temperature rise of the unexposed surface to not more than 250°F after 15-minutes) – Section 2603.4

May be used in roofing & exterior walls if part of a fire resistive assembly – Sections 2603.4.1.5 & 2603.5.1

May be used as interior trim if covering is no more than 10% of walls or ceilings – Section 2604.2

7.0 EXIT REQUIREMENTS

7.1 GENERAL EXIT CRITERIA

Occupant Load Factors

Mechanical or storage spaces	300 square feet gross/person – Table 1004.5
Vocational classrooms (i.e., computers, industrial arts, etc.)	50 square feet net/person – Table 1004.5

Number of Exits

2 exits from each floor required; 3 exits required in areas where there are 501 to 1,000 persons; 4 exits required in areas where there is more than 1,000 people –Table 1006.3.2 2 exit doors required from a room in the following conditions – Table 1006.3.3(2):

- Mechanical or storage rooms serving 29 or more people
- Office/classroom serving 49 or more people

Arrangement of Exits

Where 2 exits are required, they must be placed a minimum distance apart of ⅓ the overall diagonal dimension of the room or building; ½ diagonal if fully sprinklered (also see Section 7.9 of this report) – Section 1007.1.1

Doors	Where 3 or more exits are required, at least 2 must be separated by ½ the diagonal; ½ diagonal if fully sprinklered – Section 1007.1.2 Additional exits are required to be separated such that if 1 becomes blocked, the others remain available

Capacity of Exits

Groups E and S-2

Doors/ramps	60 people/foot (0.2 inches/person) – Section 1005.3.2

Travel Distance

Non-Smoke Protected

Group E	200 feet to an exit – Table 1017.2
Group S-2	300 feet to an exit – Table 1017.2

Note: Travel distance is measured to an "exit". By definition, an "exit" is one of the following: an exterior door, a stair enclosure, an exit passageway, or a horizontal exit (i.e., a 2-hour wall exclusive of floor plate).

Common Path of Travel

Group E	75 feet – Table 1006.2.1
Group S-2	100 feet – Table 1006.2.1

7.2 DOOR CRITERIA

Maximum leaf width	48 inches – Section 1010.1.1
Minimum leaf width	Wide enough to allow minimum clearance width of 32 inches when open – Section 1010.1.1
Minimum clear height	6 feet, 8 inches – Section 1010.1.1
Exit door swing	Exit doors are required to be swinging type – Section 1010.1.2 Exit doors serving 50 or more people or high hazard or refrigeration uses are required to swing in the direction of egress – Section 1010.1.2
Doors in series	Doors in series required to swing in the same direction or away from the space in between a minimum of 48 inches plus 1 door width between doors – Section 1010.1.8
Panic hardware requirements	Required on latched doors serving assembly areas having an occupant load of 50 or more & electrical rooms with equipment rated 1,200 amps or more & greater than 6 feet wide that contain over-current devices, switching devices, or control devices with exit access doors –Section 1010.1.10

7.3 CORRIDORS

Minimum height	7 feet, 6 inches – Section 1208.2
Minimum width	44 inches serving an occupant load of more than 50 – Section 1020.2 72 inches serving a Group E occupancies with 100 or more people – Section 1020.2
Maximum allowable dead-end corridor	20 feet or 2.5 times the least width of the corridor – Section 1020.4
Construction	0-hour – Section 1020.1, Exception 1
Projections	Not permitted except when doors are fully opened; exception may project no more than 7 inches into the required width – Section 1005.7 Doors in any position cannot reduce the required width by more than half Fixtures & furnishings may project up to 4 inches on either side into the required width between heights of 27 & 80 inches – Section 1003.3.3 & ADAAG Section 4.4.1 Ceiling projections may extend below the ceiling but not less than 80 inches above the finished floor for not more than 50% of the ceiling – Section 1003.3.1

7.4 STAIRWAY CRITERIA

Access to Roof	Required – IMC Section 306.5

If roof is unoccupied, access may be by a roof hatch providing a minimum of 16 square feet with a 2 feet minimum dimension
- Section 1011.12.2

7.5 OTHER EXIT ISSUES

Exit access through adjoining spaces	Permitted No limitations on number of exits or number of occupants limited by travel distance provided the space is accessory & not a storage room, kitchen, closet, or other room of similar use – Section 1016.2, Part 2

7.5 EXIT PROVISIONS FOR THE DISABLED

Number of exits	2 accessible exits are required when 2 or more exits are required – Section 1009.1 Required to be provided in the same number as required for exits – ADAAG Section 4.1.3(9)
Area of refuge	Not required – ADAAG Section 4.1.3(9)
Areas not required to be accessible	Elevator pits & similar areas accessed only by ladders & frequented only by service personnel & the like are not required to be accessible – ADAAG Section 4.1.3 (5), Exception 2

7.6 EXIT SIGNS AND EXIT LIGHTING

Exit lighting requirements	Required for means of egress with a minimum intensity of 1 footcandle at floor level; emergency power is required – Section 1008.2.1
Exit sign requirements	Required for means of egress from a room or space where 2 or more exits are required & placed no greater than 100 feet apart in corridors – Section 1013.1 Required to be illuminated at all times & be provided with emergency power – Section 1013.5
Tactile exit signs	Required at exit doors – Section 1013.4
Tactile sign requirements	Exterior exit doors are to be identified with a tactile sign with the word "EXIT" – Section 1013.4

8.0 FIRE PROTECTION ISSUES

8.1 FIRE SUPPRESSION

Automatic sprinklers	Not required -Section 903.2.3
Portable Fire Extinguishers	Required by Local Authority Required per IFC 906.1

8.3 FIRE ALARMS

Manual pull stations	Required – Section 907.2.3
Visual	Visual alarms are required to be installed in accordance with ADAAG & NFPA 72,
Audible	Audible alarms are required by the ADAAG to provide a sound intensity exceeding the average ambient sound level by 15 dBA or a level which exceeds the maximum sound level by 5 dBA with a duration of 60 The average sound pressure for notification appliances shall provide a sound pressure level of 15 decibels above average ambient sound level or 5 dBA above maximum sound level having a duration of not less than 60 seconds. – Section 907.5.2.1.1 Maximum sound pressure level for audible alarm notification appliances shall be 110 dBA. Where ambient noise is greater than 95 dBA, visible alarm shall be provided and audible alarm shall not be required. – Section 907.5.2.1.2

8.4 FIRE AND SMOKE DETECTION

Smoke detection required to shut-off heating or cooling air systems 2,000 cfm capacity or serving more than 1 occupancy – IMC

Duct smoke detectors are required to initiate a visible & supervisory signal at a constantly attended location - Section 907.11; the supervisory signal is not required when the duct smoke detectors activate the building's alarm notification system

Smoke detection is required at elevator lobbies & machine rooms to initiate fireman's service (Phase I) recall – Section 3003.2

Heat detector with a shunt trip device required in sprinklered machine rooms – ANSI A17.1, Section 2.8.2.3

Smoke detector(s) provided in conjunction with smoke dampers & hold openers at rated doors – NFPA 72

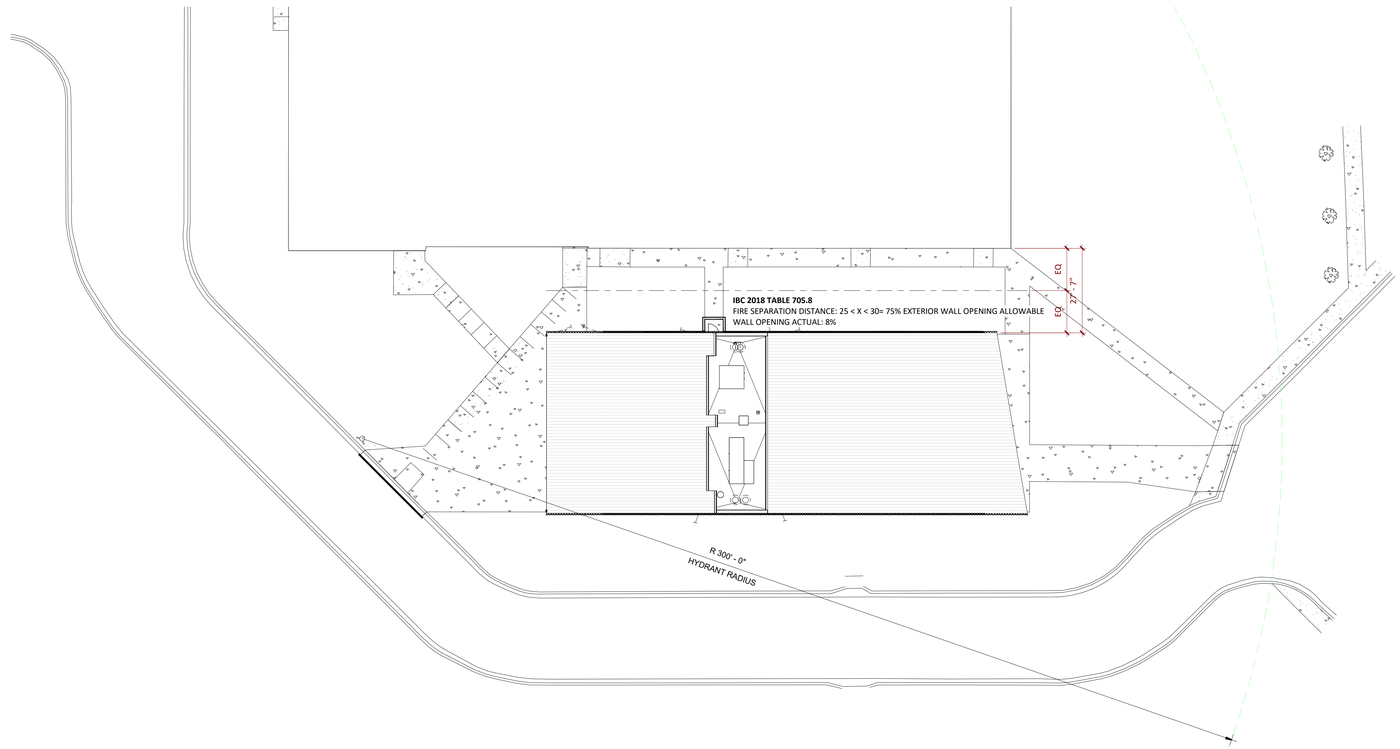
8.5 BACK-UP POWER

Fire alarm system	Emergency power is required per NFPA 72
Exit signs & exit lights	Emergency power is required; may be unit batteries – Sections 1006.3 &
Elevator	Not required – Section 1007.2.1

9.0 MISCELLANEOUS ISSUES

9.1 ROOM HEIGHT CRITERIA

Classroom, assembly and office spaces	7 feet, 6 inches – Section 1208.2
Corridors	7 feet, 6 inches; means of egress (i.e., including rooms) – Section 1208.2
Doors	7 feet, 6 inches – Section 1208.2
Bathrooms	7 feet – Section 1208.2



Code Site Plan - Lee's Summit North A3
1" = 20'-0"

General Notes (Code Plans):

1. ALL WORK, MATERIALS, AND METHODS SHALL BE IN CONFORMANCE WITH THE CODES, ORDINANCES AND REGULATIONS OF ALL GOVERNMENTAL AGENCIES HAVING JURISDICTION AT THE PROJECT LOCATION.
2. CONTRACTOR SHALL PROVIDE AND IS SOLELY RESPONSIBLE AND LIABLE FOR PUBLIC AND EMPLOYEE PROTECTION AS NECESSARY AND AS REQUIRED BY THE CODES, INCLUDING EXTERIOR PEDESTRIAN AND TRAFFIC BARRIERS. ALL WORK SHALL CONFORM TO ORDINANCES AND REGULATIONS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION AT THE PROJECT LOCATION.
3. THE SIZE, TYPE, QUANTITY, AND LOCATION OF ALL TEMPORARY FIRE EXTINGUISHERS SHALL BE DETERMINED BY THE AUTHORITY HAVING JUISDICTION.
4. COORDINATE LOCATION OF KNOX BOX WITH ARCHITECT, OWNER'S REPRESENTATIVE, AND THE AUTHORITY HAVING JUISDICTION IN THE FIELD.

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Code Review.

G100-B

Occupant Load Schedule - Full LSN_LSW

Occupancy	Number	Name	Area	Occupant Load Factor	Occupant Load
E					
E	R101	CORRIDOR	145 SF	0 SF	
E	R102	PLUMBING	44 SF	300 SF	1
E	R103	MEN'S RESTROOM	126 SF	0 SF	
E	R104	WOMEN'S RESTROOM	135 SF	0 SF	
E	R105	ROBOTICS FABRICATION	2,431 SF	50 SF	49
E	R105B	ROBOTICS FIELD	1,686 SF		34
E	R106	ELECTRICAL	54 SF	300 SF	1
E	R108	TELECOM	59 SF	300 SF	1
E	R109	VOCATION SHOP	1,808 SF	50 SF	37
S					
S	R107	STORAGE	45 SF	300 SF	1
			6,533 SF		124

Path of Travel LSN_LSW

Mark	Path of Egress (200' Max)	Common Path (75' Max)
PATH A	103'	38'
PATH B	45'	26'

	WATER CLOSETS + LAVATORIES						DRINKING FOUNTAINS		SERVICE SINK	
OCCUPANT LOAD: 90	TABLE 2902.1	WOMEN WC	WOMEN LAV	MEN WC	MEN LAV	TOTALS WC	TOTALS LAV	TABLE 2902.1	DRINKING FOUNTAINS	TABLE 2902.1	SERVICE SINKS
COUNT REQ:	1 per 50	2	2	2	2	4	4	1 per 100	2	1 per	1
COUNT PROV:		2	2	2	2	4	4		2		1

General Notes (Code Plans):

1. ALL WORK, MATERIALS, AND METHODS SHALL BE IN CONFORMANCE WITH THE CODES, ORDINANCES AND REGULATIONS OF ALL GOVERNMENTAL AGENCIES HAVING JURISDICTION AT THE PROJECT LOCATION.
2. CONTRACTOR SHALL PROVIDE AND IS SOLELY RESPONSIBLE AND LIABLE FOR PUBLIC AND EMPLOYEE PROTECTION AS NECESSARY AND AS REQUIRED BY THE CODES, INCLUDING EXTERIOR PEDESTRIAN AND TRAFFIC BARRIERS. ALL WORK SHALL CONFORM TO ORDINNANCES AND REGULATIONS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION AT THE PROJECT LOCATION.
3. THE SIZE, TYPE, QUANTITY, AND LOCATION OF ALL TEMPORARY FIRE EXTINGUISHERS SHALL BE DETERMINED BY THE AUTHORITY HAVING JUISDICTION.
4. COORDINATE LOCATION OF KNOX BOX WITH ARCHITECT, OWNER'S REPRESENTATIVE, AND THE AUTHORITY HAVING JUISDICTION IN THE FIELD.

Code Plan Legend:

Egress Path of Travel — Distance to Exit: 100' — Common Path of Travel Distance: 50' CPT

Egress Point — EXIT — Maximum # of Occupants (by width): 40' 2956.44 — Required # of Occupants

Stair Egress — Stair #1 | 4'-0" — Maximum # of Occupants (by width): 75' 4 — Required # of Occupants

Occupancy Tag — Room name — Occupancy Group: B 222 SF x 2P — Area — Occupant Load

Fire Extinguisher Radius — 75' Typ

Fire Extinguisher Symbol — FE

1-Hour: Fire Rated Assembly

2-Hour: Fire Rated Assembly

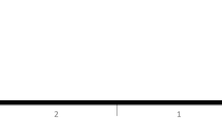
3-Hour: Fire Rated Assembly

4-Hour: Fire Rated Assembly

Smoke Barrier

Smoke Partition

Design No. U419
Nonbearing Wall Ratings — 1, 2, 3 or 4 Hr (See Items 3 & 4)



1. **Floor and Ceiling Runners** — (Not shown) — Channel shaped, fabricated from min 25 MSG (min 20 MSG when Item 4A is used) corrosion-protected steel, min width to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners 24 in. OC max.
2. **Steel Studs** — Channel shaped, fabricated from min 25 MSG (min 20 MSG when Item 4A is used) corrosion-protected steel, min width as indicated under Item 4, min 1-1/4 in. flanges and 1/4 in. returns, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
3. **Batts and Blankets*** — (Required as indicated under Item 4) — Mineral wool batts, friction fitted between studs and runners. Min nominal thickness as indicated under Item 4. See **Batts and Blankets (BKNV or RZJZ) Categories** for names of Classified companies.

3A. **Batts and Blankets*** — (Optional) — Placed in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. See **Batts and Blankets (BKNV or RZJZ) Categories** for names of Classified companies.

4. **Gypsum Board*** — Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

Wallboard Protection on Each Side of Wall

Rating	Min Steel Depth	No. of Layers & Thkns of Panel	Min Thkns of Insulation (Item 3)
1	3-1/2	1 layer, 5/8 in. thick	Optional
1	2-1/2	1 layer, 1/2 in. thick	1-1/2 in.
1	1-5/8	1 layer, 3/4 in. thick	Optional
2	1-5/8	2 layers, 1/2 in. thick	Optional
2	1-5/8	2 layers, 5/8 in. thick	Optional
2	3-1/2	1 layer, 3/4 in. thick	3 in.
3	1-5/8	3 layers, 1/2 in. thick	Optional
3	1-5/8	2 layers, 3/4 in. thick	Optional
3	1-5/8	3 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 5/8 in. thick	Optional
4	1-5/8	4 layers, 1/2 in. thick	Optional
4	2-1/2	2 layers, 3/4 in. thick	2 in.

CANADIAN GYPSUM COMPANY —1/2 in. thick Type C, IP-X2 or IPC-AR; WRC, 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX or WRC, 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC.
UNITED STATES GYPSUM CO —1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type SCX, SHX, WRX, IP-X1, AR, C, WRC, FRX-G, IP-AR, IPXC, IPC-AR; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE VRC.
USG MEXICO S. A DE C. V —1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, WRC or 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC.

4A. **Gypsum Board*** — (As an alternate to Item 4) — 5/8 in. thick gypsum panels, installed as described in Item 4 with Type S-12 steel screws. The length and spacing of the screws as specified under Item 5.
CANADIAN GYPSUM COMPANY —Type FRX
UNITED STATES GYPSUM CO —Type FRX.

4B. **Gypsum Board*** — (As an alternate to Items 4 and 4A) — 5/8 in. thick, 2 ft. wide, tongue and groove edge, applied horizontally as the outer layer to one side of the assembly. Secured as described in Item 5. Joint covering (Item 7) not required.
CANADIAN GYPSUM COMPANY — Type SHX.
UNITED STATES GYPSUM CO —Type SHX.
USG MEXICO S. A DE C. V. — Type SHX.

5. **Fasteners** — (Not shown) — Type S or S-12 steel screws used to attach panels to studs (Item 2) or furring channels (Item 6). **Single layer systems:** 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 8 in. OC along vertical and bottom edges and 12 in. OC in the field when panels are applied vertically. Two layer systems: First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer.**Three- layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. **Four-layer systems:** First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 24 in. OC. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels or 3 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below.

8. **Furring Channels** — (Optional, not shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 steel screws. Not for use with Item 4A.
7. **Joint Tape and Compound** — Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over all joints of outer layer panels. Paper tape and joint compound may be omitted when gypsum panels are supplied with a square edge.
8. **Siding, Brick or Stucco** — (Optional, not shown) — Aluminum, vinyl or steel siding, brick veneer or stucco, meeting the requirements of local code agencies, installed over gypsum panels. Brick veneer attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick.
9. **Caulking and Sealants*** — (Optional, not shown) — A bead of acoustical sealant applied around the partition perimeter for sound control.
UNITED STATES GYPSUM CO —Type AS

*Bearing the UL Classification Mark

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LSR7 Robotics, GiC & Phys Education

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
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301 NE Tudor Road
Lee's Summit, MO 64086

architect:
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civil engineer:
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Lenexa, KS 66215
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816.531.4144
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Lenexa, KS 66214
816.742.5000
www.hendersonengineers.com

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

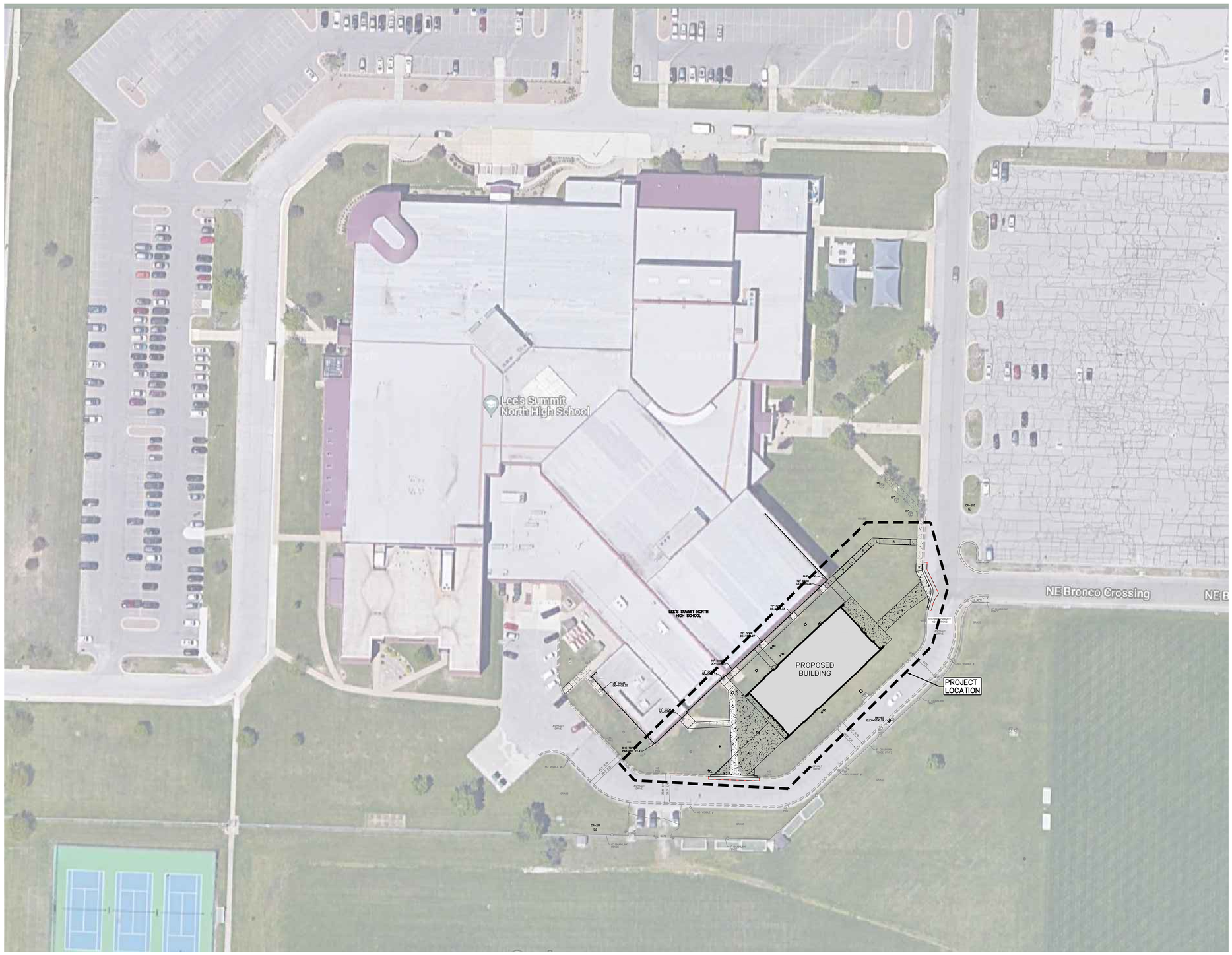
UNLESS A PROFESSIONAL SEAL WITH SIGNATURE AND DATE IS AFFIXED, THIS DOCUMENT IS PRELIMINARY AND IS NOT INTENDED FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

STATE OF MISSOURI — ADAM LEE STERNS — NUMBER A-7450 — REGISTERED ARCHITECT

Code Plan
G101

LSN - Level 1 Code Footprint A3
3/16" = 1'-0"

LEE'S SUMMIT NORTH HIGH SCHOOL - ROBOTICS BUILDING
GENERAL LAYOUT SHEET
901 NE DOUGLAS ST, LEE'S SUMMIT, MO 64086
SECTION 31 - TOWNSHIP 48 N - RANGE 31 W



0 20 40 80
SCALE: 1" = 40'

Know what's below. Call before you dig.

CHRISTIAN J CROWDER
ENGINEER
MO # 2015000538
14700 WEST 114TH TERRACE
LENEXA, KANSAS 66215
PH. (913) 894-5150 | FAX (913) 894-5977
lx@kveng.com | www.kveng.com
KAW VALLEY ENGINEERING

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241GLS DWN: NJN

KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PRINT DATE/TIME: 11/22/2022 3:59 PM

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Lee's Summit Robotics, GiC & Phys Educaiton

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
Lee's Summit R-7 School
301 NE Tudor Road
Lee's Summit, MO 64086

architect:
Multistudio
4200 Pennsylvania
Kansas City, MO 64111
816.931.6655
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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

Kaw Valley Engineering, Inc
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN GENERAL LAYOUT SHEET

C000-B

LEE'S SUMMIT NORTH HIGH SCHOOL - ROBOTICS BUILDING
SITE PLAN
901 NE DOUGLAS ST, LEE'S SUMMIT, MO 64086
SECTION 31 - TOWNSHIP 48 N - RANGE 31 W

LEGEND

- 1/2"x24" REBAR W/LS 2146" CAP SET (UNLESS NOTED OTHERWISE)
- CURB-CHIP
- CUT "+" SET
- (CM) CALCULATED MEASURED VALUE
- (M) MEASURED VALUE
- (D) DEED VALUE
- (P) PLAT VALUE
- CONTROL POINT
- MONUMENT FOUND (ORIGIN UNCERTAIN)
- BENCHMARK
- AIR CONDITIONER
- BREAKER BOX
- BASKETBALL GOAL
- BHE BUILDING HEIGHT/ELEVATION
- BUSH
- SANITARY SEWER CLEAN OUT
- DOWN SPOUT
- CANOPY SUPPORT
- CONIFEROUS TREE
- DE DOOR ELEVATION (AT THRESHOLD)
- DECIDUOUS TREE
- ELECTRIC BOX
- CONC CONCRETE
- L/S LANDSCAPING AREA
- ELECTRIC METER
- FF FINISH FLOOR ELEVATION
- FIRE HYDRANT
- CHAIN LINK FENCE
- PVC FENCE
- GUY ANCHOR
- HANDICAP SYMBOL
- PARKING STALL COUNT
- HANDICAP SIGN
- LIGHT POLE
- UTILITY POLE
- UTILITY POLE W/ TRANSFORMER
- (2) OU OVERHEAD UTILITY LINE (# OF LINES)
- PULL BOX
- FOC FIBER OPTIC CABLE SIGN
- STREET/TRAFFIC SIGN
- BUSINESS/BILLBOARD SIGN
- SANITARY SEWER MANHOLE
- WHEEL STOP
- WATER METER
- WALL MOUNTED LIGHT
- WALL MOUNTED CAMERA
- WATER LINE GATE VALVE
- FP FENCE POST
- WV WALL MOUNTED VENT
- GI GRATE INLET

PROPOSED LEGEND

- ASPHALT EDGE TREATMENT, SEE SECTION ON C190
- CONCRETE CURB AND GUTTER
- CONCRETE CURB AND GUTTER WITH REVERSE FLOW
- ASPHALT OVERLAY (040)
- AREAS OF FULL DEPTH ASPHALT (040)
- TURF
- CONCRETE PAVEMENT (042) W/JOINTING (TYPE 1 JOINT (TYP) / TYPE 3 JOINT (TYP))
- CONCRETE SIDEWALK (055+005) W/JOINTING

TYPE 1/TYPE 3 JOINT TYPE
- L LANDING
- R RAMP
- T TRANSITION

PROJECT AREA (LIMITS OF DISTURBANCE)

SITE DATA:

ZONING: R-1 (SINGLE-FAMILY RESIDENTIAL)
SETBACKS: FRONT: 30'
REAR: 30'
SIDE: 30'

EXISTING USE: SCHOOL
PROPOSED USE: SCHOOL

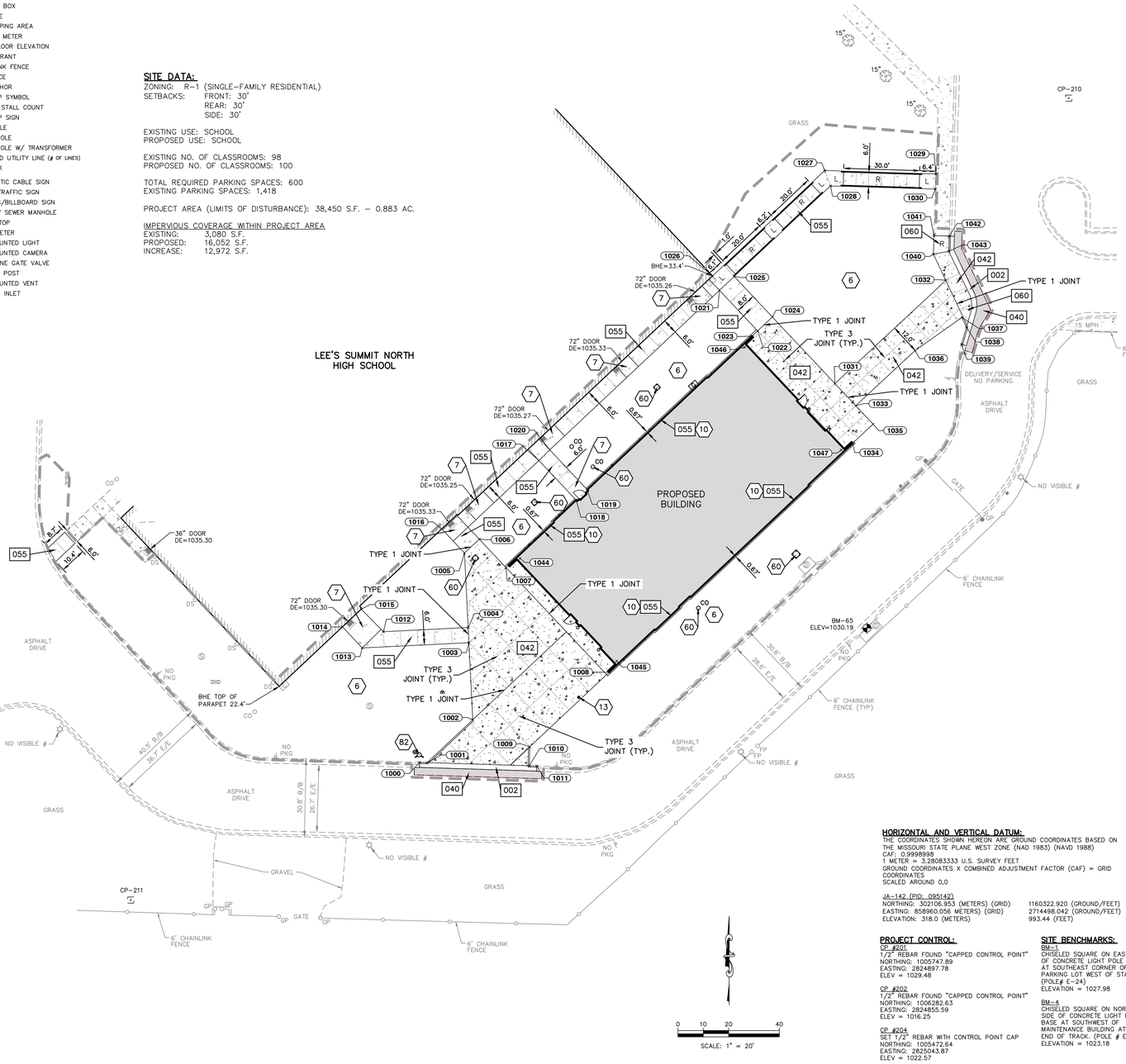
EXISTING NO. OF CLASSROOMS: 98
PROPOSED NO. OF CLASSROOMS: 100

TOTAL REQUIRED PARKING SPACES: 600
EXISTING PARKING SPACES: 1,418

PROJECT AREA (LIMITS OF DISTURBANCE): 38,450 S.F. – 0.883 AC.

IMPERVIOUS COVERAGE WITHIN PROJECT AREA
EXISTING: 3,080 S.F.
PROPOSED: 16,052 S.F.
INCREASE: 12,972 S.F.

LEE'S SUMMIT NORTH HIGH SCHOOL



0 10 20 40
SCALE: 1" = 20'

COORDINATE TABLE			
◇	NORTHING	EASTING	DESCRIPTION
1000	1005562.70	2823983.21	BC
1001	1005562.61	2823986.21	BC
1002	1005579.51	2824004.19	BC
1003	1005609.94	2824002.68	SW
1004	1005615.93	2824002.38	SW
1005	1005645.31	2824000.93	SW
1006	1005650.79	2824006.76	SW
1007	1005639.60	2824017.29	EC
1008	1005598.27	2824058.01	EC
1009	1005568.83	2824026.70	BC
1010	1005561.33	2824026.49	BC
1011	1005561.25	2824029.49	BC
1012	1005614.27	2823968.91	SW
1013	1005607.85	2823960.55	SW
1014	1005616.23	2823952.78	SW
1015	1005623.18	2823960.17	SW
1016	1005654.85	2823991.96	SW
1017	1005681.85	2824030.30	SW
1018	1005666.23	2824045.00	SW
1019	1005670.34	2824049.37	SW
1020	1005686.06	2824034.58	SW
1021	1005749.03	2824101.57	SW
1022	1005733.01	2824116.64	SW
1023	1005730.95	2824114.44	EC
1024	1005738.48	2824122.46	SW
1025	1005754.51	2824107.39	SW
1026	1005754.71	2824098.84	SW
1027	1005796.33	2824143.10	SW
1028	1005790.26	2824145.40	SW
1029	1005794.97	2824187.01	SW
1030	1005788.98	2824186.81	SW
1031	1005712.23	2824147.14	EC
1032	1005753.01	2824190.88	EC
1033	1005703.49	2824155.37	EC
1034	1005688.69	2824154.18	EC
1035	1005696.23	2824162.19	EC
1036	1005725.23	2824178.77	EC
1037	1005738.31	2824197.27	BC
1038	1005734.52	2824199.06	BC
1039	1005727.71	2824197.10	BC
1040	1005763.31	2824186.01	EC
1041	1005770.61	2824186.24	SW
1042	1005770.43	2824192.30	BC
1043	1005764.43	2824192.10	BC
1044	1005643.22	2824022.84	B1
1045	1005602.66	2824060.98	B3
1046	1005726.56	2824111.48	H1
1047	1005686.00	2824149.61	H3

HORIZONTAL AND VERTICAL DATUM:

THE COORDINATES SHOWN HEREON ARE GROUND COORDINATES BASED ON THE MISSOURI STATE PLANE WEST ZONE (NAD 1983) (NAVD 1988)
CAF: 0.9998998
1 METER = 3.28083333 U.S. SURVEY FEET
GROUND COORDINATES X COMBINED ADJUSTMENT FACTOR (CAF) = GRID COORDINATES
SCALED AROUND 0,0

JA-142 (PID: 095142)
NORTHING: 302106.953 (METERS) (GRID) 1160322.920 (GROUND/FEET)
EASTING: 858960.056 (METERS) (GRID) 2714498.042 (GROUND/FEET)
ELEVATION: 318.0 (METERS) 993.44 (FEET)

PROJECT CONTROL:

CP #201
1/2" REBAR FOUND "CAPPED CONTROL POINT"
NORTHING: 1005747.89
EASTING: 2824897.78
ELEV = 1029.48

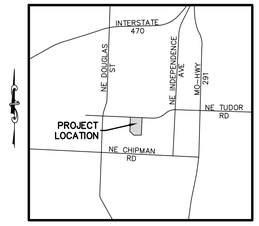
CP #202
1/2" REBAR FOUND "CAPPED CONTROL POINT"
NORTHING: 1006282.63
EASTING: 2824855.59
ELEV = 1016.25

CP #204
SET 1/2" REBAR WITH CONTROL POINT CAP
NORTHING: 1005472.64
EASTING: 2825043.87
ELEV = 1022.57

SITE BENCHMARKS:

BM-3
CHISELED SQUARE ON EAST SIDE OF CONCRETE LIGHT POLE BASE AT SOUTHEAST CORNER OF PARKING LOT WEST OF STADIUM. (POLE# E-24)
ELEVATION = 1027.98

BM-4
CHISELED SQUARE ON NORTH SIDE OF CONCRETE LIGHT POLE BASE AT SOUTHWEST OF MAINTENANCE BUILDING AT SOUTH END OF TRACK. (POLE # E-26)
ELEVATION = 1023.18



VICINITY MAP
SEC 31 – TWP 48N – RNG 31W
NOT TO SCALE

PREPARED FOR:
LEE'S SUMMIT R-7 SCHOOL DISTRICT
502 SE TRANSPLANT DRIVE,
LEE'S SUMMIT, MO 64081
PHONE: (816) 986-2420
CONTACT: KYLE GORRELL
EMAIL: kyle.gorrell@lsr7.net

PREPARED BY:
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14700 W 114TH TERR.
LENEXA, KANSAS 66215
PHONE: (913) 894-5150
CONTACT: CHRIS CROWDER
EMAIL: crowder@kveng.com

NOTE:
1. **CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.**
2. **THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACTOR DOCUMENTS.**

CONSTRUCTION NOTES:

1. COORDINATE START-UP AND ALL CONSTRUCTION ACTIVITIES WITH THE LEE'S SUMMIT SCHOOL DISTRICT.
2. CONSTRUCTION METHODS AND MATERIALS NOT SPECIFIED IN THESE PLANS ARE TO MEET OR EXCEED THE CURRENT EDITION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT, MISSOURI AND MODIFIED AS NOTED ON THESE PLANS.
3. ALL CONSTRUCTION WORK AND UTILITY WORK OUTSIDE OF PROPERTY BOUNDARIES SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.
4. PUBLIC CONVENIENCE AND SAFETY: THE CONTRACTOR SHALL CONDUCT THE WORK IN A MANNER THAT WILL INSURE, AS FAR AS PRACTICABLE, THE LEAST OBSTRUCTION TO TRAFFIC, AND SHALL PROVIDE FOR THE CONVENIENCE AND SAFETY OF THE GENERAL PUBLIC AND RESIDENTS ALONG AND ADJACENT TO PUBLIC ROADWAYS. CONTRACTOR IS RESPONSIBLE TO OBTAIN RIGHT-OF-WAY PERMIT FOR CONSTRUCTION OF DRIVE APPROACHES AND SIDEWALKS ALONG SE MILLER STREET AND SE MAIN STREET. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AS REQUIRED BY THE CITY OF LEE'S SUMMIT PUBLIC WORKS DEPARTMENT. REFERENCE MUTCD STANDARD DRAWINGS.
5. ALL DIMENSIONS SHOWN ARE TO THE BACK OF CURB UNLESS OTHERWISE NOTED.
6. ALL SIDEWALK JOINTS WITHIN PROJECT AREA SHALL BE RECAULKED WITH JOINT SEALANT. REFER TO TYPE 1 AND TYPE 2 JOINTS ON SHEET C190.

DETAILS – SEE SHEET C190-B FOR THE FOLLOWING DETAILS

001 STANDARD CONCRETE CURB & GUTTER
002 ZERO HEIGHT CURB
005 INTEGRAL CURB AND SIDEWALK
040 ASPHALT PAVEMENT
042 CONCRETE PAVEMENT
055 CONCRETE SIDEWALK
060 SIDEWALK RAMP

NOTES:

6 DISTURBED AREAS TO BE LANDSCAPED OR SODDED AS NOTED ON L SERIES SHEETS.
7 CONCRETE STOOP (REFER TO STRUCTURAL SHEETS)
10 CONCRETE MOW STRIP
13 BOLLARD (REFER TO ARCHITECTURAL SHEETS)
60 STORM SEWER STRUCTURE (SEE SHEET C600-B)
70 SANITARY SEWER STRUCTURE (SEE SHEET C700-B)
80 WATER STRUCTURE (SEE SHEET C800-B)
82 FIRE HYDRANT (SEE SHEET C800-B)

UTILITY STATEMENT:

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MISSOURI ONE CALL TICKET #220613016

WARRANTY / DISCLAIMER

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CAUTION – NOTICE TO CONTRACTOR

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Know what's below. Call before you dig.

PROJ. NO. C21_1241 DSN: CJC DWN: NJN
CFN: 12415P
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14700 WEST 114TH TERRACE LENEXA, KANSAS 66215
PH. (913) 894-5150 | FAX (913) 894-5977
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KAW VALLEY ENGINEERING
KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PRINT DATE/TIME: 11/22/2022 4:00 PM

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Lee's Summit Robotics, GiC & Phys Educaiton

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
Lee's Summit R-7 School
301 NE Tudor Road
Lee's Summit, MO 64086

architect:
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4200 Pennsylvania
Kansas City, MO 64111
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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

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STATE OF MISSOURI CHRISTIAN J. CROWDER NUMBER PE-2015000538 11-22-22 PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN SITE AND DIMENSION PLAN

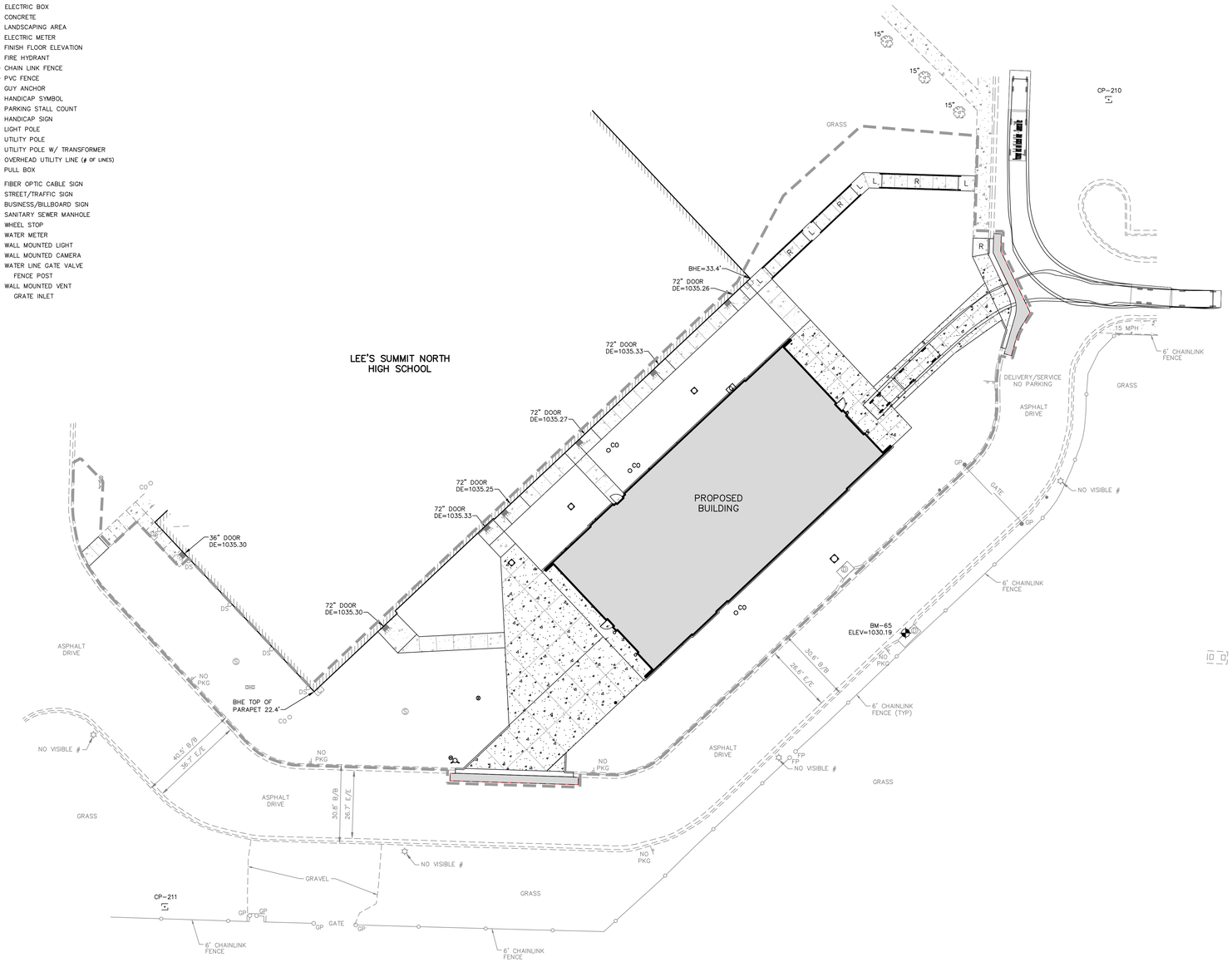
C100-B

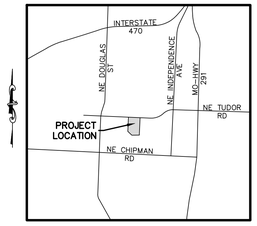
LEGEND

- 1/2"x24" REBAR W/1.5 2146" CAP SET (UNLESS NOTED OTHERWISE)
- CURB-CHIP
- CUT "+" SET
- (CM) CALCULATED MEASURED VALUE
- (M) MEASURED VALUE
- (D) DEED VALUE
- (P) PLAT VALUE
- CONTROL POINT
- MONUMENT FOUND (ORIGIN UNCERTAIN)
- BENCHMARK
- AIR CONDITIONER
- BB BREAKER BOX
- BASKETBALL GOAL
- BHE BUILDING HEIGHT/ELEVATION
- BUSH
- CO SANITARY SEWER CLEAN OUT
- DS DOWN SPOUT
- CANOPY SUPPORT
- CONIFEROUS TREE
- DE DOOR ELEVATION (AT THRESHOLD)
- DECIDUOUS TREE
- ELECTRIC BOX
- CONC CONCRETE
- L/S LANDSCAPING AREA
- ELECTRIC METER
- FF FINISH FLOOR ELEVATION
- FIRE HYDRANT
- CHAIN LINK FENCE
- PVC FENCE
- GUY ANCHOR
- HANDICAP SYMBOL
- PARKING STALL COUNT
- HANDICAP SIGN
- LIGHT POLE
- UTILITY POLE
- UTILITY POLE W/ TRANSFORMER
- (2) OU OVERHEAD UTILITY LINE (# OF LINES)
- P PULL BOX
- FOC FIBER OPTIC CABLE SIGN
- STREET/TRAFFIC SIGN
- BUSINESS/BILLBOARD SIGN
- SANITARY SEWER MANHOLE
- WHEEL STOP
- W WATER METER
- WALL MOUNTED LIGHT
- WALL MOUNTED CAMERA
- WATER LINE GATE VALVE
- FP FENCE POST
- WMV WALL MOUNTED VENT
- GI GRATE INLET

PROPOSED LEGEND

- A-A B-B ASPHALT EDGE TREATMENT. SEE SECTION ON C190
- CONCRETE CURB AND GUTTER
- CONCRETE CURB AND GUTTER WITH REVERSE FLOW
- ASPHALT OVERLAY (040)
- AREAS OF FULL DEPTH ASPHALT (040)
- TURF
- CONCRETE PAVEMENT (042) W/JOINTING
- TYPE 1 JOINT (TYP) / TYPE 3 JOINT (TYP)
- CONCRETE SIDEWALK (055+005) W/JOINTING
- TYPE 1/TYPE 3 JOINT TYPE
- L LANDING
- R RAMP
- T TRANSITION
- PROJECT AREA (LIMITS OF DISTURBANCE)





VICINITY MAP
SEC 31 – TWP 48N – RNG 31W
NOT TO SCALE

0 10 20 40
SCALE: 1" = 20'

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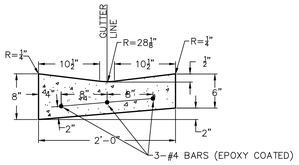
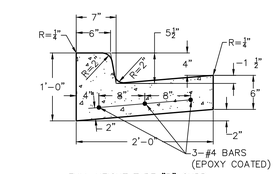
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN TRUCK TURNING TEMPLATE

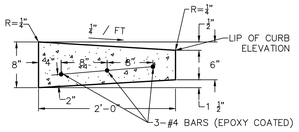
C101-B



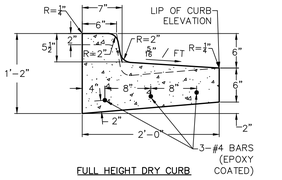
STANDARD TYPE "C" CURB



FULL HEIGHT TYPE "B" CURB



STANDARD TYPE "C" DRY CURB AND AT RAMPS



FULL HEIGHT DRY CURB

ZERO HEIGHT CURB 002

FULL HEIGHT CURB 001

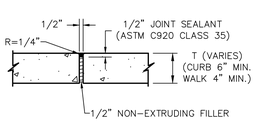
*GUTTER DEPTH MAY VARY TO IMPROVE DRAINAGE

CURB & GUTTER NOTES:

1. ½" PREMOLDED EXPANSION JOINTS SHALL BE PLACED AT POINTS OF CURVATURE, CURB RETURNS, CURB INLETS AND AT 250' CENTERS. THE EXPANSION JOINTS SHALL BE DOWELED IN ACCORDANCE WITH THE SPECIFICATIONS. CONTRACTION JOINTS SHALL BE 2" DEEP AND PLACED AT 15' INTERVALS EQUALLY SPACED BETWEEN EXPANSION JOINTS.
2. ALL CONCRETE USED IN THIS WORK SHALL MEET THE LATEST EDITION OF THE KANSAS CITY METROPOLITAN CHAPTER OF THE AMERICAN PUBLIC WORKS ASSOCIATION. KCMMB4K CONCRETE SHALL BE USED THROUGHOUT.
3. ALL REINFORCING STEEL SHALL BE SUPPORTED ON FABRICATED STEEL BAR SUPPORTS @ 3'-0" MAXIMUM SPACING.
4. SEE SIDEWALK RAMP DETAILS FOR TYPICAL SIDEWALK RAMP CURB & GUTTER SECTIONS.
5. DETAILS AS SHOWN FOR CONCRETE AND ASPHALT PAVING, WHEN USED WITH CONCRETE PAVING POURED MONOLITHICALLY WITH CURB NO MODIFICATIONS ARE REQUIRED. WHEN CURB AND CONCRETE PAVING ARE TO BE POURED SEPARATELY #4 BARS, 24" LONG ARE TO BE PROVIDED TO TIE CURB TOGETHER WITH CONCRETE PAVING. PLACE AT 8" O.C.
6. ALL REINFORCING SHALL BE 60 GRADE DEFORMED BARS AND COMPLY WITH ASTM A615, EPOXY BARS AS NOTED, SHALL COMPLY WITH ASTM A775.
7. CURBS TO BE CONSTRUCTED ON MINIMUM 6 INCHES OF COMPACTED WELL GRADED BASE ROCK.

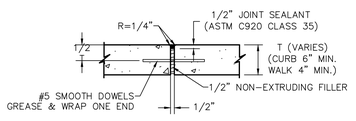
CURB & GUTTER

N.T.S



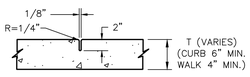
NOTE:
1. TYPE 1 JOINTS SHALL BE PLACED WHERE NEW CONCRETE ABUTS EXISTING CONCRETE AND IN AREAS WHERE CONCRETE ABUTS BUILDINGS. UNLESS NOTED OTHERWISE.

EXPANSION JOINT – TYPE 1



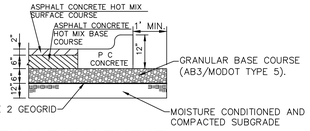
TYPE 2

NOTE:
1. TYPE 2 JOINTS SHALL BE PLACED AS NOTED AND AT ALL P.C.'S, P.T.'S AND TRANSITIONS, AND WHERE NEW CURB OR CONCRETE PAVEMENT TIES INTO EXISTING CURB OR CONCRETE PAVEMENT.
2. SMOOTH BARS SHALL BE 24" LONG

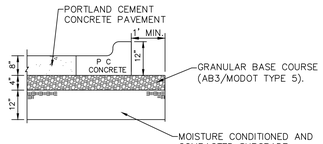


CONTRACTION JOINT – TYPE 3

CONCRETE JOINTING DETAILS



ASPHALT PAVEMENT 040



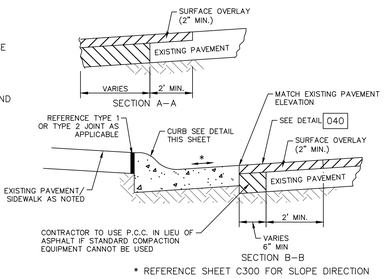
CONCRETE PAVEMENT 042

1. FLEXIBLE PAVEMENT SHALL BE IN ACCORDANCE WITH THE LATEST (FEBRUARY 2017) EDITION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200 AS AMENDED BY PROJECT SPECIFICATIONS.

   ASPHALT SURFACE COURSE – APWA TYPE 3-01

   ASPHALT BASE COURSE – APWA TYPE 2-01

2. PORTLAND CEMENT CONCRETE FOR DRIVEWAYS SHALL BE A KCMMB4K AE MIX AND SHALL MEET THE LATEST EDITION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200.



* REFERENCE SHEET C300 FOR SLOPE DIRECTION

MILL AND OVERLAY DETAIL

ASPHALT NOTES:

PAVING SHALL BE IN ACCORDANCE WITH THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200 AS AMENDED BELOW.

MILLING FOR THE DRIVES AND PARKING LOTS SHALL BE COLD MILLED AS FOLLOWS:

1. EQUIPMENT: MILLING THE SURFACE OF PAVEMENTS SHALL BE COMPLETED BY USE OF A MILLING MACHINE CONFORMING TO THE FOLLOWING.
   A. MACHINE: THE COLD MILLING MACHINE SHALL BE SELF–PROPELLED AND SHALL HAVE IN COMBINATION THE MEANS OF MILLING AND CUTTING, WITHOUT SOFTENING THE OLD SURFACE AND BLADING THE CUTTING INTO A SINGLE WINDROW, OR DEPOSITING THEM DIRECTLY INTO A TRUCK.
   B. AIR POLLUTION: THE MACHINE SHALL BE EQUIPPED WITH A DUST SUPPRESSION SYSTEM INCLUDING WATER STORAGE TANKS AND HIGH PRESSURE SPRAY BARS.
   C. OPERATING WIDTH: IT IS DESIRABLE THAT THE CUTTING WIDTH BE GREATER THAN 1 FEET (0.3 m). IN THE EVENT THE CUTTING WIDTH IS LESS THAN 1 FEET (0.3 m) CONTRACTOR IS RESPONSIBLE FOR ENSURING GRADE CONTROL AS NOTED ON PLANS.
   D. CUTTING DRUM: THE CUTTING DRUM SHALL BE TOTALLY ENCLOSED TO PREVENT DISCHARGE OF ANY LOOSENED MATERIAL ADJACENT TO WORK AREAS.
2. CONSTRUCTION DETAILS
   A. METHODS OF OPERATIONS FOR MILLING:

1. OPERATOR: THE MILLING MACHINE SHALL BE OPERATED BY AN EXPERIENCED AND CAPABLE OPERATOR.
2. UTILITIES: STREET SURFACES ADJACENT TO MANHOLE, WATER VALVES AND OTHER UTILITY EXTENSIONS, SHALL BE COMPLETELY REMOVED TO THE FULL DEPTH THE CUT SPECIFIED FOR THE STREET UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. MATERIAL DISPOSAL: THE MATERIAL WITHDREW BY THE MACHINE SHALL BE REMOVED FROM THE SURFACE OF THE PAVEMENT AND PROPERLY DISPOSED OF BY THE CONTRACTOR.
4. SURFACE CONDITIONS: THE DRUM LACING PATTERNS SHALL PRODUCE A SMOOTH SURFACE AFTER MILLING WITH GROOVE DEPTHS NOT TO EXCEED 1/4 INCH (0.64 cm) AND GROOVE SPACING NOT TO EXCEED 1 INCH (2.54 cm) UNLESS OTHERWISE APPROVED BY THE ENGINEER.

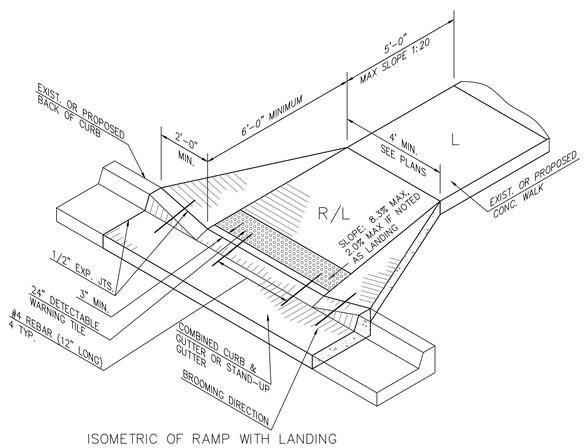
   B. TYPES OF CUTS TO BE MADE BY MILLING:

5. LEVELING: SUFFICIENT PASSES SHALL BE MADE SUCH THAT ALL IRREGULARITIES OR HIGH SPOTS ARE ELIMINATED, AND THAT 100% OF THE SURFACE IS MILLED.
6. AVERAGE DEPTH: SUFFICIENT PASSES, OR CUTS, SHALL BE MADE IN ORDER TO REMOVE A SPECIFIED DEPTH OVER THE ENTIRE STREET SECTION. THESE DEPTHS WILL BE DESIGNATED ON THE PLANS.
7. CURB CUT: SUFFICIENT PASSES, OR CUTS, SHALL BE MADE IN ORDER TO REMOVE A SPECIFIED DEPTH AT THE CURB FOR A SPECIFIED WIDTH. THE DEPTH AT THE WIDTH FURTHEST FROM THE CURB IS 0. THESE DIMENSIONS WILL BE DESIGNATED ON THE PLANS.

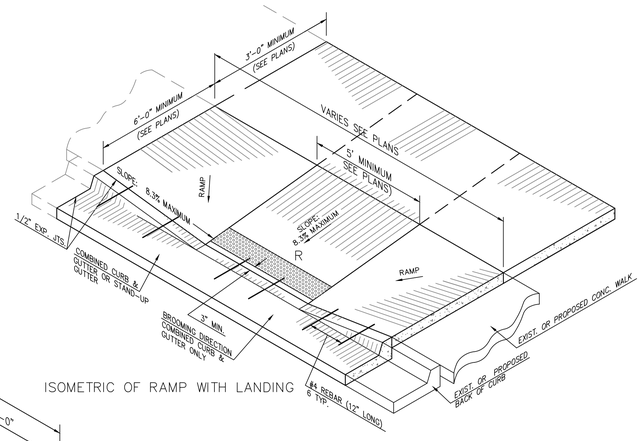
   C. CLEANUP: ALL LOOSE ASPHALT AND DEBRIS SHALL BE REMOVED FROM THE STREET SURFACE AND CURB AND GUTTER. ANY MATERIAL AND DEBRIS THAT ADHERES TO THE CURB AND GUTTER SHALL BE REMOVED.

CRACKS: REFER TO CRACK SEALING/FILLING GUIDELINES.

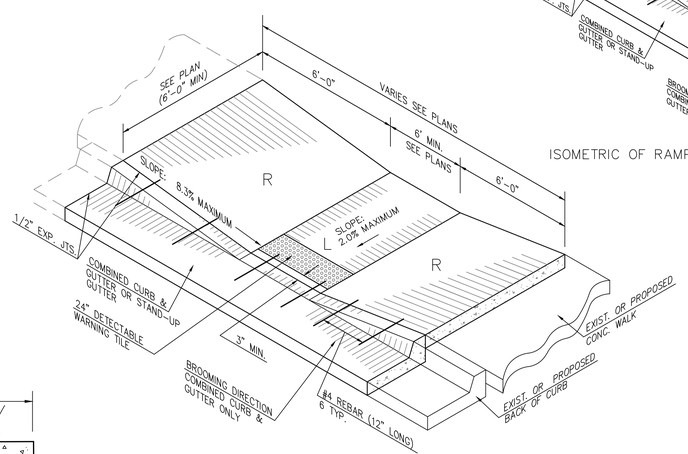
1. AREAS OF THE PAVEMENT REQUIRING PATCHING WILL BE DESIGNATED ON THE PLANS OR MARKED BY THE ENGINEER AFTER COMPLETION OF MILLING OPERATIONS FOR THE SECTION OF PAVEMENT UNDER CONSTRUCTION. THE DETERIORATED PAVEMENT WILL BE REMOVED TO THE LIMITS DESIGNATED BY THE ENGINEER. THE SUBGRADE SHALL BE ADJUSTED TO PERMIT THE THICKNESS OF ASPHALT INDICATED ON THE PLANS. THE SUBGRADE SHALL CONSIST OF MODOT TYPE 5 AGGREGATE AND SHALL BE UNIFORMLY COMPACTED BY HAND TAMPING OR ROLLING. BITUMINOUS MIX FOR PATCHING WILL MEET THE REQUIREMENTS FOR APWA TYPE 1 OR 2 ASPHALT CONCRETE AS SPECIFIED IN THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200. AT THE TIME OF PLACING ASPHALT THE EDGE OF THE AREA TO BE PATCHED WILL BE COATED WITH SS–1H EMULSIFIED ASPHALT OR APPROVED EQUAL. THE ASPHALT IN THE PATCH SHALL BE PLACED IN TWO EQUAL LIFTS WITH EACH LIFT THOROUGHLY COMPACTED PRIOR TO PLACEMENT OF THE SUBSEQUENT LIFT.
2. CONSTRUCTION OF THE 2 INCH OVERLAY WILL BE PERFORMED IN ACCORDANCE WITH THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200 – ASPHALT CONCRETE SURFACE WITH THE FOLLOWING MODIFICATIONS:
3. THE APWA TYPE 3 ASPHALT CONCRETE MIX MAY CONTAIN RECYCLED ASPHALT CONTENT. RECYCLED ASPHALT MIX DESIGN APWA TYPE 3 (FRAP) AND APWA TYPE 1 OR 2 (FRAP) (FOR FULL DEPTH PATCH) MUST BE A 50–BLOW MARSHALL MIX MEETING THE AGGREGATE, GRADATION, AND VOLUMETRIC DESIGN REQUIREMENTS FOR APWA TYPE 3 OR APWA TYPE 3 (FRAP) FOR SURFACE COURSE AND APWA TYPE 1 OR 2 OR APWA TYPE 1 OR 2 (FRAP) FOR BASE COURSES AS DEFINED BY THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SECTION 2200, CURRENT EDITION. ANY SUBMITTED 50–BLOW MARSHALL MIX DESIGN MUST ALSO BE CHECKED FOR RESISTANCE TO STRIPPING DURING DESIGN USING AASHTO T–283 TO DETERMINE IF ANTISTRIPPING AGENT IS NEEDED FOR THE SAME ASPHALT CONCRETE CHOSEN FOR THE PROJECT. THE INDEX OF RETAINED STRENGTH SHALL EXCEED 80%. ANY ASPHALT MIX SUPPLIED TO THE PROJECT DURING PLACEMENT WILL BE SUBJECT TO TESTING BY THE OWNERS REPRESENTATIVES USING THE AASHTO T–283 PROCEDURE FOR TENSILE STRENGTH RATIO.)
4. MEASURED DENSITY OF THE COMPLETED OVERLAY SHALL HAVE A COMPACTED DENSITY OF 92% TO 97% OF THE DAILY THEORETICAL MAXIMUM SPECIFIC GRAVITY (GMM) OF THE APWA TYPE 3 MIX SUPPLIED TO THE PROJECT.
5. AREAS OF THE PAVEMENT SURFACE ON THE DRIVES AND PARKING LOTS THAT ARE SHOWN TO HAVE SEGREGATION UPON COMPLETION OF FINAL ROLLING SHALL RECEIVE AN ADDITIONAL SURFACE TREATMENT TO CLOSE THE SURFACE VOIDS. THE SURFACE TREATMENT SHALL CONSIST OF MANUFACTURED SAND COATED WITH SS–1H EMULSION WORKED INTO THE SURFACE VOIDS TO YIELD A UNIFORM APPEARING SURFACE.



ISOMETRIC OF RAMP WITH LANDING



ISOMETRIC OF RAMP WITH LANDING



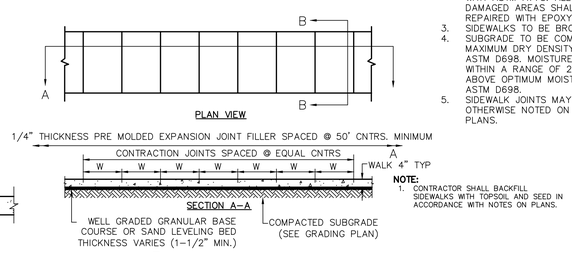
ISOMETRIC OF RAMP WITH LANDING

SIDEWALK RAMPS 060

DETECTABLE WARNING SURFACE TILE 101

NOTES:
1. TILE MATERIAL SHALL BE VITRIFIED POLYMER COMPOSITE AS MANUFACTURED BY ARMOR–TILE OR APPROVED EQUAL DETECTABLE WARNING TILE TO BE PLACED A MINIMUM OF 3 INCHES FROM BACK OF CURB AND ALIGNED IN THE DIRECTION OF PEDESTRIAN TRAVEL.
2. DETECTABLE WARNING TILE TO BE PLACED A MINIMUM OF 3 INCHES FROM BACK OF CURB AND ALIGNED IN THE DIRECTION OF PEDESTRIAN TRAVEL.

CONCRETE AND SIDEWALK NOTES:
1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND COMPLY WITH KCMMB SPECIFICATIONS. ALL CONCRETE SHALL BE PLACED IN ACCORDANCE WITH APWA SECTION 2200.
2. REINFORCING STEEL SHALL BE GRADE 60 AND COMPLY WITH ASTM A615, EPOXY COATED BARS AS NOTED SHALL COMPLY WITH ASTM A775. ALL CUT ENDS OR DAMAGED AREAS SHALL BE FIELD REPAIRED WITH EPOXY COATING.
3. SIDEWALKS TO BE BROOM FINISHED.
4. SUBGRADE TO BE COMPACTED TO 90% MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698. MOISTURE CONTENT TO BE WITHIN A RANGE OF 2% BELOW TO 2% ABOVE OPTIMUM MOISTURE AS DEFINED BY ASTM D698.
5. SIDEWALK JOINTS MAY BE SAWN UNLESS OTHERWISE NOTED ON ARCHITECTURAL PLANS.

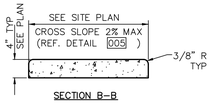


NOTE:
1. CONTRACTOR SHALL BACKFILL SIDEWALKS WITH TOPSOIL AND SEED IN ACCORDANCE WITH NOTES ON PLANS.

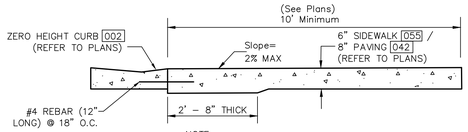
TURNDOWN

*MATCH ASPHALT THICKNESS

PROVIDE TURN DOWN ALONG PLAYGROUND EDGE CURB PROVIDE 12" BARS AT 24" O.C.



CONCRETE SIDEWALK 055



NOTE:
INSTALL 12" TIE BARS #4 EPOXY COATED @ 18" O.C. AND THROUGH WINGS AS SHOWN.

INTEGRAL CURB AND SIDEWALK 005

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Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN SITE DETAILS

C190-B

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241DET DWN: NJN

CHRISTIAN J CROWDER
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KAW VALLEY ENGINEERING

KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

LEGEND:

- UNDERGROUND GAS
- GAS METER
- CONTROL POINT
- BENCHMARK
- GATE POST
- CHAIN LINK FENCE
- STREET/TRAFFIC SIGN
- UNDERGROUND FIBER OPTIC CABLE
- UNDERGROUND FIBER OPTIC (FROM RECORDS)
- TELEPHONE PEDESTAL
- SANITARY SEWER MANHOLE
- STORM SEWER MANHOLE
- AREA INLET
- CURB INLET
- SANITARY SEWER CLEAN OUT
- DOWN SPOUT
- FLOOR DRAIN
- FLARED END SECTION
- SANITARY SEWER LINE
- STORM SEWER LINE
- CORRUGATED METAL PIPE
- REINFORCED CONCRETE PIPE
- UNDERGROUND ELECTRIC
- OVERHEAD UTILITY LINE (# OF LINES)
- PULL BOX
- LIGHT POLE
- UTILITY POLE
- UTILITY POLE W/ LIGHT
- UTILITY POLE W/ TRANSFORMER
- WATER LINE PER RECORD
- UNDERGROUND ELECTRIC PER RECORD
- CONIFEROUS TREE
- TREE LINE
- HIGH DENSITY POLYETHYLENE
- GAS VALVE
- GAS RISER
- GAS LINE SIGN
- DOOR ELEVATION AT THRESHOLD
- FINISH FLOOR ELEVATION
- BUILDING HEIGHT/ELEVATION
- BACK TO BACK OF CURB MEASUREMENT
- EDGE TO EDGE OF ASPHALT
- WATER LINE
- WATER METER
- WATER LINE GATE VALVE
- BUSH
- DECIDUOUS TREE
- TRASH ENCLOSURE
- LANDSCAPING AREA
- CONCRETE
- FLAG POLE
- ELECTRIC METER
- UNDERGROUND ELECTRIC PEDESTAL
- LANDING
- RAMP
- UNDERGROUND GAS PER RECORD
- SANITARY SEWER LINE PER RECORD
- STORM SEWER LINE PER RECORD
- ASPHALT PAVING TO BE REMOVED
- CONCRETE PAVING/SIDEWALKS TO BE REMOVED
- LIMITS OF DISTURBANCE

EROSION & PROPOSED IMPROVEMENTS LEGEND:

- 1218 — EXISTING GROUND CONTOUR (1' INTERVALS)
- 1218 — PROPOSED FINISHED GROUND CONTOUR (1' INTERVALS)
- GRAVEL FILTER BAGS
- SEDIMENTATION FENCE
- CONSTRUCTION ENTRANCE
- LIMITS OF DISTURBANCE
- (CW) CONCRETE WASH AREA

DEMOLITION

1 TO REMAIN.

3 TREES TO REMAIN. EARTHWORK CONTRACTOR SHALL PROVIDE TREE PROTECTION FENCE AT DRIPLINE PRIOR TO EXCAVATION AND EMBANKMENT. A MINIMUM RADIUS OF 10' FROM TREE SHALL BE PROVIDED ANYWHERE WHERE PORTIONS OF DRIPLINE ARE NOT FENCED OFF, A LAYER OF MULCH (6" MINIMUM) SHALL BE PROVIDED TO PROTECT ROOT SYSTEM FROM DAMAGE. SELECTIVE HARVESTING OF MARKETABLE TREES MAY OCCUR WITH APPROVAL OF PLATTE COUNTY SCHOOL DISTRICT.

7 SIGN TO BE RELOCATED

15 SAW CUT LINE (FOR CONCRETE SAW CUT AT NEAREST CONTROL JOINT. FOR ASPHALT SAW CUT MINIMUM OF 6" FROM NEW CURB LINE). SEE C100–B AND C200–B SERIES SHEETS FOR LIMITS.

30 CONTRACTOR TO REMOVE CONCRETE CURBS TO CONSTRUCT IMPROVEMENTS. SEE SHEET C100–B FOR LIMITS.

40 CONTRACTOR TO REMOVE ASPHALT PAVING AS REQUIRED TO CONSTRUCT IMPROVEMENTS.

41 CONTRACTOR TO MILL ASPHALT SURFACE, MINIMUM 2' OUTSIDE ASPHALT REMOVAL. REFER TO C100–B SERIES SHEETS SHEETS FOR LIMITS.

55 CONTRACTOR TO REMOVE CONCRETE PAVING AND WALKS.

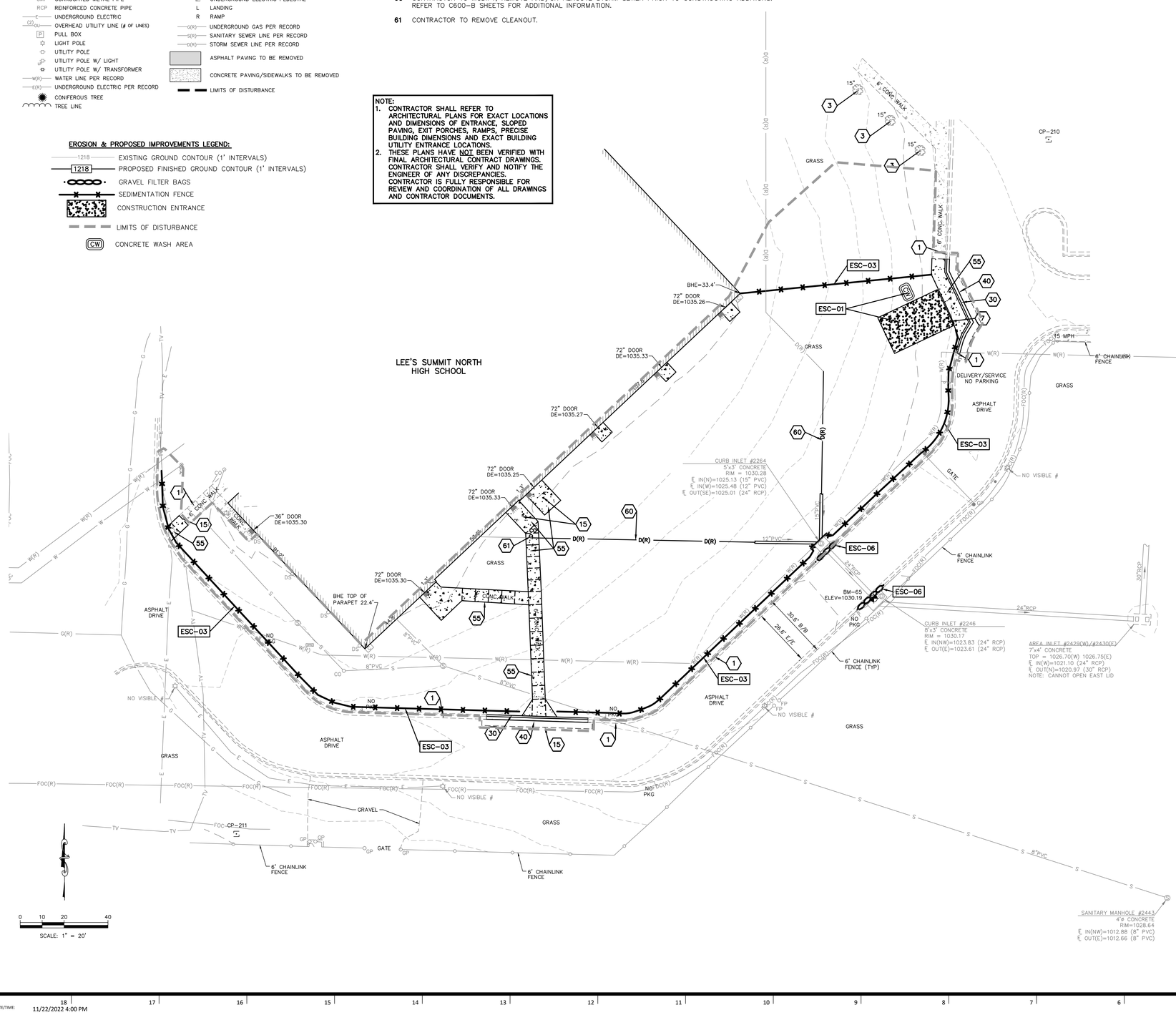
60 CONTRACTOR TO MODIFY, REMOVE AND/OR REROUTE STORM SEWER PRIOR TO CONSTRUCTING ADDITIONS. REFER TO C600–B SHEETS FOR ADDITIONAL INFORMATION.

61 CONTRACTOR TO REMOVE CLEANOUT.

NOTE:
1. **CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.**
2. **THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACTOR DOCUMENTS.**

FOR THE FOLLOWING DETAILS REFER TO THE KC METROPOLITAN CHAPTER ADOPTED DIVISION III APWA STANDARD DRAWINGS FOR EROSION AND SEDIMENT CONTROL (2017 VERSION) ON SHEETS C290–B.

ESC–01 CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT
ESC–03 SEDIMENTATION FENCE
ESC–06 CURB INLET PROTECTION
ESC–07 AREA INLET PROTECTION



SCALE: 1" = 20'

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL VERIFY SITE CONDITIONS PRIOR TO BIDDING. CONTRACTOR SHALL REMOVE ALL UTILITIES, PAVEMENT, CURBS AND ALL OTHER STRUCTURES AS NOTED EXCEPTING THOSE DESIGNATED "TO REMAIN" OR "TO BE REMOVED BY OTHERS", IN ACCORDANCE WITH THE SPECIFICATIONS AND THE CITY OF LEE'S SUMMIT AND STATE REGULATIONS. SITE CONDITIONS SHOWN WERE AS OF MARCH 7, 2022.
2. ALL UTILITY PIPE LINES TO BE ABANDONED SHALL BE PLUGGED PER CITY AND STATE REGULATIONS.
3. ALL PAVING, FLATWORK AND OTHER STRUCTURES DESIGNATED TO BE REMOVED SHALL BE REMOVED FROM PROPERTY AND DISPOSED OF IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
4. ALL EXISTING UTILITIES ETC. LOCATED WITHIN THE BOUNDARIES OF THE PROPOSED BUILDING SHALL BE COMPLETELY REMOVED TO 10 FEET OUTSIDE OF BUILDING LINE.
5. CONTRACTOR SHALL VERIFY THAT ALL UTILITIES TO EXISTING STRUCTURES HAVE BEEN DISCONNECTED PRIOR TO COMMENCING DEMOLITION.
6. COORDINATE START–UP AND ALL CONSTRUCTION ACTIVITIES WITH THE ARCHITECT.
7. CONSTRUCTION METHODS AND MATERIALS NOT SPECIFIED IN THESE PLANS ARE TO MEET OR EXCEED THE KANSAS CITY METROPOLITAN CHAPTER OF APWA STANDARD SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
8. ALL CONSTRUCTION WORK AND UTILITY WORK SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.

EROSION AND SEDIMENT CONTROL INSPECTION PROCEDURES

THE FOLLOWING PROCEDURES WILL BE USED TO MAINTAIN EROSION AND SEDIMENTATION CONTROLS.

1. ALL CONTROL MEASURES WILL BE INSPECTED AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL EVENT PRODUCING RUNOFF AND DAILY DURING PROLONGED RAINFALL PERIODS.
2. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT WILL BE MADE WITHIN 24 HOURS OF THE INSPECTION.
3. SEDIMENT WILL BE REMOVED FROM THE SILT BARRIERS WHEN IT HAS REACHED ONE–THIRD OF THE HEIGHT OF THE BARRIER.
4. SILT BARRIERS WILL BE INSPECTED FOR DEPTH OF ACCUMULATED SEDIMENT, TEARS, ATTACHMENT TO POSTS, AND STABILITY ON A WEEKLY BASIS.
5. TEMPORARY AND PERMANENT SEEDING AND PLANTING WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND HEALTHY GROWTH.
6. THE CONSTRUCTION MANAGER WILL SELECT INDIVIDUALS TO BE RESPONSIBLE FOR INSPECTIONS, MAINTENANCE, REPAIRS, AND REPORTING. THE DESIGNATED INDIVIDUALS WILL RECEIVE THE NECESSARY TRAINING FROM THE CONSTRUCTION MANAGER TO PROPERLY INSPECT AND MAINTAIN THE CONTROLS IN GOOD WORKING ORDER.

GENERAL NOTES:

1. PROJECT AREA IS APPROXIMATE LIMITS OF CONSTRUCTION.
2. THE CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS PRIOR TO BEGINNING EARTHWORK OPERATIONS.
3. THE CONTRACTOR SHALL MAINTAIN ALL SILT CONTROL MEASURES DURING CONSTRUCTION.
4. ALL SILT SHALL REMAIN WITHIN THE CONSTRUCTION LIMITS. SURROUNDING PARKING LOTS AND PLAYGROUNDS SHALL BE KEPT CLEAR OF ALL MUD AND DEBRIS.
5. A SEDIMENTATION BARRIER IS TO BE INSTALLED AS SHOWN.
6. ACCUMULATED SEDIMENT SHALL BE REMOVED AND THE SEDIMENTATION BARRIERS MAINTAINED AS NEEDED TO PREVENT SEDIMENTATION BYPASS OF THE BARRIER.
7. SLOPES ARE TO BE LEFT IN A ROUGH CONDITION DURING GRADING.
8. CURB INLET SEDIMENTATION BARRIERS ARE TO BE INSTALLED AROUND INLETS WHERE SEDIMENTATION IS A CONCERN. INLET BARRIERS SHALL BE FILTER BAGS.
9. SEDIMENT IS TO BE REMOVED FROM STORM WATER DRAINAGE SYSTEMS.
10. CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY ADDITIONAL EROSION CONTROL AS HE/SHE DEEMS NECESSARY.
11. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, TOOLS, EQUIPMENT AND LABOR AS NECESSARY TO INSTALL AND MAINTAIN ADEQUATE EROSION AND SILTATION CONTROLS REQUIRED TO PREVENT SOIL EROSION FROM LEAVING THE PROJECT SITE. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THAT METHODS UTILIZED ARE ADEQUATE AND COMPLY WITH REQUIREMENTS OF THE SPECIFICATIONS AND GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE WORK.
12. TEMPORARY SEDIMENT FENCE/STRAW WATTLES TO REMAIN UNTIL ADEQUATE VEGETATION IS ESTABLISHED.
13. MUD AND DEBRIS SHALL BE CLEANED UP AT THE CONCLUSION OF EACH WORKING DAY, OR AFTER EACH RAINFALL IF SILT IS PRESENT.
14. INSPECTION, MAINTENANCE AND REPAIR OF EROSION CONTROL DEVICES SHALL BE ON GOING THROUGHOUT THE LIFE OF BUILDING CONSTRUCTION TO KEEP THE DEVICES IN OPERABLE CONDITION AT ALL TIMES. ADDITIONAL MEASURES SHALL BE INSTALLED AS REQUIRED BY ACTUAL FIELD CONDITIONS AND/OR GOVERNING INSPECTION AGENCIES.
15. INSTALL CONSTRUCTION ENTRANCE AS NOTED.
16. AT COMPLETION OF SITE GRADING AND OTHER RELATED CONSTRUCTION ACTIVITIES, ALL DISTURBED AREAS WITHIN THE PROJECT SITE SHALL BE SEEDED, SODDED, OR LANDSCAPED AS SHOWN ON THE SITE. IF GRADING ACTIVITIES CEASE ON AN AREA OF THE SITE DISTURBED SLOPES SHALL BE TEMPORARILY SEEDED IN ACCORDANCE WITH PLANS.
17. TOPSOIL IS TO BE PLACED IN AREAS UNSUITABLE FOR VEGETATIVE GROWTH.
18. STRIP TOPSOIL PRIOR TO EXCAVATION, STOCKPILE AND SPREAD ONTO DISKED SUBGRADE (4" MIN) A THICKNESS OF 4 INCHES.
19. THE CONTRACTOR SHALL HAVE THE RESPONSIBILITY FOR RESOLVING COMPLAINTS IN THE EVENT THAT COMPLAINTS OR DAMAGE CLAIMS ARE FILED DUE TO DAMAGES OCCURRING ADJACENT TO OR DOWNSTREAM FROM PROPERTY BY SEDIMENT RESULTING FROM EROSION ON THE PROJECT SITE.
20. GOOD HOUSEKEEPING PRACTICES SHALL BE MAINTAINED ON SITE TO KEEP SOLID WASTE FROM ENTRY INTO WATERS.
21. ALL FUELING FACILITIES PRESENT ON SITE SHALL ADHERE TO APPLICABLE FEDERAL AND STATE REQUIREMENTS CONCERNING UNDERGROUND STORAGE, ABOVE GROUND STORAGE AND DISPENSERS, INCLUDING SPILL PREVENTION, CONTROL AND COUNTER MEASURES.
22. EROSION CONTROL IS TO BE PLACED IN PHASING AS CONSTRUCTION PROGRESSES.
23. MINIMAL WASHING OF CONCRETE EQUIPMENT ALLOWED, CHUTE ETC. CONCRETE WASHOUT OF THE DRUM IS NOT ALLOWED. ANY PIT/WASHOUT AREA NEEDS TO BE MAINTAINED IN A NON–DISCHARGING MANNER AND ANY WASTE RESIDUE WILL NEED TO BE CLEANED OUT AND REMOVED AT THE END OF PROJECT.
24. EROSION CONTROL SEDIMENT FENCE OR STRAW WATTLE SHALL BE INSTALLED 1'–0" BEHIND CURB & GUTTER OR SIDEWALK UPON COMPLETION OF BACKFILL OF CURB IN ALL AREAS WHERE SLOPES FROM DISTURBED AREAS DRAIN TOWARDS CURB OR SIDEWALK. UPON COMPLETION OF FINAL GRADING THE TOES OF ALL EMBANKMENTS IN EXCESS OF TWO FEET IN HEIGHT WILL HAVE EROSION CONTROL SEDIMENT FENCE INSTALLED

WARRANTY / DISCLAIMER

THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER KAW VALLEY ENGINEERING, INC NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE KAW VALLEY ENGINEERING PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.

CAUTION – NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

SAFETY NOTICE TO CONTRACTOR

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

811 Know what's below. Call before you dig.

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241DEMO DWN: NJN
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ENGINEER
MO # 2015000538
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PRINT DATE/TIME: 11/22/2022 4:00 PM

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Lee's Summit Robotics, GiC & Phys Educaiton

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LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

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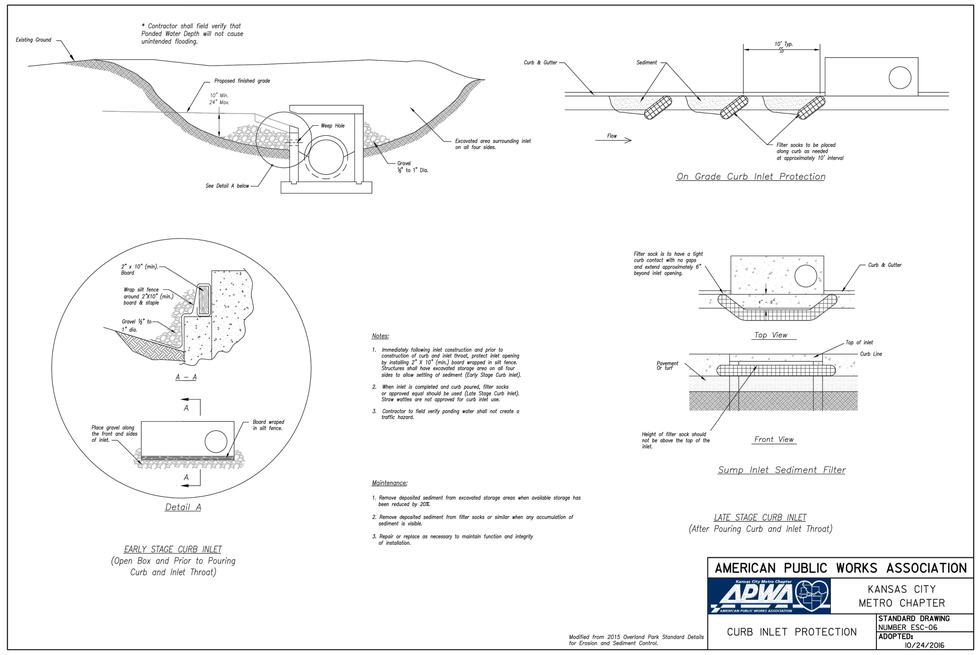
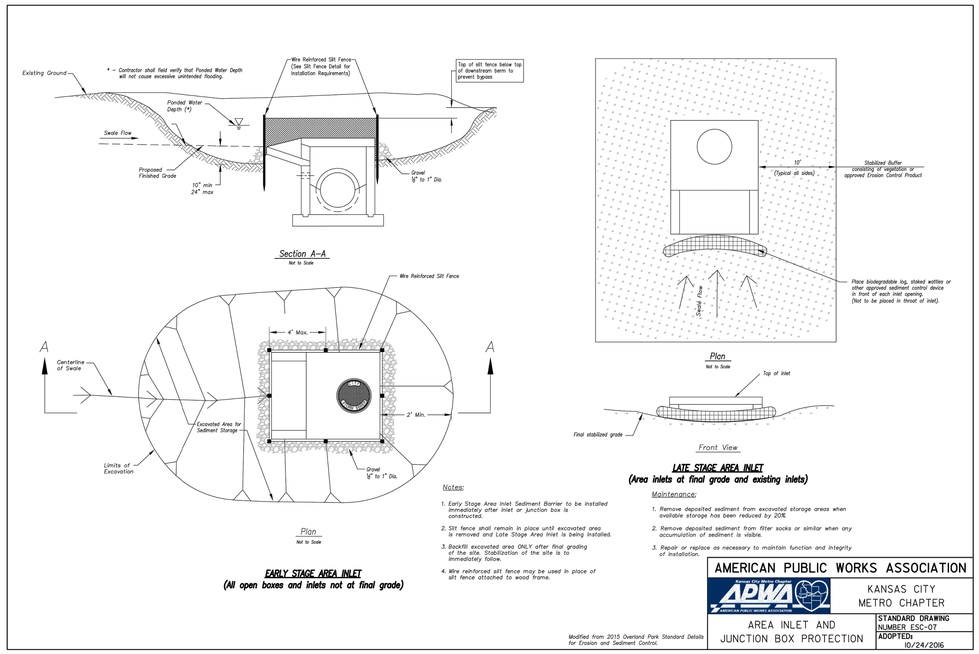
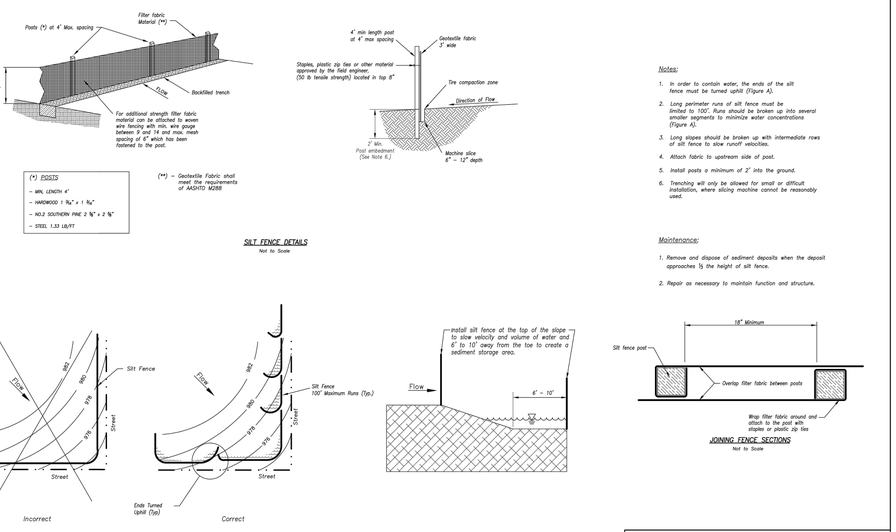
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

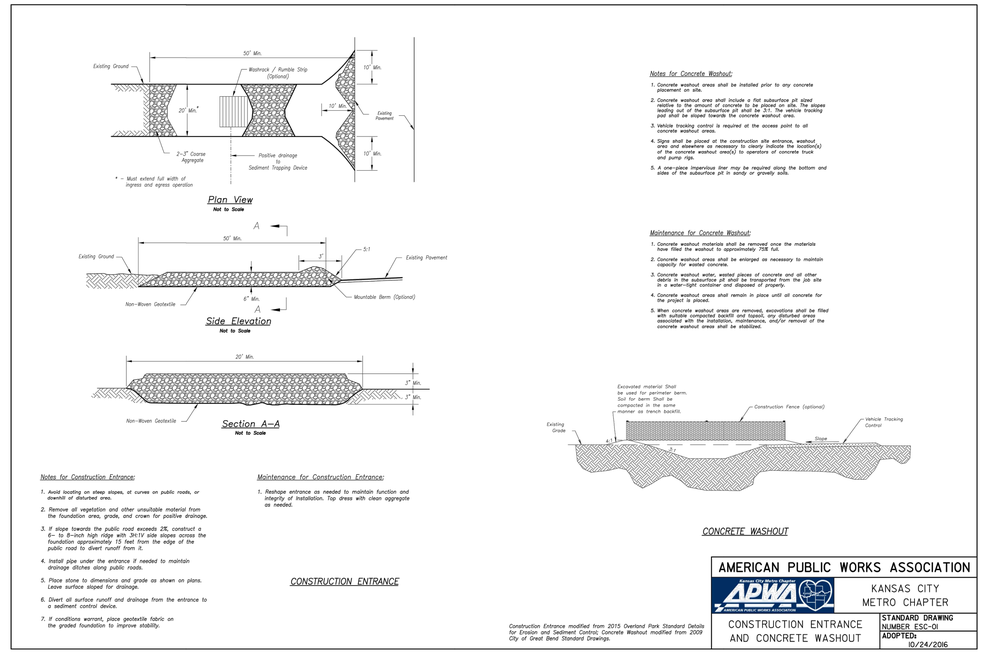
LSN DEMOLITION AND EROSION CONTROL PLAN

C200-B









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C290-B

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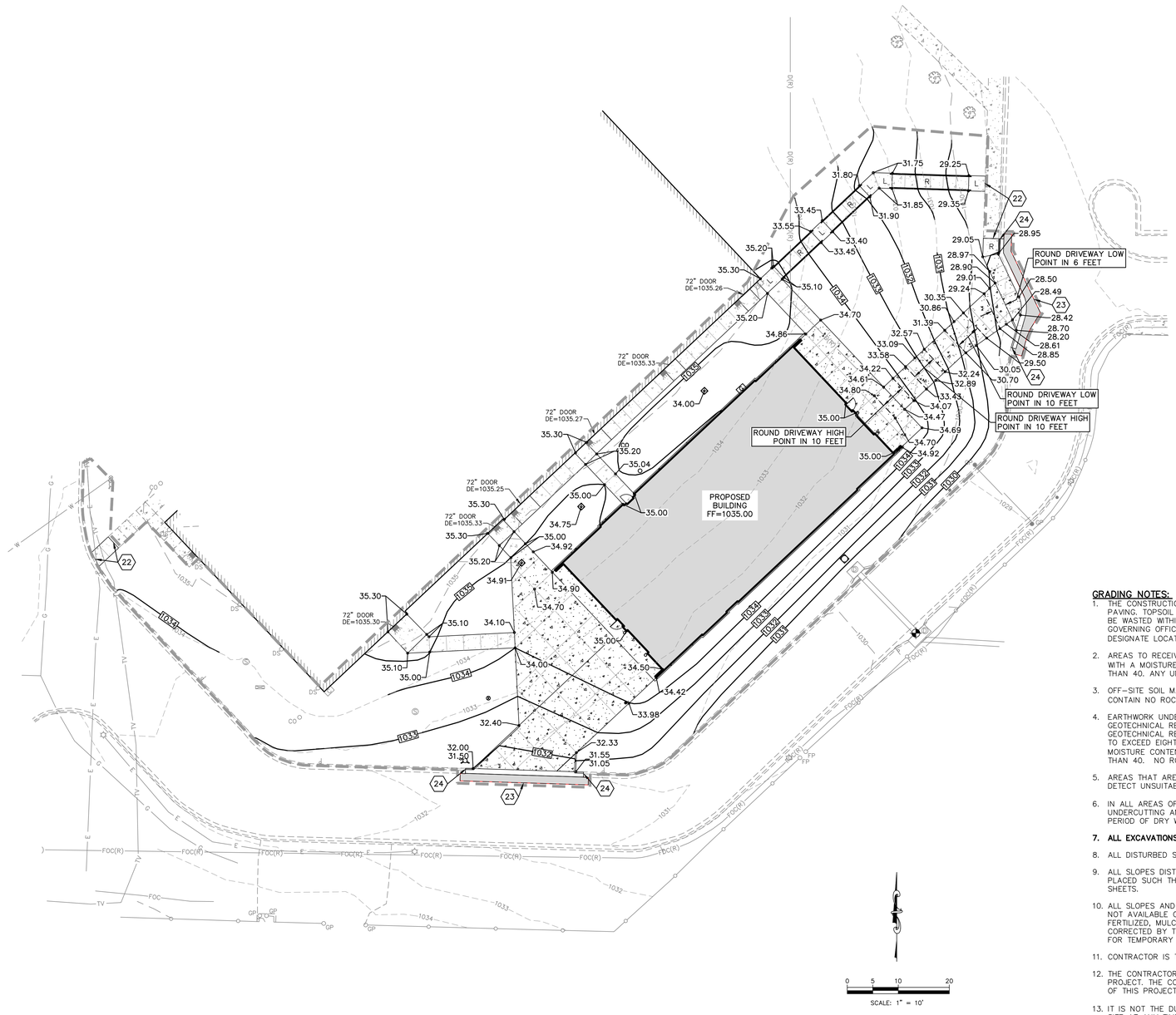

NOTES:
22 MATCH EXISTING SIDEWALK ELEVATION.
23 MATCH EXISTING PAVEMENT ELEVATION.
24 MATCH EXISTING CURB ELEVATION.

LEGEND (PROPOSED)

23.4 BACK OF CURB ELEVATION (ADD 1000),
22.9 FLOWLINE OF CURB ELEVATION (ADD 1000),
22.9 SPOT ELEVATION (ADD 1000),

1000 FINISHED 1' CONTOUR INTERVALS, TOP OF PAVEMENT

1000 EXISTING GROUND CONTOUR (1' INTERVALS)

SWALE

LP LOW POINT

HP HIGH POINT

NOTE:
1. **CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.**
2. **THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACTOR DOCUMENTS.**

GRADING NOTES:

1. THE CONSTRUCTION AREA SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL AND ORGANIC MATTER FROM ALL AREAS TO BE OCCUPIED BY BUILDING AND PAVING. TOPSOIL FOR REPLACEMENT ON SLOPES MAY BE STOCKPILED ON SITE. EXCESS TOPSOIL MAY BE WASTED IN FILL SLOPES PROVIDED THAT NO TOPSOIL WILL BE WASTED WITHIN 10 FEET OF THE EDGE OF THE BUILDING OR PARKING AREA. BURNING OF TIMBER WILL NOT BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM GOVERNING OFFICIALS. STRIPPING EXISTING TOPSOIL AND ORGANIC MATTER SHALL BE TO A MINIMUM DEPTH OF 6 INCHES. CONSTRUCTION MANAGER SHALL DESIGNATE LOCATION OF STOCKPILE AREAS DURING CONSTRUCTION. ANY UNAUTHORIZED STOCKPILE SHALL BE REMOVE/RELOCATED AT THE CONTRACTORS EXPENSE.
2. AREAS TO RECEIVE FILL SHALL BE SCARIFIED AND THE TOP 12-INCH DEPTH COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698 WITH A MOISTURE CONTENT OF +/-3% OF OPTIMUM FOR SOILS WITH A LIQUID LIMIT OF LESS THAN 40 AND 0 TO +4% FOR SOILS WITH A LIQUID LIMIT GREATER THAN 40. ANY UNSUITABLE AREAS SHALL BE UNDERCUT AND REPLACED WITH SUITABLE MATERIAL BEFORE ANY FILL MATERIAL CAN BE APPLIED.
3. OFF-SITE SOIL MATERIAL FOR USE UNDER BUILDING AND PAVED AREAS SHALL HAVE A PLASTICITY INDEX OF 25 OR LESS, A LIQUID LIMIT OF 45 OR LESS AND CONTAIN NO ROCK LARGER THAN THREE INCHES. OFF-SITE FILL MATERIAL SHALL BE APPROVED BY THE OWNER'S TESTING AGENCY PRIOR TO BRINGING ON SITE.
4. EARTHWORK UNDER THE BUILDING, PAVING AND LIGHTLY LOADED STRUCTURAL FEATURES SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND PROJECT GEOTECHNICAL REPORT. THE BUILDING PAD SHALL BE EXCAVATED AS REQUIRED TO ALLOW THE PLACEMENT OF LOW VOLUME CHANGE MATERIAL. REFER TO GEOTECHNICAL REPORT FOR PREPARING BUILDING PAD AND LOW VOLUME CHANGE THICKNESS REQUIREMENTS. OTHER FILL MATERIAL SHALL BE MADE IN LIFTS NOT TO EXCEED EIGHT INCHES DEPTH COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698. LVC SOILS SHALL BE COMPACTED AT A MOISTURE CONTENT OF 0 TO +4% OF OPTIMUM FOR SOILS WITH A LIQUID LIMIT GREATER THAN 40 AND +/-3% OF OPTIMUM FOR SOILS WITH A LIQUID LIMIT LESS THAN 40. NO ROCK LARGER THAN THREE INCHES IN ANY DIMENSION NOR ANY SHALE SHALL BE PLACED IN THE TOP 24 INCHES OF EMBANKMENT.
5. AREAS THAT ARE TO BE CUT TO SUBGRADE LEVELS SHALL BE PROOF ROLLED WITH A LOADED DUMP TRUCK OR SIMILAR APPROVED CONSTRUCTION EQUIPMENT TO DETECT UNSUITABLE SOIL CONDITIONS.
6. IN ALL AREAS OF EXCAVATION, IF UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED, THE OWNER'S ENGINEER SHALL RECOMMEND TO THE OWNER THE METHODS OF UNDERCUTTING AND REPLACEMENT OF PROPERLY COMPACTED, APPROVED FILL MATERIAL. ALL PROOFROLLING AND UNDERCUTTING SHOULD BE PERFORMED DURING A PERIOD OF DRY WEATHER.
7. **ALL EXCAVATIONS SHALL BE CONSIDERED AS UNCLASSIFIED. REFER TO PROJECT GEOTECHNICAL REPORT.**
8. ALL DISTURBED SLOPES ARE TO BE 3:1 OR FLATTER.
9. ALL SLOPES DISTURBED EXCEEDING 4:1 SHALL BE HYDROSEEDED, SODDED OR PROTECTED BY EROSION CONTROL BLANKETS THAT WILL PREVENT EROSION AND PLACED SUCH THAT THE SURFACE IS FLUSH WITH SURROUNDING GROUND AND SHAPED TO CHANNEL WATER IN DIRECTIONS INDICATED. SEE GENERAL NOTES ON THIS SHEETS.
10. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND A MINIMUM OF FOUR INCHES OF TOPSOIL APPLIED. IF ADEQUATE TOPSOIL IS NOT AVAILABLE ON-SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL, APPROVED BY THE OWNER, AS NEEDED. THE AREA SHALL THEN BE SODDED OR SEEDED, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER PRIOR TO FINAL ACCEPTANCE OF THE PROJECT. REFER TO THE NOTES ON THIS SHEET FOR TEMPORARY SEEDING SPECIFICATIONS. REFER TO PROJECT SITE PLAN FOR FINAL STABILIZATION TREATMENTS.
11. CONTRACTOR IS TO REMOVE AND DISPOSE OF ALL DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM PREVIOUS AND CURRENT DEMOLITION OPERATIONS.
12. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASES OF THIS PROJECT.
13. IT IS NOT THE DUTY OF THE ENGINEER OR THE OWNER TO REVIEW THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON OR NEAR THE CONSTRUCTION SITE AT ANY TIME DURING CONSTRUCTION.
14. IF ANY OF THESE NOTES CONFLICT WITH THE PROJECT GEOTECHNICAL REPORT AND ALL ADDENDUMS PREPARED BY CFS ENGINEERS DATED AUGUST 3, 2022 (CFS PROJECT NO. 22-5545), RECOMMENDATIONS IN GEOTECHNICAL REPORT SHALL GOVERN.

WARRANTY / DISCLAIMER
THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER KAW VALLEY ENGINEERING, INC NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE KAW VALLEY ENGINEERING PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.

SAFETY NOTICE TO CONTRACTOR
IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

CAUTION – NOTICE TO CONTRACTOR
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

Know what's below. Call before you dig.

PROJ. NO. C21_1241 DSN: CJC DWN: NJN
CFN: 1241GP
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KAW VALLEY ENGINEERING
KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PRINT DATE/TIME: 11/22/2022 4:00 PM

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Lee's Summit Robotics, GiC & Phys Educaiton

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LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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structural engineer:
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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

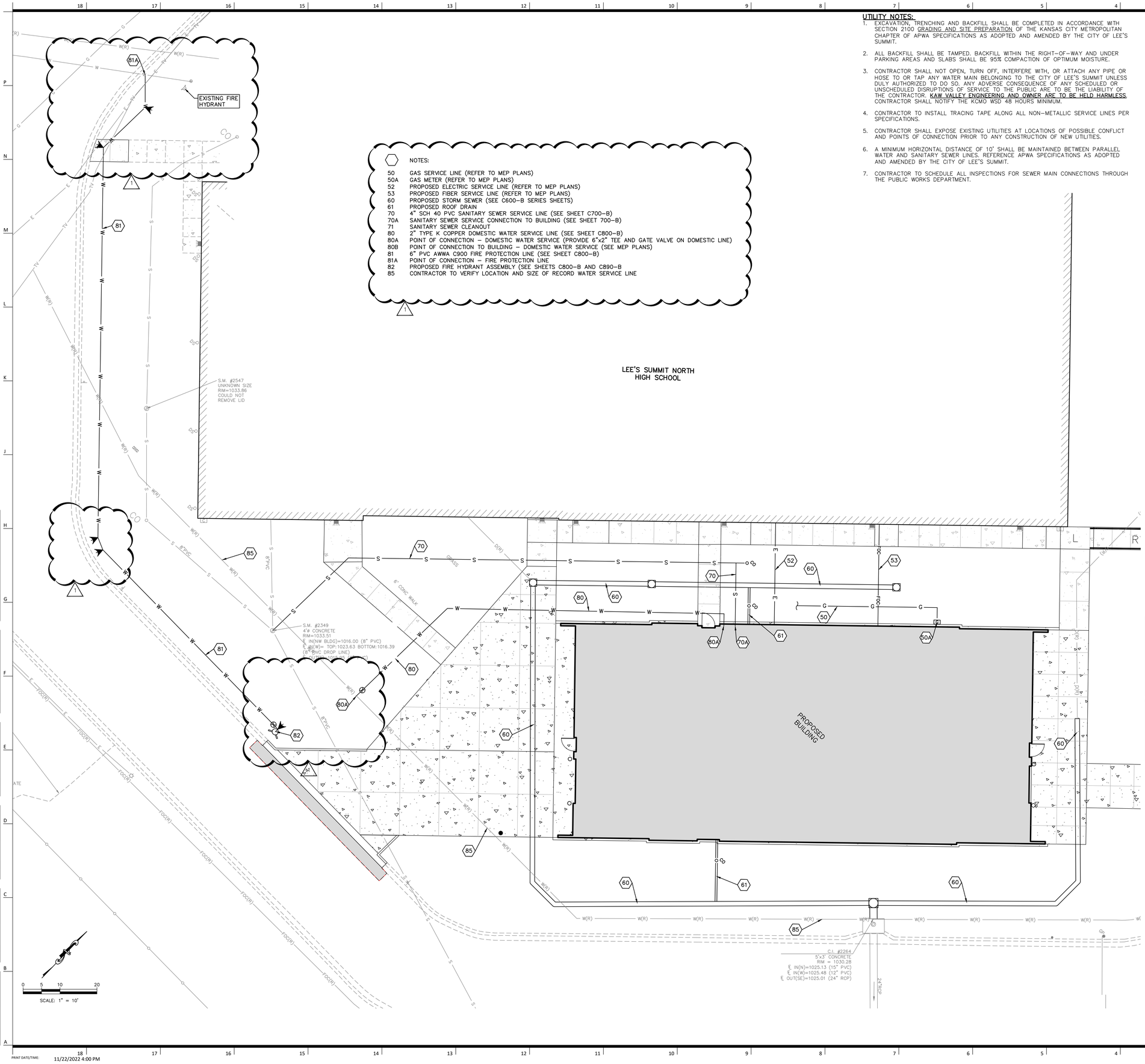
UNLESS A PROFESSIONAL SEAL WITH SIGNATURE AND DATE IS AFFIXED, THIS DOCUMENT IS PRELIMINARY AND IS NOT INTENDED FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

STATE OF MISSOURI CHRISTIAN J CROWDER NUMBER PE-2015000538 11-22-2022 PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN GRADING PLAN

C300-B



NOTES:

50	GAS SERVICE LINE (REFER TO MEP PLANS)
50A	GAS METER (REFER TO MEP PLANS)
52	PROPOSED ELECTRIC SERVICE LINE (REFER TO MEP PLANS)
53	PROPOSED FIBER SERVICE LINE (REFER TO MEP PLANS)
60	PROPOSED STORM SEWER (SEE C600–B SERIES SHEETS)
61	PROPOSED ROOF DRAIN
70	4" SCH 40 PVC SANITARY SEWER SERVICE LINE (SEE SHEET C700–B)
70A	SANITARY SEWER SERVICE CONNECTION TO BUILDING (SEE SHEET 700–B)
71	SANITARY SEWER CLEANOUT
80	2" TYPE K COPPER DOMESTIC WATER SERVICE LINE (SEE SHEET C800–B)
80A	POINT OF CONNECTION – DOMESTIC WATER SERVICE (PROVIDE 6"x2" TEE AND GATE VALVE ON DOMESTIC LINE)
80B	POINT OF CONNECTION TO BUILDING – DOMESTIC WATER SERVICE (SEE MEP PLANS)
81	6" PVC AWWA C900 FIRE PROTECTION LINE (SEE SHEET C800–B)
81A	POINT OF CONNECTION – FIRE PROTECTION LINE
82	PROPOSED FIRE HYDRANT ASSEMBLY (SEE SHEETS C800–B AND C890–B
85	CONTRACTOR TO VERIFY LOCATION AND SIZE OF RECORD WATER SERVICE LINE

UTILITY NOTES:

1. EXCAVATION, TRENCHING AND BACKFILL SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 2100 GRADING AND SITE PREPARATION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
2. ALL BACKFILL SHALL BE TAMPED. BACKFILL WITHIN THE RIGHT–OF–WAY AND UNDER PARKING AREAS AND SLABS SHALL BE 95% COMPACTION OF OPTIMUM MOISTURE.
3. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH, OR ATTACH ANY PIPE OR HOSE TO OR TAP ANY WATER MAIN BELONGING TO THE CITY OF LEE'S SUMMIT UNLESS DULY AUTHORIZED TO DO SO. ANY ADVERSE CONSEQUENCE OF ANY SCHEDULED OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE TO BE THE LIABILITY OF THE CONTRACTOR. KAW VALLEY ENGINEERING AND OWNER ARE TO BE HELD HARMLESS. CONTRACTOR SHALL NOTIFY THE KCMO WSD 48 HOURS MINIMUM.
4. CONTRACTOR TO INSTALL TRACING TAPE ALONG ALL NON–METALLIC SERVICE LINES PER SPECIFICATIONS.
5. CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICT AND POINTS OF CONNECTION PRIOR TO ANY CONSTRUCTION OF NEW UTILITIES.
6. A MINIMUM HORIZONTAL DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN PARALLEL WATER AND SANITARY SEWER LINES. REFERENCE APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
7. CONTRACTOR TO SCHEDULE ALL INSPECTIONS FOR SEWER MAIN CONNECTIONS THROUGH THE PUBLIC WORKS DEPARTMENT.

LEGEND:

- CONTROL POINT
- BENCHMARK
- GP — GATE POST
- CHAIN LINK FENCE
- STREET/TRAFFIC SIGN
- FOC — UNDERGROUND FIBER OPTIC CABLE
- FOC(R) — UNDERGROUND FIBER OPTIC (FROM RECORDS)
- TELEPHONE PEDESTAL
- SANITARY SEWER MANHOLE
- STORM SEWER MANHOLE
- AI — AREA INLET
- CI — CURB INLET
- CO — SANITARY SEWER CLEAN OUT
- DSP — DOWN SPOUT
- FLARED END SECTION
- S — SANITARY SEWER LINE
- S — PROPOSED SANITARY SEWER LINE
- D — STORM SEWER LINE
- D — PROPOSED STORM SEWER LINE
- CMP — CORRUGATED METAL PIPE
- RCP — REINFORCED CONCRETE PIPE
- VCP — VITRIFIED CLAY PIPE
- DIP — DUCTILE IRON PIPE
- HDPE — HIGH DENSITY POLYETHYLENE
- E — UNDERGROUND ELECTRIC
- (2) — OVERHEAD UTILITY LINE (# OF LINES)
- P — PULL BOX
- LIGHT POLE
- UTILITY POLE
- UP — UTILITY POLE W/ LIGHT
- UTILITY POLE W/ TRANSFORMER
- GUY ANCHOR
- W(R) — WATER LINE PER RECORD
- E(R) — UNDERGROUND ELECTRIC PER RECORD
- G — UNDERGROUND GAS
- GAS METER
- GV — GAS VALVE
- GR — GAS RISER
- GAS LINE SIGN
- W — WATER LINE
- W — PROPOSED WATER LINE
- WATER METER
- WATER LINE GATE VALVE
- FIRE HYDRANT
- WATER MANHOLE
- CONCRETE JOINT/CUT LINE
- BUSH
- DECIDUOUS TREE
- CONIFEROUS TREE
- TREE LINE
- FP — FLAG POLE
- L/S — LANDSCAPING AREA
- CONC — CONCRETE
- ELECTRIC METER
- UNDERGROUND ELECTRIC PEDESTAL
- G(R) — UNDERGROUND GAS PER RECORD
- S(R) — SANITARY SEWER LINE PER RECORD
- D(R) — STORM SEWER LINE PER RECORD
- W(R) — STORM SEWER LINE PER RECORD
- ASPHALT PAVEMENT (040)
- HEAVY DUTY ASPHALT PAVEMENT (041)
- CONCRETE PAVEMENT (042)

NOTE:
1. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, TRUCK DOCKS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
2. THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACTOR DOCUMENTS.

NOTE:
1. REFER TO A AND E SERIES SHEETS FOR ADDITIONAL SITE ELECTRICAL AND TELECOM REQUIREMENTS FOR SITE ELECTRICAL, LIGHTING AND SIGNAGE.
2. ALL WATER SERVICE INSTALLATIONS INCLUDING BACKFLOW DEVICES ARE SUBJECT TO FIELD VERIFICATION AND APPROVAL BY THE WATER DEPARTMENT INSPECTOR.

Know what's **below.** **Call** before you dig.

WARRANTY / DISCLAIMER

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PROJ. NO. C21_1241 DSN: CJC
CFN: 1241UP DWN: NJN

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ENGINEER
MO # 2015000538

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KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PRINT DATE/TIME: 11/22/2022 4:00 PM

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the evolution of gould evans

Lee's Summit Robotics, GiC & Phys Educaiton

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

UNLESS A PROFESSIONAL SEAL WITH SIGNATURE AND DATE IS AFFIXED, THIS DOCUMENT IS PRELIMINARY AND IS NOT INTENDED FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

MISSOURI — CHRISTIAN J CROWDER — NUMBER PE-2015000538 — 11-22-22 — PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

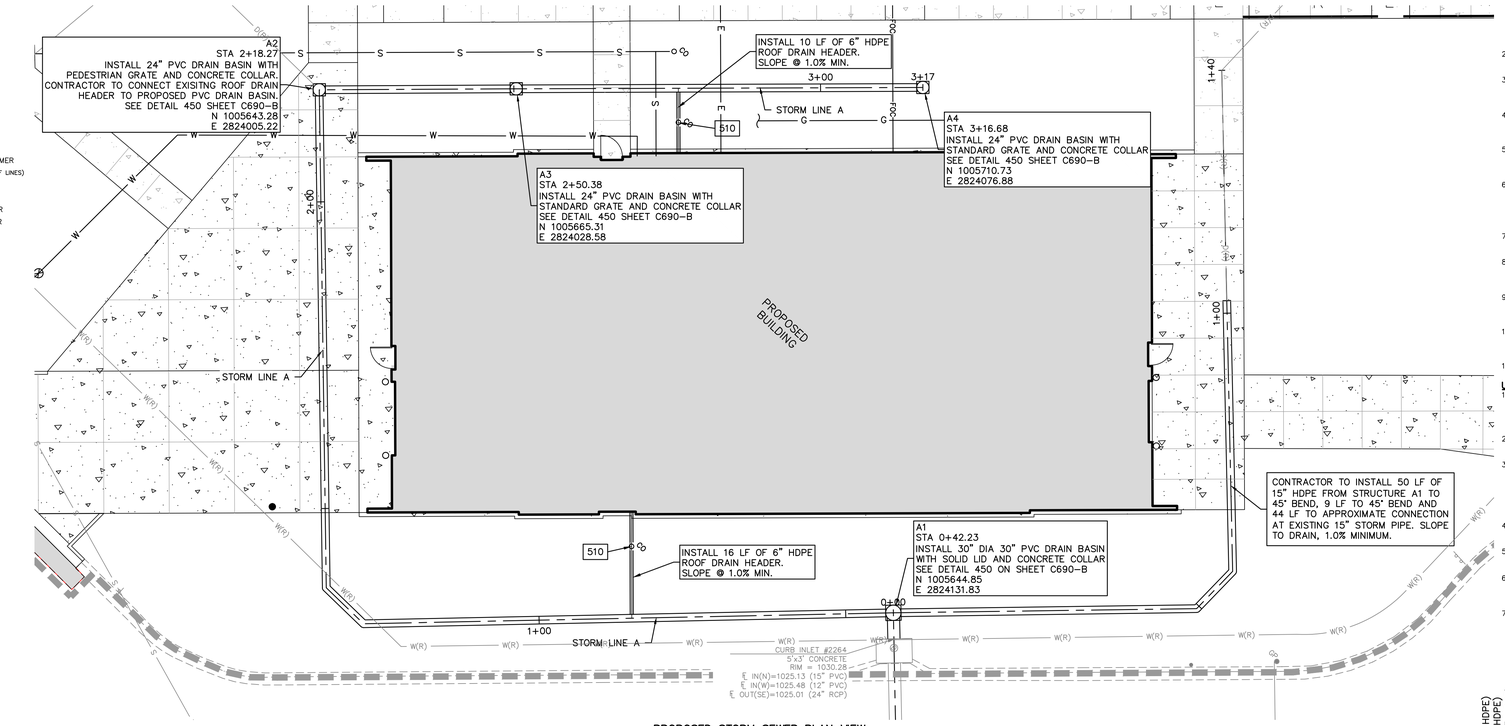
LSN UTILITY PLAN

C500-B

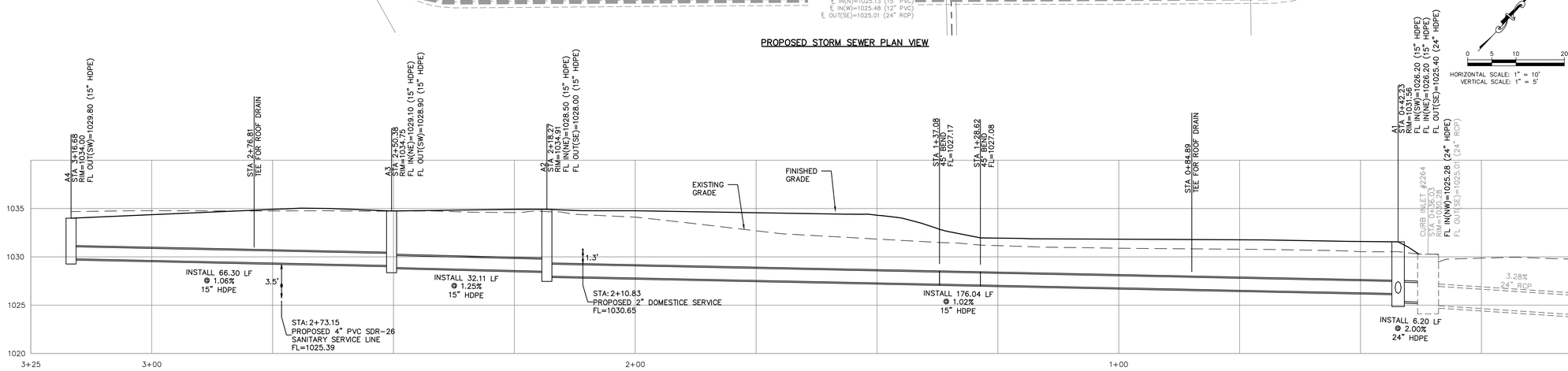
LEGEND

●	1/2"x24" REBAR W/LS 214F CAP SET (UNLESS NOTED OTHERWISE)	FF	FINISH FLOOR ELEVATION
▮	CURB-CHIP	▽	FIRE HYDRANT
✢	CUT "+" SET	—o—	CHAIN LINK FENCE
(CM)	CALCULATED MEASURED VALUE	—o—	PVC FENCE
(M)	MEASURED VALUE	⟵	GUY ANCHOR
(D)	DEED VALUE	♿	HANDICAP SYMBOL
(P)	PLAT VALUE	(3)	PARKING STALL COUNT
⊆	CABLE PAINT	♿	HANDICAP SIGN
○	MONUMENT FOUND (ORIGIN UNCERTAIN)	☼	LIGHT POLE
		○	UTILITY POLE
		⊡	UTILITY POLE W/ TRANSFORMER
	BENCHMARK	(2) OU	OVERHEAD UTILITY LINE (# OF LINES)
AC	AIR CONDITIONER	P	PULL BOX
BB	BREAKER BOX	SSMH	EXISTING SPOT ELEVATION
	BASKETBALL GOAL	1052	EXISTING GRADE 5' CONTOUR
BHE	BUILDING HEIGHT/ELEVATION	1054	EXISTING GRADE 1' CONTOUR
	BUSH	FOC	FIBER OPTIC CABLE SIGN
CO	SANITARY SEWER CLEAN OUT		STREET/TRAFFIC SIGN
DS	DOWN SPOUT		BUSINESS/BILLBOARD SIGN
	CANOPY SUPPORT	S	SANITARY SEWER MANHOLE
	CONIFEROUS TREE		WHEEL STOP
DE	DOOR ELEVATION AT THRESHOLD	W	WATER METER
	DECIDUOUS TREE		WALL MOUNTED LIGHT
	ELECTRIC BOX	C	WALL MOUNTED CAMERA
CONC	CONCRETE		WATER LINE GATE VALVE
L/S	LANDSCAPING AREA	FP	FENCE POST
E	ELECTRIC METER	WM	WALL MOUNTED VENT
		GI	GRATE INLET

DETAILS SEE SHEET C690-B
450 PVC DRAIN BASIN
510 CLEANOUT



PROPOSED STORM SEWER PLAN VIEW



PROPOSED STORM SEWER LINE A PROFILE

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 5'

STORM SEWER CONSTRUCTION NOTES:

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 2600 STORM SEWER OF THE KANSAS CITY METRO CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF PLATTE CITY, MISSOURI STANDARD SPECIFICATIONS. REFERENCE APWA SPECIFICATION SECTION 2102.4 FOR EXCAVATION, TRENCHING AND BACKFILLING FOR PIPE AND STORM STRUCTURES. REFER TO PROJECT GEOTECHNICAL REPORT AND PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. A MINIMUM OF 18" COVER SHALL BE PROVIDED PRIOR TO AND MAINTAINED AFTER INSTALLATION OF STORM SEWER.
3. ALL COORDINATES FOR CURB INLETS ARE TO THE MIDDLE OF THE INSIDE FRONT FACE. ALL COORDINATES FOR PVC STRUCTURES AND CONCRETE YARD INLETS ARE TO THE CENTER OF THE STRUCTURE.
4. ALL JUNCTION BOXES/AREA INLETS HAVE ONE COORDINATE PROVIDED AT THE CENTER OF STRUCTURE. SEE PLAN FOR CLARIFICATION. ORIENT STRUCTURES PARALLEL TO ADJACENT CURB, BUILDING OR WALL FACE, UNLESS NOTED OTHERWISE.
5. RIM ELEVATION IS PROVIDED AT COORDINATE, UNLESS NOTED OTHERWISE. CONTRACTOR TO ADJUST ELEVATION OF RIM AS REQUIRED TO MATCH SLOPE OF ADJACENT CURB LINE. REFER TO GRADING PLAN (C3.0 SERIES SHEETS).
6. ALL EXISTING UTILITIES INDICATED ON THE DRAWING ARE ACCORDING TO THE BEST INFORMATION AVAILABLE TO THE ENGINEER; HOWEVER, ALL UTILITIES ACTUALLY EXISTING MAY NOT BE SHOWN. UTILITIES DAMAGED THROUGH THE NEGLIGENCE OF THE CONTRACTOR TO OBTAIN THE LOCATION OF SAME SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT THEIR EXPENSE.
7. ALL BACKFILL SHALL BE COMPACTED TO 95 PERCENT STANDARD DENSITY AT OPTIMUM MOISTURE.
8. ALL EXCAVATION BENEATH THE STREETS AND PARKING LOTS FOR DRAINAGE PIPE LESS THAN 4'-0" IN DIAMETER SHALL BE BACKFILLED WITH AGGREGATE TO FOUR FEET (4') PAST BACK OF CURB IN ACCORDANCE WITH APWA SPECIFICATIONS SECTION 2102.4J.
9. RELOCATION OF ANY WATER LINE, SEWER LINE OR SERVICE LINE THEREOF REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE AT THEIR EXPENSE.
10. IF PRECAST STORM STRUCTURES ARE TO BE USED ON THIS PROJECT, THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND HAVE THEM APPROVED BY THE ENGINEER PRIOR TO FABRICATION OF THE STRUCTURES. FAILURE TO DO SO SHALL BE CAUSE FOR REJECTION.
11. ALL HDPE PIPE JOINTS SHALL BE WATER TIGHT.

UTILITY NOTES:

1. EXCAVATION, TRENCHING AND BACKFILL SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 2100 GRADING AND SITE PREPARATION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
2. ALL BACKFILL SHALL BE TAMPED. BACKFILL WITHIN THE RIGHT-OF-WAY AND UNDER PARKING AREAS AND SLABS SHALL BE 95% COMPACTION OF OPTIMUM MOISTURE.
3. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH, OR ATTACH ANY PIPE OR HOSE TO OR TAP ANY WATER MAIN BELONGING TO THE CITY OF LEE'S SUMMIT UNLESS DULY AUTHORIZED TO DO SO. ANY ADVERSE CONSEQUENCE OF ANY SCHEDULED OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE TO BE THE LIABILITY OF THE CONTRACTOR. KAW VALLEY ENGINEERING AND OWNER ARE TO BE HELD HARMLESS. CONTRACTOR SHALL NOTIFY THE KCMO WSD 48 HOURS MINIMUM.
4. CONTRACTOR TO INSTALL TRACING TAPE ALONG ALL NON-METALLIC SERVICE LINES PER SPECIFICATIONS.
5. CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICT AND POINTS OF CONNECTION PRIOR TO ANY CONSTRUCTION OF NEW UTILITIES.
6. A MINIMUM HORIZONTAL DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN PARALLEL WATER AND SANITARY SEWER LINES. REFERENCE APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
7. CONTRACTOR TO SCHEDULE ALL INSPECTIONS FOR SEWER MAIN CONNECTIONS THROUGH THE PUBLIC WORKS DEPARTMENT.

WARRANTY / DISCLAIMER

THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER KAW VALLEY ENGINEERING, INC NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE KAW VALLEY ENGINEERING PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.

CAUTION – NOTICE TO CONTRACTOR

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THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

SAFETY NOTICE TO CONTRACTOR

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

NOTE:
1. **REFER TO SHEET N-E001 FOR ADDITIONAL SITE ELECTRICAL AND TELECOM REQUIREMENTS FOR COMMUNICATIONS.**
2. **ALL WATER SERVICE INSTALLATIONS INCLUDING BACKFLOW DEVICES ARE SUBJECT TO FIELD VERIFICATION AND APPROVAL BY THE WATER DEPARTMENT INSPECTOR.**

NOTE:
1. **CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRANCE, SLOPED PAVING, EXIT PORCHES, RAMPS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.**
2. **THESE PLANS HAVE NOT BEEN VERIFIED WITH FINAL ARCHITECTURAL CONTRACT DRAWINGS. CONTRACTOR SHALL VERIFY AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR IS FULLY RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND CONTRACTOR DOCUMENTS.**

Know what's below. Call before you dig.

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241DPP DWN: NJN

CHRISTIAN J CROWDER
ENGINEER
MO # 2015000538

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Lee's Summit Robotics, GiC & Phys Educaiton

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LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
Lee's Summit R-7 School
301 NE Tudor Road
Lee's Summit, MO 64086

architect:
Multistudio
4200 Pennsylvania
Kansas City, MO 64111
816.931.6655
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civil engineer:
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structural engineer:
Bob D. Campbell &
4338 Belleview
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Revisions

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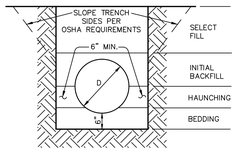
STATE OF MISSOURI
CHRISTIAN J CROWDER
NUMBER
PE-2015000538
11-22-22
PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN STORM PLAN AND PROFILE

C600-B



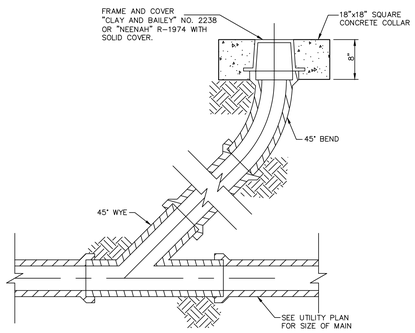
FLEXIBLE PIPE: INCLUDES CORRUGATED POLYETHELENE PIPE AND/OR POLYVINYL CHLORIDE PIPE.

RIGID PIPE: INCLUDES REINFORCED CONCRETE, DUCTILE IRON, & CAST IRON

1. BEDDING SHALL BE COMPACTED CRUSHED STONE AND SHALL BE SHAPED TO THE BOTTOM OF THE PIPE.
2. HAUNCHING AND INITIAL BACKFILL MATERIAL SHALL BE CLASS I OR II (REF. ASTM D2321) GRANULAR MATERIAL AND SHALL BE COMPACTED TO 95% STANDARD PROCTOR.

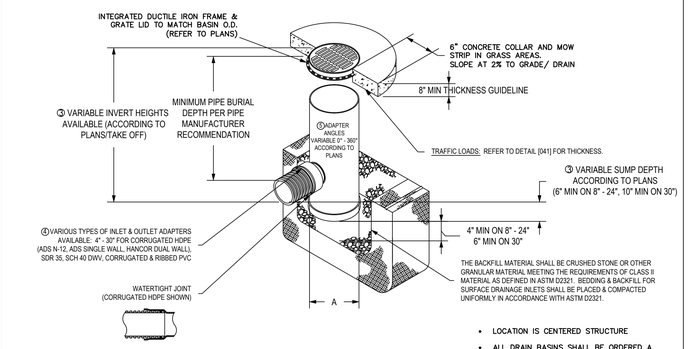
TRENCH AND BEDDING DETAILS

REFER TO KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS SECTION 2102.4



CLEAN-OUT 510

PVC DRAIN BASIN 450



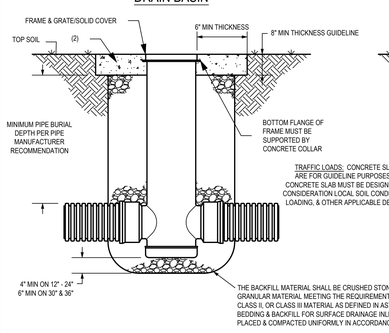
- LOCATION IS CENTERED STRUCTURE
- ALL DRAIN BASINS SHALL BE ORDERED A MINIMUM 1' TALLER THAN PLAN ELEVATION AND SHALL BE FIELD ADJUSTED TO GRADE UPON COMPLETED OF CONSTRUCTION

① 8" - 30" GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05, WITH THE EXCEPTION OF THE 8" - 15" BRONZE GRATES
② 12" - 30" FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
③ DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-093
④ DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
⑤ ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012, 7001-110-013, & 7001-110-014.
6 - GRATES SHALL MEET H-10 LOAD RATING FOR 12" - 24" PED
7 - GRATES SHALL MEET H-20 LOAD RATING FOR 30" PED & 12" - 30" STD & SOLID
8 - ALL BRONZE GRATES, DROP IN GRATES, & 8" & 10" PED/STD GRATES & SOLID COVERS ARE RATED FOR LIGHT DUTY APPLICATIONS ONLY
9 - DOME GRATES HAVE NO LOAD RATING

NYLOPLAST BASIN IS THE BASIS OF DESIGN

DRAWN BY	EBC	MATERIAL	Nyloplast	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE	1-23-06			
APPD BY	CJA	PROJECT NO./NAME	TITLE	DRAIN BASIN WITH STANDARD GRATE QUICK SPEC INSTALLATION DETAIL 450
DATE	1-23-06			
DWG SIZE	A	SCALE 1:40 SHEET 1 OF 1	DWG NO.	7001-110-144 REV D

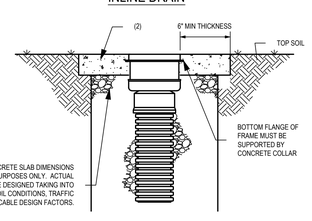
DRAIN BASIN



TRAFFIC LOADS: CONCRETE SLAB DIMENSIONS ARE FOR GUIDELINE PURPOSES ONLY. ACTUAL CONCRETE SLAB MUST BE DESIGNED TAKING INTO CONSIDERATION LOCAL SOIL CONDITIONS, TRAFFIC LOADING, & OTHER APPLICABLE DESIGN FACTORS.

THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS I, CLASS II, OR CLASS III MATERIAL AS DEFINED IN ASTM D2321. BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

INLINE DRAIN



1. GRATES/SOLID COVERS SHALL MEET H-20 LOAD RATING FOR 30" PEDESTRIAN & 12" - 30" STANDARD & SOLID
2. DESIGN SHOULD ACCOUNT FOR ROOT DEPTH TO ALLOW TURF TO GROW AND PREVENT EROSION AROUND GRATE SO THAT HAZARDS DO NOT FORM.

DRAWN BY	EBC	MATERIAL	Nyloplast	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE	01-05-09			
REVISED BY	NMH	PROJECT NO./NAME	TITLE	DRAIN BASIN & INLINE DRAIN TURF TRAFFIC INSTALLATION 460
DATE	06-12-18			
DWG SIZE	A	SCALE 1:25 SHEET 1 OF 1	DWG NO.	7001-110-340 REV G

PRINT DATE/TIME: 11/22/2022 4:01 PM

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Lee's Summit Robotics, GiC & Phys Educaiton

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LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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architect:
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civil engineer:
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Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN DETAIL SHEET

C690-B

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241DET DWN: NJN

CHRISTIAN J CROWDER
ENGINEER
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14700 WEST 114TH TERRACE
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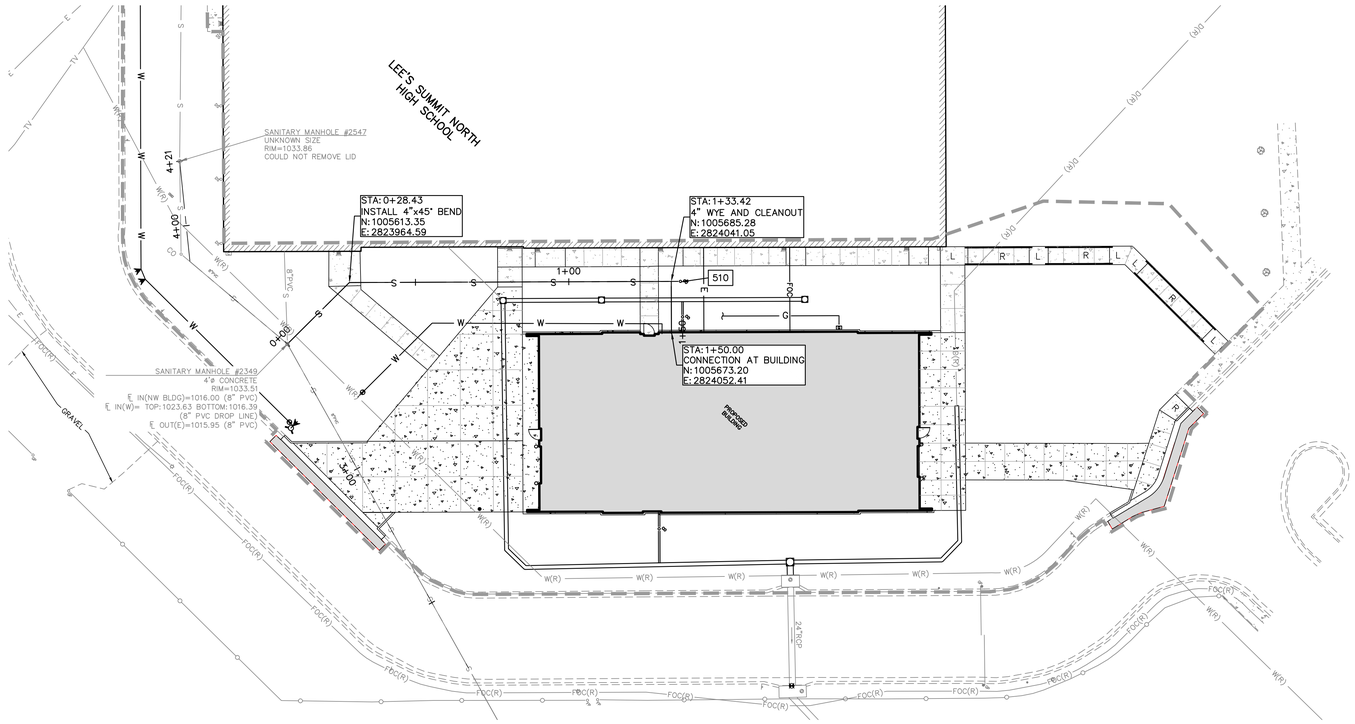
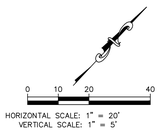
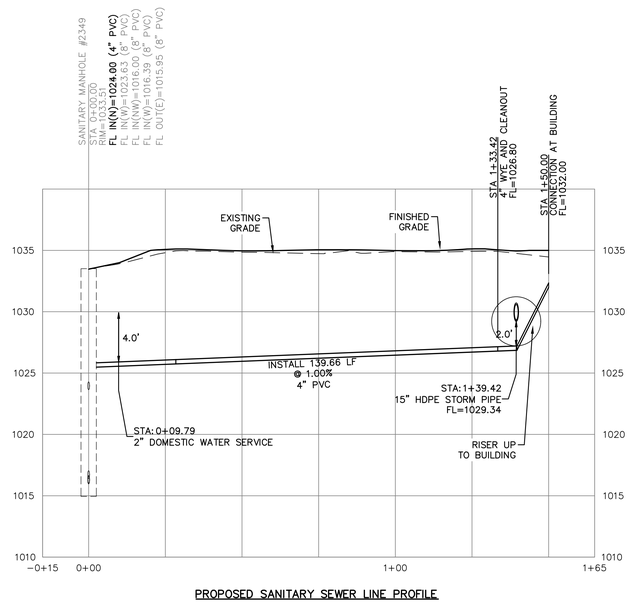


PROPOSED SANITARY SEWER LINE PLAN

DETAILS – SEE SHEET C790–B FOR THE FOLLOWING DETAILS

510 CLEANOUT
SAN–1 BUILDING SEWER STUB AND RISER





PROPOSED SANITARY SEWER LINE PROFILE

LEGEND

- 1/2"x24" REBAR W/LS 214F CAP SET (UNLESS NOTED OTHERWISE)
- CURB–CHIP
- CUT "+" SET
- (CM) CALCULATED MEASURED VALUE
- (M) MEASURED VALUE
- (D) DEED VALUE
- (P) PLAT VALUE
- CONTROL POINT
- MONUMENT FOUND (ORIGIN UNCERTAIN)
- BENCHMARK
- AIR CONDITIONER
- BREAKER BOX
- BASKETBALL GOAL
- BHE BUILDING HEIGHT/ELEVATION
- BUSH
- SANITARY SEWER CLEAN OUT
- DOWN SPOUT
- CANOPY SUPPORT
- CONIFEROUS TREE
- DE DOOR ELEVATION AT THRESHOLD
- DECIDUOUS TREE
- ELECTRIC BOX
- CONC CONCRETE
- L/S LANDSCAPING AREA
- ELECTRIC METER
- FF FINISH FLOOR ELEVATION
- FIRE HYDRANT
- CHAIN LINK FENCE
- PVC FENCE
- GUY ANCHOR
- HANDICAP SYMBOL
- PARKING STALL COUNT
- HANDICAP SIGN
- LIGHT POLE
- UTILITY POLE
- UTILITY POLE W/ TRANSFORMER
- (2) OU OVERHEAD UTILITY LINE (# OF LINES)
- P PULL BOX
- FOC FIBER OPTIC CABLE SIGN
- STREET/TRAFFIC SIGN
- BUSINESS/BILLBOARD SIGN
- SANITARY SEWER MANHOLE
- WHEEL STOP
- WATER METER
- WALL MOUNTED LIGHT
- WALL MOUNTED CAMERA
- WATER LINE GATE VALVE
- FP FENCE POST
- WMV WALL MOUNTED VENT
- GRATE INLET

SANITARY SEWER MATERIALS AND CONSTRUCTION NOTES:

1. ALL WORK RELATED TO SANITARY SEWER SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 3500 SANITARY SEWERS OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.
2. ALL PIPE USED FOR SANITARY SEWER SHALL BE PVC (SDR 26) OR DIP (CL 50) AS NOTED ON PLANS. MATERIAL SHALL CONFORM TO SECTION 3501 C & D OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.
3. MANHOLES SHALL CONFORM TO SECTION 3501 P OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.
4. ALL EXISTING UTILITIES INDICATED ON THE DRAWINGS ARE ACCORDING TO THE BEST INFORMATION AVAILABLE TO THE ENGINEER; HOWEVER, ALL UTILITIES ACTUALLY EXISTING MAY NOT BE SHOWN. UTILITIES DAMAGED THROUGH THE NEGLIGENCE OF THE CONTRACTOR TO OBTAIN THE LOCATION OF SAME SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS EXPENSE.
5. ALL INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 3502 OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS. REFER TO SECTION 3502.C FOR TESTING AND ACCEPTANCE REQUIREMENTS.
6. EXCAVATION, TRENCHING AND BACKFILL SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 2100 GRADING AND SITE PREPARATION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT. ALL EXCAVATIONS SHALL BE CONSIDERED UNCLASSIFIED. REFER TO PROJECT GEOTECHNICAL REPORT.
7. ALL BACKFILL SHALL BE TAMPED. BACKFILL WITHIN THE RIGHT–OF–WAY AND UNDER PARKING AREAS AND SLABS SHALL BE 95% COMPACTION OF OPTIMUM MOISTURE.
8. ALL STUB LINES SHALL BE LAID ON 1.00% GRADE FOR 6" PIPE AND 2.00% GRADE FOR 4" PIPE, UNLESS NOTED OTHERWISE.
9. RELOCATION OF ANY WATER LINE, SEWER LINE OR SERVICE LINE THEREOF REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE AT HIS EXPENSE. REFER TO PLANS FOR ADDITIONAL INFORMATION.
10. REFER TO SHEET C790–B FOR SANITARY SEWER DETAILS.

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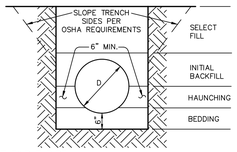
STATE OF MISSOURI CHRISTIAN J. CROWDER NUMBER PE-2015000538 11-22-22 PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN SANITARY PLAN AND PROFILE

C700-B



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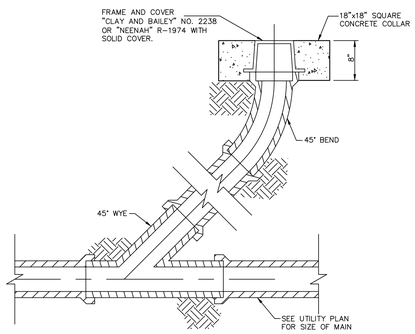
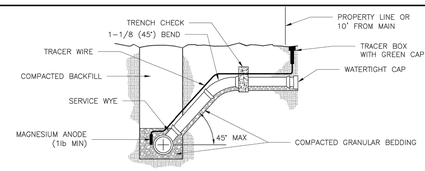
TRENCH AND BEDDING DETAILS

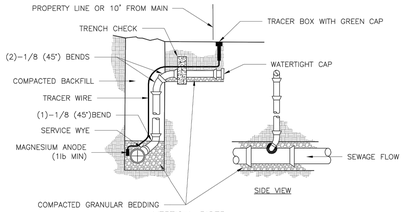
REFER TO KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS SECTION 2102.4



CLEAN-OUT 510



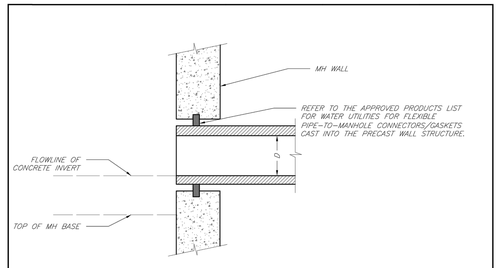
STANDARD INSTALLATION
NOT TO SCALE



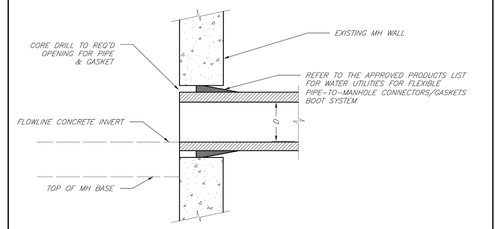
VERTICAL RISER
NOT TO SCALE

NOTES:
1. ALL SEWER STUBS SHALL BE CONSTRUCTED TO PROPERTY LINE OR 10' MINIMUM FROM THE MAIN. WHERE SIDEWALKS ARE PRESENT, CONTRACTOR SHALL EXTEND SERVICE LINE UNDER EXISTING SIDEWALK TO TWO FEET BEYOND.
2. ALL NEW CONSTRUCTION OFF SEWER STUBS SHALL BE TEMPORARILY MARKED WITH A MARKING STAKE, 36" ABOVE GROUND AND PAINTED GREEN.
3. IMPERVIOUS TRENCH CHECKS SHALL BE PLACED ON BUILDING SEWER STUBS (AT LEAST 5' AWAY FROM THE SANITARY SEWER MAIN).
4. TRENCH CHECKS ON THE BUILDING SEWER STUBS SHALL EXTEND 6" BELOW THE BOTTOM OF THE PIPE. LENGTH SHALL BE A MINIMUM OF 12". THE HEIGHT OF THE TRENCH CHECK SHALL EXTEND 12" ABOVE THE TOP OF THE PIPE. THE WIDTH OF THE TRENCH CHECK SHALL BE THE WIDTH OF THE TRENCH.
5. SEE SPECIFICATION SECTION 2100 FOR SEWER MAIN BEDDING AND BACKFILL.
6. #12 GAUGE GREEN INSULATED COPPER TRACER WIRE SHALL BE INSTALLED. TRACER WIRE TERMINAL BOXES SHALL BE INSTALLED DIRECTLY ABOVE THE SEWER SERVICE OR AS DETERMINED BY THE ENGINEER.
7. FOR SERVICES, TRACER WIRE SHALL RUN FROM THE WYE AND TERMINATE IN A FLUSH MOUNTED TRACER BOX WITH A GREEN CAST IRON LOCKABLE TOP. WIRE SHALL BE TAPED OR TIED TO THE PIPE AT 5' INTERVALS.
8. TRACER WIRE BOX SHALL BE INSTALLED WITHIN 1.0' OF PROPERTY LINE.
9. THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

LEE'S SUMMIT MISSOURI PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063	Date: 04/17 Drawn By: MJF Checked By: DL
BUILDING SEWER STUB AND RISER	SAN-1



NEW MANHOLE



EXISTING MANHOLE

LEE'S SUMMIT MISSOURI PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063	Date: 02/13 Drawn By: JN Checked By: DL FILE: SAN-5
MANHOLE WALL CONNECTIONS	Rev: 1/14 Rev:

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Lee's Summit Robotics, GiC & Phys Educaiton

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LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

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KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PROJ. NO. C21_1241
CFN: 1241DET
DSN: CJC
DWN: NJN

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

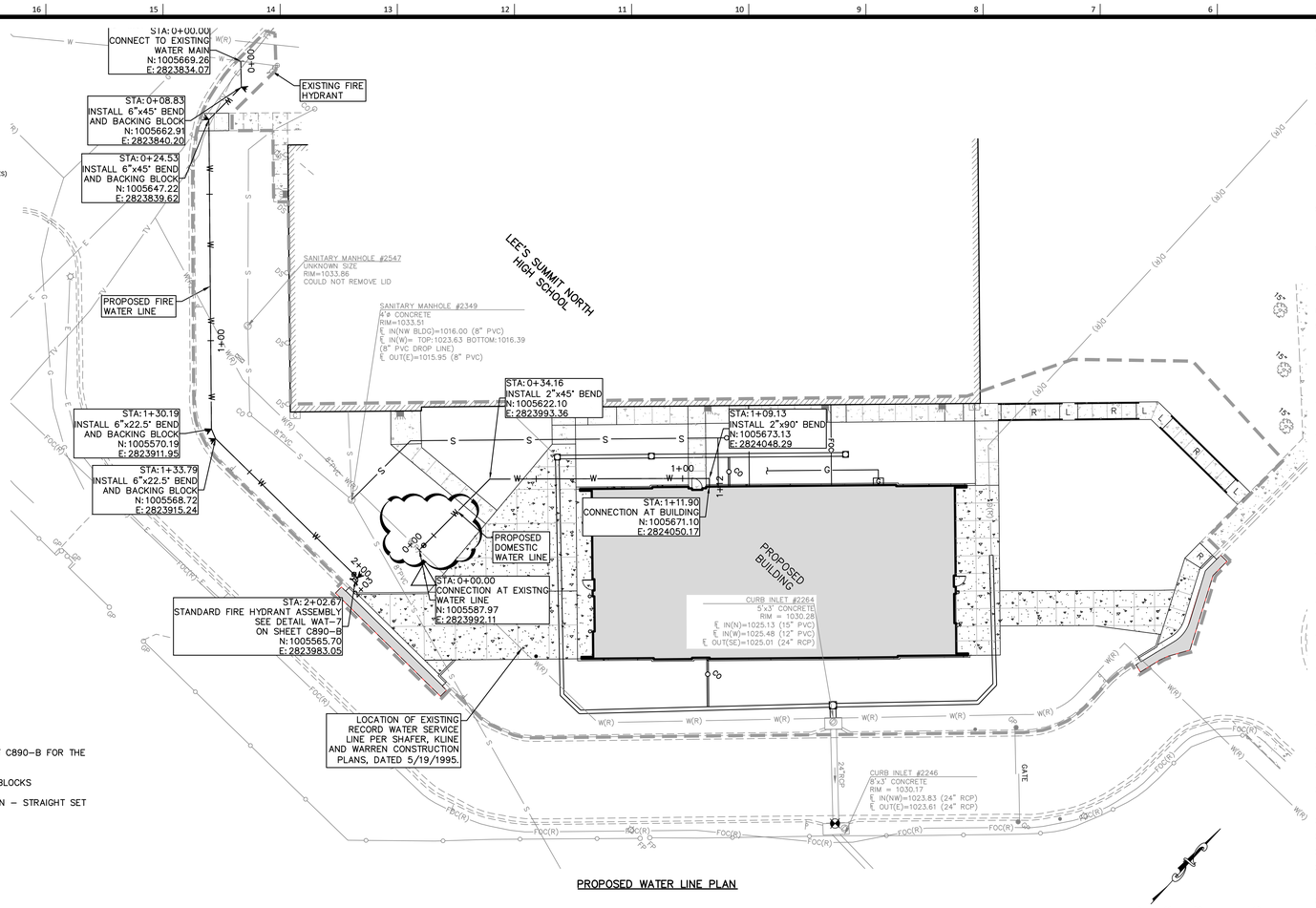
LSN SANITARY DETAILS

C790-B

PRINT DATE/TIME: 11/22/2022 4:01 PM

LEGEND

●	1/2"x24" REBAR W/A.S 214F CAP SET (UNLESS NOTED OTHERWISE)	FF	FINISH FLOOR ELEVATION
▮	CURB-CHIP		FIRE HYDRANT
✢	CUT "+" SET		CHAIN LINK FENCE
(CM)	CALCULATED MEASURED VALUE		PVC FENCE
(M)	MEASURED VALUE		GUY ANCHOR
(D)	DEED VALUE		HANDICAP SYMBOL
(P)	PLAT VALUE	3	PARKING STALL COUNT
⊡	CONTROL POINT		HANDICAP SIGN
○	MONUMENT FOUND (ORIGIN UNCERTAIN)		LIGHT POLE
			UTILITY POLE
	BENCHMARK		UTILITY POLE W/ TRANSFORMER
	AIR CONDITIONER		OVERHEAD UTILITY LINE (# OF LINES)
	BREAKER BOX	P	PULL BOX
	BASKETBALL GOAL		EXISTING SPOT ELEVATION
BHE	BUILDING HEIGHT/ELEVATION		EXISTING GRADE 5' CONTOUR
	BUSH		EXISTING GRADE 1' CONTOUR
	SANITARY SEWER CLEAN OUT		FIBER OPTIC CABLE SIGN
	DOWN SPOUT		STREET/TRAFFIC SIGN
	CANOPY SUPPORT		BUSINESS/BILLBOARD SIGN
	CONIFEROUS TREE		SANITARY SEWER MANHOLE
DE	DOOR ELEVATION AT THRESHOLD		WHEEL STOP
	DECIDUOUS TREE		WATER METER
	ELECTRIC BOX		WALL MOUNTED LIGHT
CONC	CONCRETE		WALL MOUNTED CAMERA
L/S	LANDSCAPING AREA		WATER LINE GATE VALVE
	ELECTRIC METER		FENCE POST
			WALL MOUNTED VENT
			GRATE INLET

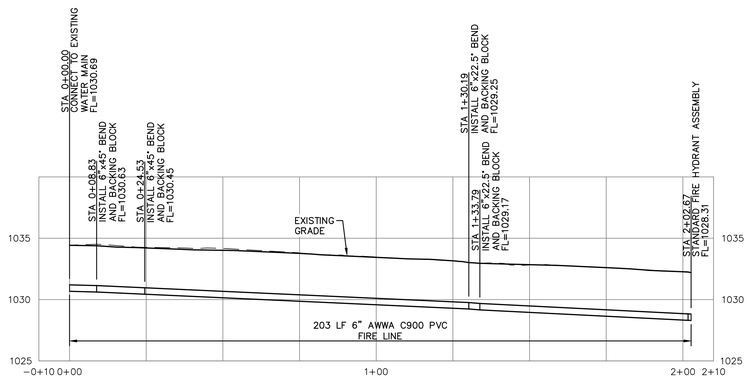


PROPOSED WATER LINE PLAN

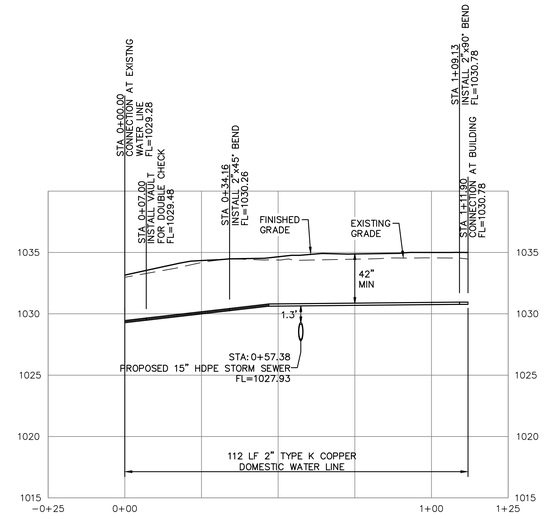
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'

UTILITY NOTES:

1. EXCAVATION, TRENCHING AND BACKFILL SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 2100 GRADING AND SITE PREPARATION OF THE KANSAS CITY METROPOLITAN CHAPTER OF APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
2. ALL BACKFILL SHALL BE TAMPED. BACKFILL WITHIN THE RIGHT-OF-WAY AND UNDER PARKING AREAS AND SLABS SHALL BE 95% COMPACTION OF OPTIMUM MOISTURE.
3. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH, OR ATTACH ANY PIPE OR HOSE TO OR TAP ANY WATER MAIN BELONGING TO THE CITY OF LEE'S SUMMIT UNLESS DULY AUTHORIZED TO DO SO. ANY ADVERSE CONSEQUENCE OF ANY SCHEDULED OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE TO BE THE LIABILITY OF THE CONTRACTOR. **KAW VALLEY ENGINEERING AND OWNER ARE TO BE HELD HARMLESS.** CONTRACTOR SHALL NOTIFY THE KCMO WSD 48 HOURS MINIMUM.
4. CONTRACTOR TO INSTALL TRACING TAPE ALONG ALL NON-METALLIC SERVICE LINES PER SPECIFICATIONS.
5. CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICT AND POINTS OF CONNECTION PRIOR TO ANY CONSTRUCTION OF NEW UTILITIES.
6. A MINIMUM HORIZONTAL DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN PARALLEL WATER AND SANITARY SEWER LINES. REFERENCE APWA SPECIFICATIONS AS ADOPTED AND AMENDED BY THE CITY OF LEE'S SUMMIT.
7. CONTRACTOR TO SCHEDULE ALL INSPECTIONS FOR SEWER MAIN CONNECTIONS THROUGH THE PUBLIC WORKS DEPARTMENT.



PROPOSED 6" FIRE WATER LINE PROFILE



PROPOSED 2" DOMESTIC WATER LINE PROFILE

WATER LINE MATERIALS AND CONSTRUCTION NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH SECTION 3900 WATER MAINS OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS, CURRENT EDITION.
2. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH, OR ATTACH ANY PIPE OR HOSE TO OR TAP ANY WATER MAIN BELONGING TO CITY OF LEE'S SUMMIT UTILITIES DEPARTMENT UNLESS DULY AUTHORIZED TO DO SO BY THE WATER DISTRICT. ANY ADVERSE CONSEQUENCE OF ANY SCHEDULED OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE TO BE THE LIABILITY OF THE CONTRACTOR. KAW VALLEY ENGINEERING AND OWNER ARE TO BE HELD HARMLESS. CONTRACTOR SHALL PROVIDE A MINIMUM OF 48 HOURS NOTICE TO THE CITY OF LEE'S SUMMIT WATER UTILITIES OPERATIONS DEPARTMENT PRIOR TO STARTING ANY WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING REQUIRED PERMITS, PAYING ALL FEES AND FOR OTHERWISE COMPLYING WITH ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
4. THE UTILITIES AS SHOWN ON THESE DRAWINGS WERE DEVELOPED FROM THE BEST INFORMATION AVAILABLE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES (WHETHER SHOWN OR NOT) AND PROTECT SAID UTILITIES FROM ANY DAMAGE. CONTRACTOR SHALL POTHOLE AND EXPOSE ALL UTILITIES AT LEAST 500 FEET IN ADVANCE OF WATER MAIN CONSTRUCTION, DETERMINING THE DEPTH, SIZE, AND MATERIAL OF THE UTILITIES IN PROXIMITY TO THE PROPOSED WATER MAIN ALIGNMENT. DEFLECT PIPE TO MAINTAIN MINIMUM 5 FEET HORIZONTAL AND 18 INCH VERTICAL CLEARANCES BETWEEN PROPOSED WATER MAIN AND EXISTING UTILITIES. SEPARATION WITH NON-POTABLE LINES REQUIRES 18 INCH VERTICAL CLEARANCE, SEE CONST. NOTE 9.
5. THE CONTRACTOR SHALL FURNISH AND INSTALL, AT NO EXTRA COST, ALL FITTINGS AND RESTRAINING DEVICES REQUIRED TO PROVIDE PROPER HORIZONTAL AND VERTICAL ALIGNMENT FOR THE NEW WATER SERVICE, CONNECTING TO EXISTING WATER MAIN, AND INSTALLATION OF FIRE HYDRANTS AT THE PROPER LOCATION AND ELEVATION, WHETHER OR NOT THE FITTINGS ARE CALLED OUT ON THESE PLANS.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL, AT NO EXTRA COST, ALL TEMPORARY BLOW-OFF ASSEMBLIES, FITTINGS, AND RESTRAINING DEVICES NECESSARY FOR TEMPORARY CONNECTIONS FOR PRESSURE TESTING, CHLORINATING, DE-CHLORINATING, AND FLUSHING THE NEW WATER MAINS AND SERVICE LINES. THE CONTRACTOR SHALL REMOVE ANY CORPORATION COCKS USED FOR TESTING OR CHLORINATION AND REPLACE THEM WITH TAPERED BRASS PLUGS PRIOR TO PLACING NEW MAINS IN SERVICE.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING REQUIRED PERMITS, PAYING ALL FEES AND FOR OTHERWISE COMPLYING WITH ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
8. ALL DISTURBED AREAS SHALL BE SEEDED, SODDED OR STABILIZED PER PROPOSED LANDSCAPE PLANS.
9. WHEN WATER MAINS AND SANITARY SEWERS CROSS, A MINIMUM OF 18 INCHES OF CLEARANCE SHALL BE MAINTAINED BETWEEN THE BOTTOM OF THE WATER MAIN AND THE TOP OF SANITARY SEWER. WHERE 18 INCHES OF CLEARANCE CANNOT BE MAINTAINED OR WHEN A WATER MAIN MUST CROSS UNDER A SANITARY SEWER, THE SANITARY SEWER SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE, PVC PRESSURE PIPE OR PRE-STRESSED CONCRETE CYLINDER PIPE FOR A DISTANCE OF 10.0 FEET ON EACH SIDE OF THE CROSSING. WHEN A WATER MAIN IS CONSTRUCTED PARALLEL TO A SANITARY SEWER, THE HORIZONTAL SEPARATION SHALL BE 10.0 FEET MEASURED FROM THE OUTSIDE OF THE PIPE OR STRUCTURE. IF A VERTICAL SEPARATION OF 18 INCHES CANNOT BE MAINTAINED AND IF THE WATER MAIN IS CONSTRUCTED CLOSER THAN 10.0 FEET TO THE SANITARY SEWER, THE SANITARY SEWER SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE, PVC PRESSURE PIPE OR PRE-STRESSED CONCRETE CYLINDER PIPE. AND SHALL BE PRESSURE TESTED FOR WATER TIGHTNESS.
10. CONTRACTOR SHALL FIELD CHECK ALL DIMENSIONS, COORDINATES AND ELEVATIONS BEFORE PROCEEDING WITH NEW WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES IMMEDIATELY. NO NEW CONSTRUCTION SHOULD BE PERFORMED BY "SCALING" FROM THE PLANS.
11. ALL EXCAVATION AND BACKFILL SHALL MEET OR EXCEED THE PROJECT SPECIFICATION. ALL TRENCHES SHALL BE BACKFILLED IN UNIFORM LIFTS NOT TO EXCEED 8 INCHES IN LOOSE MEASUREMENT. EACH LIFT SHALL BE COMPACTED TO THE REQUIRED DENSITY PRIOR TO THE NEXT LIFT BEING PLACED. THE BACKFILL MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT OF WITHIN A RANGE OF OPTIMUM TO BE 4 PERCENT ABOVE OPTIMUM MOISTURE CONTENT FOR SOILS WITH A LIQUID LIMIT OF GREATER THAN 40 AND +/-3% OF OPTIMUM FOR SOILS WITH A LIQUID LIMIT LESS THAN 40 AS DEFINED BY THE STANDARD PROCTOR (ASTM-D698) UNDER AREAS TO BE PAVED. THE BACKFILL MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY AT OPTIMUM MOISTURE, PLUS 4% IN AREAS NOT TO BE DEVELOPED. COMPACTION TESTS SHALL BE TAKEN AT EACH PAVEMENT CROSSING AND AT LOCATIONS DESIGNATED BY THE ENGINEER. ALL TRENCH BACKFILL WHICH DOES NOT MEET THE REQUIRED DENSITY, SHALL BE RE-EXCAVATED AND RE-COMPACTED UNTIL THE REQUIRED DENSITY IS OBTAINED. COPIES OF ALL COMPACTION TEST REPORTS SHALL BE PROVIDED TO THE ENGINEER.
12. NO ROCK LARGER THAN FOUR INCHES MAXIMUM DIMENSION SHALL BE PLACED WITHIN TWO FEET OF THE TOP OF THE PIPE. NO ROCK GREATER THAN ONE FOOT SHALL BE PLACED IN ANY EXCAVATION AS A BACKFILL.
13. LOCATIONS SHOWN FOR PROPOSED WATER LINES ARE APPROXIMATE. VARIATIONS MAY BE MADE, WITH APPROVAL OF THE ENGINEER TO AVOID CONFLICTS.
14. TAPS 1-1/2" AND LARGER AT EXISTING MAIN WILL BE RESPONSIBILITY OF THE CONTRACTOR. WORK WILL BE COORDINATED WITH THE WATER DISTRICT.
15. ALL PIPE SHALL BE DUCTILE IRON PIPE AND FITTINGS SHALL COMPLY WITH SECTIONS 3901 B & C OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARDS SPECIFICATIONS SUBJECT TO THE CITY'S CURRENTLY ADOPTED FIRE CODE. THICKNESS SHALL BE SPECIAL THICKNESS CLASS 50 FOR 6" AND LARGER PIPE, CLASS 52, FOR 3" AND 4" PIPE.
16. ALL POLYVINYL CHLORIDE PIPE AND FITTINGS SHALL COMPLY WITH SECTION 3901.B & D OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARDS SPECIFICATIONS SUBJECT TO RESTRICTION OF THE CITY'S CURRENTLY ADOPTED FIRE CODE. THE MINIMUM PRESSURE CLASS SHALL BE CLASS 235.
17. ALL DUCTILE IRON PIPE AND FITTINGS SHALL COMPLY WITH SECTIONS 3901 B & C OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARDS SPECIFICATIONS SUBJECT TO THE CITY'S CURRENTLY ADOPTED FIRE CODE. THICKNESS SHALL BE SPECIAL THICKNESS CLASS 50.
18. SERVICE LINES 2 INCHES IN DIAMETER AND SMALLER WITHIN 10 FEET OF THE METER INSTALLATION SHALL BE MADE OF TYPE K SOFT COPPER, COMPLYING WITH ASTM B88.
19. ALL VALVES AND OTHER MATERIALS SHALL CONFORM TO SECTIONS 3901 E THRU S. REFER TO THE CITY'S APPROVED MATERIALS LIST.
20. WHERE FIRE HYDRANTS ARE NOT LOCATED AT THE END OF LINES, THE CONTRACTOR SHALL FURNISH A FLUSHING DEVICE.
21. CONSTRUCTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 3902 OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.
22. WATER LINES SHALL HAVE A MINIMUM COVER OF 42". DEEPER EXCAVATIONS FOR CLEARANCE AT EXISTING PROPOSED UTILITIES IS ACCEPTABLE. REFERENCE CONST. NOTES 3 AND 8. FOR WATER MAINS CONSTRUCTED UNDER DRIVES OR PARKING AREAS THE DRIVES OR PARKING AREAS ARE TO BE TO SUBGRADE PRIOR TO WATER MAIN CONSTRUCTION.
23. ALL TREES SHALL BE SPARED UNLESS MARKED. REFERENCE PROJECT LAND DISTURBANCE PLANS.
24. THRUST BLOCKS OR APPROVED JOINT RESTRAINTS SHALL BE PROVIDED AT TEES, BENDS.
25. CONSTRUCTION INSPECTION WILL BE PROVIDED BY OWNER.
26. CONTRACTOR SHALL INSTALL PIPE, BENDS AND FITTINGS A NECESSARY TO MAKE A COMPLETE OPERATIONAL SYSTEM. LINE IS TO BE AS-BUILT. CONTRACTOR SHALL MAINTAIN "AS CONSTRUCTED DRAWINGS" TO BE SUPPLIED TO LEE'S SUMMIT SCHOOL DISTRICT NOTING VALVE AND FITTING LOCATIONS AT THE END PROJECT.
27. THE ABANDONMENT OF ALL SERVICE LINES SHALL BE IN ACCORDANCE WITH SECTION 3900 B.13 OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.
28. THE CONTRACTOR SHALL VERIFY THE OUTSIDE DIAMETER (O.D.) OF THE EXISTING WATER MAIN PRIOR TO SCHEDULING CONNECTION. PROVIDE SOLID SLEEVES AS REQUIRED.
29. THE CONTRACTOR SHALL FLUSH, DISINFECT AND COMPLETE HYDROSTATIC AND LEAKAGE TESTS ON WATER MAINS IN ACCORDANCE WITH SECTIONS 3902 C & D OF THE CITY OF LEE'S SUMMIT, MISSOURI STANDARD SPECIFICATIONS.

WARRANTY / DISCLAIMER

THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER KAW VALLEY ENGINEERING, INC NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE KAW VALLEY ENGINEERING PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.

SAFETY NOTICE TO CONTRACTOR

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

CAUTION – NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

Know what's **below.** **Call** before you dig.

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KAW VALLEY ENGINEERING

PROJ. NO. C21_1241 DSN: CJC
CFN: 1241WPP DWN: NJN

KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23

PRINT DATE/TIME: 11/22/2022 4:01 PM

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the evolution of gould evans

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

UNLESS A PROFESSIONAL SEAL WITH SIGNATURE AND DATE IS AFFIXED, THIS DOCUMENT IS PRELIMINARY AND IS NOT INTENDED FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

STATE OF MISSOURI
CHRISTIAN J. CROWDER
NUMBER
PE-2015000538
11-22-2022
PROFESSIONAL ENGINEER

Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

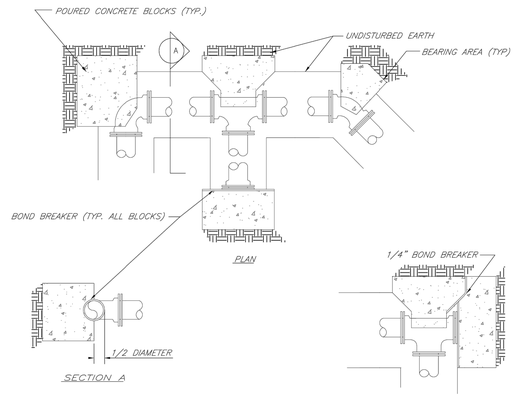
LSN WATER PLAN AND PROFILE

C800-B

REQUIRED CONCRETE BEARING AREA (SQUARE FEET – SF)

NOM. DIA. (INCHES)	180 TEE, PLUG	90 BEND	45 BEND	22.5 BEND	11.25 BEND
6	4.7	6.7	4.0	4.0	4.0
8	8.4	11.8	6.4	4.0	4.0
10	13.1	18.5	10.0	5.1	4.0
12	18.8	26.7	14.4	7.4	4.0
14	25.7	36.3	19.6	10.0	5.0
16	33.5	47.4	25.6	13.1	6.6
18	42.4	REST. JT.	32.5	16.5	8.3
20	REST. JT.	REST. JT.	40.1	20.4	10.3
24	REST. JT.	REST. JT.	REST. JT.	29.4	14.8

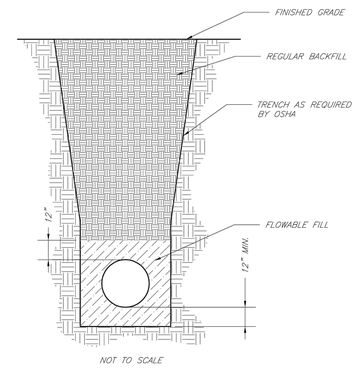
NOTES:
1. ALL BENDS WITHOUT RESTRAINED JOINTS SHALL HAVE CONCRETE THRUST BLOCKS INSTALLED FOR RESTRAINT.
2. MEGA LUGS MAY BE USED ONLY IN CONJUNCTION WITH CONCRETE THRUST BLOCKING.
3. BEARING AREA MUST BE AGAINST UNDISTURBED SOIL.
4. DO NOT COVER JOINTS OR BOLTS (WHERE APPLICABLE) WITH CONCRETE.



LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

HORIZONTAL THRUST BLOCKS

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-1
Rev: 1/14
Rev:



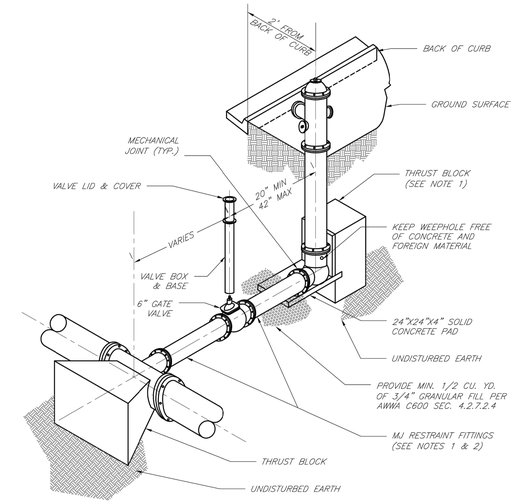
NOT TO SCALE

NOTES:
1. FLOWABLE FILL SHALL MEET THE REQUIREMENTS OF THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL.
2. REGULAR BACKFILL ABOVE THE TRENCH CHECK SHALL BE FREE OF DEBRIS, ORGANIC MATTER, AND STONES > 6" IN ANY DIMENSION.
3. TOP OF FLOWABLE BACKFILL SHALL EXTEND 12" ABOVE THE TOP OF THE PIPE.
4. LENGTH OF TRENCH CHECK SHALL BE A MINIMUM OF 12".

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

TRENCH CHECK

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-6
Rev: 1/14
Rev:



NOTES:

1. WHEN RETAINER GLANDS ARE USED IN LIEU OF MECHANICAL JOINT (MJ) RESTRAINT FITTINGS, HORIZONTAL THRUST BLOCKS ARE REQUIRED.
2. GATE VALVE MAY BE BOLTED DIRECTLY TO MJ RESTRAINT TEE.
3. SEE APPROVED PRODUCTS LIST FOR WATER UTILITIES FOR FIRE HYDRANT, VALVES, VALVE BOX LID, AND COVER.
4. BOTTOM HYDRANT FLANGE SHALL BE 2" TO 6" ABOVE FINISHED GRADE.
5. FOR STREETS WITHOUT CURBS FIRE HYDRANTS SHALL BE PLACED WITHIN 1 FOOT OF THE R/W LINE, BUT NOT MORE THAN 10' FROM EDGE OF PAVEMENT. FIRE HYDRANT SHALL NOT BE PLACED IN BOTTOM OF DITCH.
6. HYDRANT SHALL BE ROTATED AS DIRECTED BY INSPECTOR.

LEE'S SUMMIT
MISSOURI
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

HYDRANT INSTALLATION – STRAIGHT SET

Date: 02/13
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Rev: 1/14
Rev:

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Lee's Summit Robotics, GiC & Phys Educaiton

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
Lee's Summit R-7 School
301 NE Tudor Road
Lee's Summit, MO 64086

architect:
Multistudio
4200 Pennsylvania
Kansas City, MO 64111
816.931.6655
multi.studio

civil engineer:
Kaw Valley Engineering
14700 West 114th Terrace
Lenexa, KS 66215
913.485.0318
kveng.com

structural engineer:
Bob D. Campbell &
4338 Belleview
Kansas City, MO 64111
816.531.4144
www.bdc-engrs.com

MEPFT/Code::
Henderson Engineers
8345 Lenexa Drive, Suite 300
Lenexa, KS 66214
816.742.5000
www.hendersonengineers.com

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	ASI 01 - CODE COMMENTS	11/22/2022

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Kaw Valley Engineering, Inc.
Missouri Certificate of Authority: 000842
Christian Crowder Date: 11/22/2022
Engineer License No. PE-2015000538

LSN WATER LINE DETAILS

C890-B

PROJ. NO. C21_1241
CFN: 1241DET
DSN: CJC
DWN: NJN

CHRISTIAN J CROWDER
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MO # 2015000538

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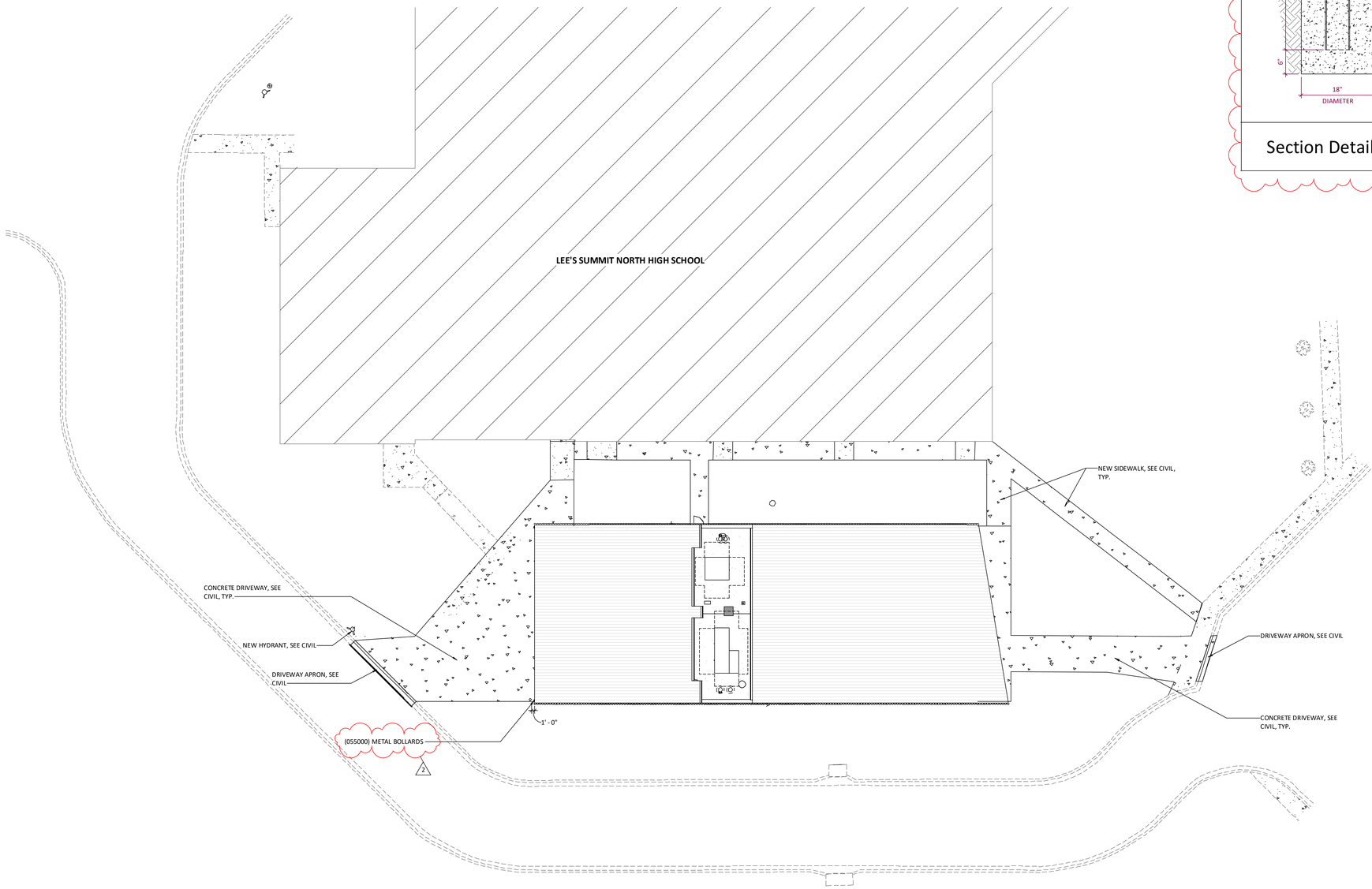
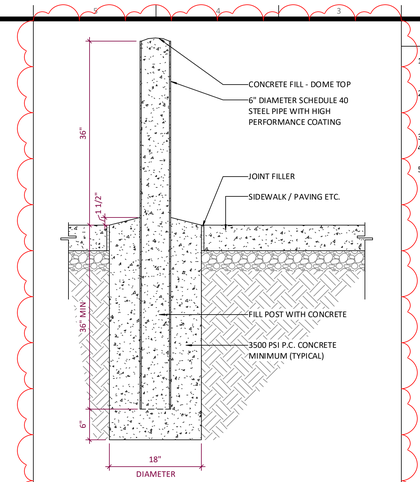
KAW VALLEY ENGINEERING

KAW VALLEY ENGINEERING, INC., IS AUTHORIZED TO OFFER ENGINEERING SERVICES BY MISSOURI STATE CERTIFICATE OF AUTHORITY # 000842. EXPIRES 12/31/23



Architectural Site Plan - LSN A3
1/16" = 1'-0"



Section Detail - Pipe Bollard K3
1" = 1'-0"

2

General Notes (Site Plan):

1. COORDINATE ALL SPOT ELEVATIONS AND DIMENSIONS WITH CIVIL/LANDSCAPE/STRUCTURAL DRAWINGS
2. PROVIDE POSITIVE DRAINAGE OF 1% MINIMUM / 2% MAXIMUM AT ALL EXTERIOR PAVED PEDESTRIAN AREAS SUCH AS SIDEWALKS, PATIOS, STAIRS, ETC. UNLESS NOTED OTHERWISE
3. PROVIDE POSITIVE DRAINAGE AWAY FROM THE
4. BUILDING OF 5% FOR A DISTANCE OF 10 FEET UNLESS NOTED OTHERWISE.
5. FINISH GRADE SLOPES SHALL BE NO STEEPER THAN 1 FOOT VERTICAL IN 3 FEET HORIZONTAL UNLESS NOTED OTHERWISE.

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NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

LSN - Architectural Site Plan

AS100-B

GENERAL NOTES - STRUCTURAL

1. General Information

A. The contractor shall verify dimensions and conditions before construction and notify the engineer of any discrepancies, inconsistencies, or difficulties affecting the work before proceeding.
B. The contractor shall coordinate all disciplines, verifying size and location of all openings, whether shown on structural drawings or not, as called for on architectural, mechanical, or electrical drawings. In the case of work in an existing building the contractor shall scan existing structure to locate all rebar in the area of the new core/opening using ground penetrating radar and notify the engineer of record for review prior to coring/cutting. Conflicts, inconsistencies, or other difficulties affecting structural work shall be called to the architect or engineer's attention for direction before proceeding.
C. All design and construction work for this project shall conform to the requirements of the following governing design codes:
   1. International Building Code (IBC 2018) as amended by the city of Lee Summit, MO
   2. Minimum Design Loads for Buildings and Other Structures (ASCE7-16)
   3. Specification for Structural Steel Buildings (AISC 360-16)
      Member Design Basis is Allowable Stress Design (ASD)
      Connection Design Basis is Allowable Stress Design (ASD)
   4. Structural Welding Code (AWS D1.4-2017)
   5. Building Code Requirements for Structural Concrete (ACI 318-14)
   6. Building Code Requirements for Masonry Structures (TMS 402-2016)
   7. North American Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-16)
D. These drawings are for this specific project and no other use is authorized.

2. Structural Load Design Criteria

A. Roof Live = 30 psf; Roof Dead = 25psf
B. Snow: Pg = 20psf, Pf =14psf, Is = 1.0, Ce = 1.0, Ct = 1.0, Drift per ASCE/SEI 7
C. Lateral Loads:
   1.) Wind: V = 109 mph, Exposure C
      Occupancy [Risk] Category II, Iw=1.0 GCpi=+/-0.18
      Design wind pressures to be used for the design of exterior component and cladding materials on the designated zones of wall and roof surfaces shall be per section 30.7 and Table 30.7-2 of ASCE/SEI 7. Tabulated pressures shall be multiplied by effective area reduction factors, exposure adjustment factors, and topographic factors where applicable
   2.) Seismic: Ss = 0.101, S1 = 0.069
      Occupancy [Risk] Category II, Ie=1.0,
      Site Classification D; Sds = 0.108; Sd1 = 0.110
      Seismic Design Category B
      Basic Seismic Force-resisting System:
      Steel system not specifically detailed for seismic resistance
      Equivalent Lateral Force Procedure
      R = 3; V = 0.036W; Omega = 3; Cd= 3
D. This project is designed to resist the most critical effects resulting from the load combinations of section 1605.3 of the International Building Code.

3. Concrete

A. All concrete for foundations (walls, grade beams, footings and piers) shall develop minimum ultimate compressive design strength of 3500 psi in 28 days, but not less than 500 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 6 gallons of water per 100 pounds of cement and not over 4 inches of slump.
B. All concrete for interior flatwork (without floor covering) shall develop minimum ultimate compressive design strength of 4000 psi in 28 days, but not less than 525 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 5.75 gallons of water per 100 pounds of cement and not over 4 inches of slump. Concrete mix shop drawing shall contain testing data proving concrete design mix shrinkage is less than 0.034% at 28 days when tested according to ASTM C157 (air drying method only).
C. All concrete for interior flatwork (with floor covering) shall develop minimum ultimate compressive design strength of 4000 psi in 28 days, but not less than 540 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 5.40 gallons of water per 100 pounds of cement and not over 4 inches of slump. Concrete mix shop drawing shall contain testing data proving concrete design mix shrinkage is less than 0.034% at 28 days when tested according to ASTM C157 (air drying method only).
D. All concrete for exterior flatwork shall have a minimum design compressive strength of 4500 psi in 28 days, with not less than 560 pounds of cement per cubic yard of concrete, not over 5 gallons of water per 100 pounds of cement, with 6% +/- 1% air entrainment, and a maximum of 4 inches of slump.
E. The preceding minimum mix requirements may have water-reducing admixtures conforming to ASTM C494 added to the mix at manufacturer's dosage rates for improved workability.
F. The preceding minimum mix requirements may have up to 15% maximum of the cement content replaced with an approved ASTM C618 Class C fly ash, provided the total minimum cementitious content is not reduced.
G. Combined aggregate (coarse plus fine) for all concrete shall be well graded from coarsest to finest with no more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 and finer sieves. Submit this gradation report with the concrete mix design shop drawings.
H. All interior concrete slabs on grade shall be placed over 15 mil, Class A Vapor Barrier per ASTM E1745 with less than 0.01 perms, tested after mandatory conditioning. All joints shall be lapped and sealed per manufacturer's recommendations. All penetrations, as well as damaged vapor barrier material shall also be sealed per manufacturer's recommendation prior to concrete placement. Install barrier per manufacturer recommended details at all discontinuous edges (at interior columns, exterior edge of slab, etc.) to ensure terms of warranty are followed. The vapor barrier shall be placed over free-draining granular material as prescribed by the project soils report.
I. All concrete is reinforced concrete unless specifically called out as unreinforced. Reinforce all concrete not otherwise shown with same steel as in similar sections or areas. Any details not shown shall be detailed per ACI 315 and meet requirements of ACI 318, current editions.
J. Control joints in dirt formed slab to be as shown on plans. Where not shown, limit controlled areas to not more than 144 square feet, or 12 feet on any side. Slab panel side ratio shall not exceed 1 1/2 to 1.
K. Contractor shall verify that all concrete inserts, reinforcing and embedded items are correctly located and rigidly secured prior to concrete placement.
L. Construction joints in beams, slabs, and grade beams shall occur at midspan (middle third) unless noted otherwise. Provide 2 x 4 horizontal keys at construction joints for shear transfer.
M. No aluminum items shall be embedded in any concrete.

4. Reinforcing Steel

A. All reinforcing steel shall conform to the requirements of ASTM A615 or A706 grade 60 steel. Welded plain wire fabric shall be supplied in sheets and conform to the requirements of ASTM A185.
B. Clear coverage of concrete over reinforcing steel shall be as follows:
   1. Concrete placed against earth: 3"
   2. Formed concrete against earth: 2"
   3. Slabs: 1"
   4. Beams or Columns: 1-1/2"
   5. Other 2"
   All coverage shall be nominal bar diameter minimum.
C. All dowels shall be the same size and spacing as adjoining main bars (splice lap 48 bar diameters or 24" minimum unless noted otherwise).
D. At corners of all walls, beams, and grade beams supply corner bars (minimum 2'-0" in each direction or 48 bar diameters) in outside face of wall, matching size and spacing of horizontal bars. Where there are no vertical bars in outside face of wall, supply 3 - #4 vertical support bars for corner bars.
E. Bars marked continuous and all vertical steel shall be lapped 48 bar diameters (2'-0" minimum) at splices and embedments, unless shown otherwise. Splice top bars near midspan and splice bottom bars over supports, unless noted otherwise.
F. At all holes in concrete walls and slabs, add 2 - #5 bars (opening dimension plus 96 diameters long) at each of four sides and add 2 - #5 x 5'-0" diagonally at each of four corners of hole. Openings in 8" thick walls are reinforced similar, but with 1 - #5 instead of 2 - #5, respectively.
G. Unless otherwise covered on architectural plans or specifications, vertical control joints in concrete wall shall be spaced at a maximum of 20'-0" on center and coordinated with the architect. Every other horizontal wall reinforcing bar shall be discontinuous at control joints except heavy top and bottom bars unless noted otherwise. Provide base seal waterstop style number 772 (by Greenstreak Inc. or approved equal) on dirt face side of wall at all walls below grade.
H. Accessories shall be as specified in latest edition of the ACI Detailing Handbook and the concrete Reinforcing Steel Institute Design Handbook. Maximum accessory spacing shall be 4'-0" on center, and all accessories on exposed surfaces are to have plastic coated feet.
I. All slabs and stairs not shown otherwise shall be 6" thick with #4 bars at 12" on center each way. All exterior porches and stoops not otherwise detailed may be constructed in any standard manner, solid or hollow, but must be reinforced with #4 bars at 12" on center each way minimum. Porches shall be doweled to adjacent walls or grade beams with #4 bars at 12" on center, hooked or embedded 48 diameters into both members. Slope porches 1/8" per foot for drainage unless noted otherwise.
J. Allow 2 ton of reinforcing bars #4 or larger to be used as directed in the field for special conditions by the engineer of record (labor for placing same to be included).

5. Structural Steel

A. All structural steel beams and columns shall be ASTM A992, grade 50 steel and all miscellaneous steel shall be ASTM A36 grade steel (except at moment connections where plates shall be ASTM A572, grade 50). Hollow Structural Sections (HSS) shall be ASTM A500, grade C. Fabrication and erection shall be in accordance with AISC 303-05 "Code of Standard Practice for Steel Buildings and Bridges" in the 13th Edition of the AISC Steel Construction Manual.
B. All welding shall conform to the recommendations of the AWS.
C. All exterior steel and connections, and brick relief angles shall be hot-dip galvanized.
D. All bolts not otherwise specified shall be 3/4" diameter high strength (ASTM A325-N). All bolts shall be fully pretensioned. All beam connections shall be designed per the AISC Manual of Steel Construction "Framed Beam Connections" for the indicated reactions or at least 0.4 x beam total shear capacity, Vn/Omega, shown in the maximum total uniform load tables, whichever is greater; and, shall account for eccentricity when the bolt line is more than 2" from the center of the support. All connections must be two bolt minimum. Additional connection elements may not be specifically shown in the conceptual details in this set but may be required by the final connection design, such as stiffener plates, doubler plates, supplement/reinforcing plates or other connection material. Connection design and shop drawing preparation shall be completed under the direct supervision of a professional engineer licensed in the state the project is located and shop drawings and connection calculations shall bear his/her seal.
E. All anchor bolts shall be 3/4" diameter, ASTM F1554, Grade 36 unless noted otherwise. Washers of minimum size and thickness for the given anchor diameter in Table 14-2 of the AISC Steel Construction Manual shall be provided at every column anchor bolt. Washers shall have a standard size hole for the anchor bolt. At braced frames washers shall be welded all around to the column base plate with 3/16” fillet weld.
F. All openings in steel beam roof to have L6x4x5/16 (LLV) frame set between beams. Support mechanical equipment with L6x4x3/8 (LLV) frame laid between beams
G. Design and installation of steel decking shall comply with the recommendations of the Steel Deck Institute (SDI). All decking shall be galvanized unless noted otherwise.
H. Allow 2.0 tons structural steel to be used as directed in field for special conditions by the engineer of record. Cost for shop drawings, fabrication, delivery, detailing, and erection to be included. 50% of structural steel allowance shall be bid as miscellaneous galvanized angle and plate.

6. Post Installed Anchors

A. Post-installed anchors shall be used only where specified on the drawings unless approved in writing by the engineer of record. See drawings for anchor diameter, spacing and embedment. Performance values of the anchors shall be obtained for specified products using appropriate design procedures and/or standards as required by the governing building code. Anchors installed in concrete shall have an ICC-ES Evaluation Service Report. Special inspection is required for all post installed anchors. The contractor shall coordinate an on-site meeting with the post installed anchor manufacturer field representative to educate the construction team on the anchor installation guidelines and requirements.
B. Mechanical anchors used in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ACI 355.2 and ICC-ES AC193. All anchors shall be installed per the anchor manufacturer's written instructions.
C. Adhesive anchors used in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ICC-ES AC308. All anchors shall be installed per the anchor manufacturer's written instructions.
D. Mechanical anchors used in solid grouted masonry shall have been tested and qualified for use in accordance with ICC-ES AC01. All anchors shall be installed per the anchor manufacturer's written instructions.
E. Adhesive anchors used in solid grouted masonry shall have been tested and qualified for use in accordance with ICC-ES AC58. All anchors shall be installed per the anchor manufacturer's written instructions.
F. Anchors used in hollow concrete masonry shall have been tested and qualified in accordance with ICC-ES AC106 or ICC-ES AC58 as appropriate. All anchors shall be installed per the anchor manufacturer's written instructions with appropriate screen tubes used for adhesives.

7. Foundations

Lee's Summit North:
A1. The soil investigation was prepared by Cook, Flatt & Strobel Engineers, P.A., the report number is 22-5545 and the telephone number is 913-627-9040.
B1. Spread footings and grade beams are designed to bear on engineered fill or undisturbed soil capable of safely sustaining 2,500 psf.
Lee's Summit West:
A2. The soil investigation was prepared by Cook, Flatt & Strobel Engineers, P.A., the report number is 22-5547 and the telephone number is 913-627-9040.
B2. Spread footings and grade beams are designed to bear on engineered fill or undisturbed soil capable of safely sustaining 3,000 psf.
C. Contractor shall provide for dewatering at excavations from either surface water or seepage.
D. All foundation excavations shall be inspected by a qualified soil engineer, approved by the architect and/or structural engineer, prior to placement of steel or concrete. This inspection shall be at the owner's expense.
E. All concrete in the structural portion retaining the backfill shall have attained its design strength prior to being backfilled.
F. Moisture content in soils beneath building locations should not be allowed to change after footing excavations and after grading for slabs on grade are completed. If subgrade materials become desiccated or softened by water or other conditions, recompact materials to the density and water content specified for engineered fill. Do not place concrete on frozen ground.

8. Concrete Masonry Units

A. Concrete block used in exterior walls or load bearing walls shall meet the requirements of ASTM C90 and have a minimum net compressive strength of 2650 psi and laid up using type N mortar such that f'm equals 2000 psi. Mortar shall be volume proportion based cement lime mortar. Proportioning shall be completed by box measure. Any block in contact with earth shall be normal weight units, laid using type "S" mortar and grouted solid.
B. The contractor shall provide adequate temporary bracing for all masonry walls during construction.
C. All concrete block shall have 9 gage (or larger) horizontal joint reinforcing (ladder or truss) per architectural drawings and specifications (16" maximum vertical spacing).
D. Cavity wall construction shall be reinforced as designed for specific concrete block used. The horizontal joint reinforcing shall be of the ladder or truss style per specification and continuous between brick and block, as prescribed by the architectural drawings.
E. Concrete block shall be reinforced as follows in 6", 8", 10", and 12" walls:
   1. Vertical reinforcing shall be a minimum of 1 - #4 bar in 6" and 8" walls and 2 - #4 bars in 10" and 12" walls at 4'-0" on center, at each corner, at each door and window jamb, each side of control joints and in the end void of each length of wall. Lap splices for masonry vertical reinforcing shall be 48 bar diameters, 24" minimum.
   2. Horizontal reinforcing:
      A. Horizontal joint reinforcing as noted above.
      B. Continuous horizontal bars shall be included per section or detail in bond beam or optional running bond beam where noted. Where bond beams are continuous at corners of walls, supply corner bars matching size of horizontal bars (minimum 2'-0" or 40 bar diameters in each direction).
F. Grout, where noted above, shall have a minimum design ultimate compressive strength of 2500 psi at 28 day test and 3/8" maximum aggregate size.
G. Non-load bearing concrete block walls shall be isolated from adjacent structural elements with vertical 3/8" control joints and at the top of the wall with 1" air space or compressible material and support per architectural detail.
H. Unless otherwise covered on architectural plans or specifications, vertical control joints in masonry construction shall be 3/8" wide, full height of wall. Joints shall be spaced at a maximum of 24'-0" on center and coordinated with the architect. All horizontal joint reinforcing shall be discontinuous at control joints in masonry. All bond beam horizontal reinforcing shall be continuous through control joints.
I. Lintels over all openings up to 8'-0" wide in new and existing masonry walls not otherwise covered shall be one 6x3 1/2x5/16 angle for each 4" width of masonry. All exterior lintels to be galvanized.
J. Walls shall be anchored top and bottom by dowels matching wall vertical reinforcing(unless noted otherwise) from floor slab bottom and bracing angles at the top, per details on the drawings.

9. Light Gage Metal Structural Framing

A. All load bearing, light gage structural studs, track, and bridging shall be of the type, size, gage, and spacing as shown on the plans, minimum.
B. All materials shall be 33,000 psi minimum yield, except studs of 16 gage or heavier shall have a minimum yield of 50,000 psi.
C. All properties, fabrication, and erection shall be in accordance with latest editions of the AISI "Specifications for the Design of Cold-Formed Structural Members."
D. All framing components shall be cut squarely or at an angle to fit squarely against abutting members. Splicing of axially loaded members is not permitted. Members shall be held firmly in place until properly fastened. Attachments of similar components shall be by welding, screw attachment, or bolting. Wire tying of components is not permitted.
E. Tracks shall be securely anchored to floor and overhead members. Special anchorage requirements required for wind bracing shall be as shown on the plans.
F. Prior to fabrication and/or erection, the contractor shall submit shop drawings complete with detail of erection, fabrication, attachments, anchorages, lintels, etc., for review by the architect/engineer.

10. Deferred Submittal and Shop Drawing

A. Bob D. Campbell and Company, Inc. will review the General Contractor’s (GC) shop drawings and related submittals (as indicated below) with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall structural system designed by Bob D. Campbell and Company, Inc.
B. Deferred submittals shall be submitted to the architect of record for review who shall forward to the building official for review and approval. Design calculations for deferred sub mittals shall be submitted at the same time as the shop drawings for review. Design calculations shall be prepared and sealed by a Professional Engineer licensed in the state of the project. The deferred submittal items shall not be installed until the deferred submittal documents have been approved by the building official.
C. Prior to submittal of a shop drawing or any related material to Bob D. Campbell and Company, Inc., the GC shall:
   1. Review each submission 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 GC.
   2. Review and approve each submission.
   3. Stamp each submission as approved.
D. Bob D. Campbell and Company, Inc. shall assume that no submission comprises a variation unless the GC advises Bob D. Campbell and Company, Inc. with written documentation.
E. Bob D. Campbell and Company, Inc. shall review shop drawings and related materials with comments provided that each submission has met the above requirements. Bob D. Campbell and Company, Inc. shall return without comment unrequired material or submissions without GC approval stamp.
F. Shop drawings and related material (if any) required are indicated below. Should Bob D. Campbell and Company, Inc. require more than ten (10) working days to perform the review, Bob D. Campbell and Company, Inc. shall so notify the GC.
   1. Concrete mix designs and material certificates including admixtures and compounds applied to the concrete after placement.
   2. Reinforcing steel shop drawings including erection drawings and bending details.Bar list will not be reviewed for correct quantities.
   3. Elevations of all reinforced concrete masonry walls at a scale no smaller than 3/8" = 1’-0" showing all required reinforcing.
   4. Grout mix designs (for CMU).
   5. Construction and control joint plans and/or elevations.
   6. Structural steel shop drawings including erection drawings and piece details. Include joist, decking and connector submittals. Include miscellaneous framing specified on the structural drawings, but do not submit framing specified on non-structural drawings for Bob D. Campbell and Company, Inc. review.
   7. Deferred Submittal: Exterior curtain wall
   8. Deferred Submittal: Structural steel connection design calculations submitted concurrently with structural steel shop drawings.
   9. Miscellaneous anchors shown on the structural drawings.
   10. Deferred Submittal: Light gage framing design calculations and detailed erection and fabrication drawings.

11. Statement of Structural Special Inspections

A. The structural design for this project is based on completion of special inspections during construction in accordance with section 1704 of the International Building Code. The owner shall employ one or more qualified special inspectors to provide the required special inspections.
B. The special inspector shall furnish inspection reports to the building official, owner, architect and structural engineer, and any other designated person.
C. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority, building official and structural engineer.
D. The special inspector shall submit a final signed report stating that 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 building code.
E. The following inspections and tests are required with the frequency (continuous or periodic) as defined within the referenced section or standard listed below. The General Contractor shall provide notification to the inspector when items requiring inspection are ready to be inspected and provide access for those inspections.
   1. Shop Fabrication – structural steel and steel bar joist per Section 1704.2.5 unless AISC certified shop
   2. Steel Construction per Section 1705.2 and the quality assurance requirements of AISC 341 Chapter J (as referenced by AISC 360)
   3. Cold-Formed Steel Deck per Section 1705.2.2 and the quality assurance requirements of SDI QA/QC.
   4. Concrete Construction per Section 1705.3 and Table 1705.3
      a. Reinforcing Steel Placement
      b. Cast in Place Anchors
      c. Post Installed Anchors
      d. Design Mix Verification
      e. Concrete Sampling and Testing
      f. Concrete Placement
      g. Concrete Curing
   5. Masonry Construction per Section 1705.4 and the quality assurance requirements of TMS 602 Level 2
   6. Verification of Soils per Table 1705.6

12. Copyright and Disclaimer

B. I, Wayne E. Davis, P.E., registered engineer and a representative of Bob D. Campbell and Company, Inc., do hereby accept professional responsibility as required by the professional registration laws of this state for the structural design drawings consisting of S-series drawings. I hereby disclaim responsibility for all other drawings in the construction document package, they being the responsibility of other design professionals whose seals and signed statements may appear elsewhere in the construction document package.

STRUCTURAL ABBREVIATIONS

@	AT	GA	GAGE	RAD	RADIUS
&	AND	GALV	GALVANIZE(D)	RD-#	ROOF DECK TYPE
Ø	ROUND, DIAMETER	GEN	GENERAL	REF	REFERENCE
ADTL	ADDITIONAL	GR	GRADE	REINF	REINFORCEMENT
AFF	ABOVE FINISHED FLOOR	HORIZ	HORIZONTAL	REQD	REQUIRED
ALT	ALTERNATE	HSS	HOLLOW STRUCTURAL SECTION	REV	REVISION
ARCH	ARCHITECTURAL	IF	INSIDE FACE	RLL	ROOF LIVE LOAD
BLDG	BUILDING	INFO	INFORMATION	RTU	ROOF TOP UNIT
B/	BOTTOM OF	INT	INTERIOR	SC	SLIP CRITICAL
BM	BEAM	JST	JOIST	SCHED	SCHEDULE(D)
BOTT	BOTTOM	JT	JOINT	SECT	SECTION
BRG	BEARING	K	KIPS (1000 LBS)	SHT	SHEET
C	CAMBER	KSF	KIPS PER SQUARE FOOT	SIM	SIMILAR
CD-#	CONCRETE DECK TYPE	KSI	KIPS PER SQUARE INCH	SJ	SAW JOINT
CJ	CONSTRUCTION/CONTROL JOINT	LBS, #	POUNDS	SL	SNOW LOAD
CJP	COMPLETE JOINT PENETRATION	Ld	DEVELOPMENT LENGTH	SOG	SLAB-ON-GRADE
CL	CENTERLINE	LL	LIVE LOAD	SOG-#	SLAB-ON-GRADE TYPE
CMU	CONCRETE MASONRY UNIT	LLH	LONG LEG HORIZONTAL	SPCG	SPACING
COL	COLUMN	LLV	LONG LEG VERTICAL	SPEC	SPECIFICATION
CONC	CONCRETE	LONG	LONGITUDINAL	SPRT	SUPPORT
CONN	CONNECTION	LSLT	LONG-SLOTTED HOLE TRANSVERSE	SQ	SQUARE
CONT	CONTINUOUS	LTWT	LIGHTWEIGHT	SS	STAINLESS STEEL
COORD	COORDINATE	M	MOMENT FORCE	SSLT	SHORT-SLOTTED HOLE TRANSVERSE
COV, CVR	COVER	MAX	MAXIMUM	STD	STANDARD
DBL	DOUBLE	MECH	MECHANICAL	STIFF	STIFFENER
DET	DETAIL	MFGR	MANUFACTURER	STIR	STIRRUP
DIA	DIAMETER	MIN	MINIMUM	STL	STEEL
DIM	DIMENSION	MISC	MISCELLANEOUS	STRUCT	STRUCTURE, STRUCTURAL
DL	DEAD LOAD	MSRY	MASONRY	T/	TOP OF
DWG	DRAWING	MTL	METAL	THRU	THROUGH
EA	EACH	NF	NEAR FACE	TOS	TOP OF STEEL, TOP OF SLAB
EF	EACH FACE	NS	NEAR SIDE	TRANS	TRANSVERSE
EJ	EXPANSION JOINT	NTS	NOT TO SCALE	TYP	TYPICAL
EL, ELEV	ELEVATION	NW	NORMAL WEIGHT	UNO	UNLESS NOTED OTHERWISE
EMBED	EMBEDMENT, EMBEDDED	OC	ON CENTER	V	SHEAR FORCE
ENGR	ENGINEER	OF	OUTSIDE FACE	VERT	VERTICAL
EOD	EDGE OF DECK	OPNG	OPENING	W/	WITH
EOR	ENGINEER OF RECORD	OPP	OPPOSITE	W/0	WITHOUT
EOS	EDGE OF SLAB	OVS	OVERSIZED HOLE	WF	WIDE FLANGE
EQ	EQUAL	P	AXIAL FORCE	WL	WIND LOAD
EQUIP	EQUIPMENT	PAF	POWDER ACTUATED FASTENER	WP	WORK POINT
EW	EACH WAY	PC	PRECAST	WWF	WELDED WIRE FABRIC
EXP	EXPANSION	PCF	POUNDS PER CUBIC FOOT		
EXT	EXTERIOR	PEMB	PRE-ENGINEERED METAL BUILDING		
EXTG, EXIST	EXISTING	PERP	PERPENDICULAR		
FD-#	FLOOR DECK TYPE	PL	PLATE		
FDN	FOUNDATION	PLF	POUNDS PER LINEAR FOOT		
FF	FAR FACE	PJP	PARTIAL JOINT PENETRATION		
FIN	FINISH	PSF	POUNDS PER SQUARE FOOT		
FLR	FLOOR	PSI	POUNDS PER SQUARE INCH		
FS	FAR SIDE	QTY	QUANTITY		
FTG	FOOTING				
FV	FIELD VERIFY				

LEGEND:

...... SPAN DIRECTION OF DECK

RD-1 ...... 3", 20ga GALVANIZED TYPE N ROOF DECK (3 SPAN CONTINUOUS) ATTACH TO STRUCTURE TO DEVELOP 325plf DIAPHRAGM SHEAR (ASD LOAD).

RD-2 ...... 2", 20ga GALVANIZED DEEP ACOUSTIC DOVETAIL DECK EQUAL TO VULCRAFT 2.0DA (3 SPAN CONTINUOUS) ATTACH TO STRUCTURE TO DEVELOP 325plf DIAPHRAGM SHEAR (ASD LOAD).

3.0 ...... FOOTING MARK - SEE SCHEDULE ON SHEET S101-B.

1 HSS8x8x5/16 ....COLUMN SIZE
BASE PLATE MARK - SEE SCHEDULE ON SHEET S101-B

LEVEL BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 117'-6" — TOP OF BEAM ELEVATION

SLOPING BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 133'-0" T 132'-5" — TOP OF BEAM ELEVATION EACH END

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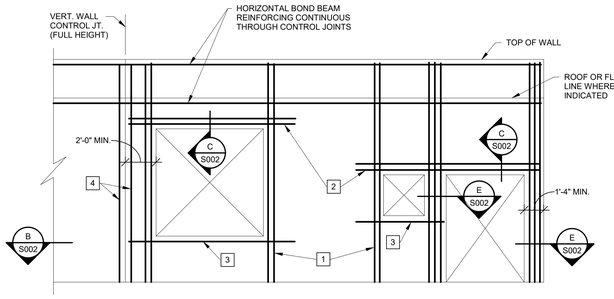
STATE OF MISSOURI WAYNE DAVIS NUMBER PE-2003035244 REGISTERED PROFESSIONAL ENGINEER
9-9-22

GENERAL NOTES
S001



TYPICAL CMU WALL REINFORCING AT OPENINGS

LEGEND:

1. FULL HEIGHT VERTICAL BARS AS JAMB REINFORCING IN FIRST 2 CELLS ADJACENT TO OPENING. REINFORCE EACH CELL WITH SIZE & QUANTITY OF BAR TO MATCH WALL REINFORCING (1 BAR TYPICAL IN 8" WALLS AND 2 BARS TYPICAL IN 12" WALLS).
2. LINTEL REINFORCING PER SECTION C. EXTEND 2'-0" PAST EDGE OF OPENING ON EACH SIDE (TYPICAL).
3. 2-#5 CONTINUOUS HORIZONTAL BARS AS SILL REINFORCING IN 8" COURSE BELOW OPENING (U.N.O.). EXTEND 2'-0" PAST EDGE OF OPENING ON EACH SIDE (TYPICAL).
4. FULL HEIGHT VERTICAL BARS PER MASONRY VERTICAL REINFORCING SCHEDULE LOCATED IN END CELL AT EACH SIDE OF VERTICAL WALL CONTROL JOINTS.

GENERAL CRITERIA: (SECTION A CONTINUED):

1. VERTICAL REINFORCING BARS SHALL BE DOWELED TO FOUNDATION WITH A DOWEL OF MATCHING SIZE AND SPACING.
2. CONTRACTOR SHALL COORDINATE AND VERIFY OPENINGS IN MASONRY WALLS. OPENINGS SHALL BE DETAILED ON REINFORCING STEEL SHOP DRAWING ELEVATIONS.
3. VERTICAL CONTROL JOINTS IN MASONRY WALLS SHALL BE 3/8" WIDE, FULL HEIGHT OF WALL. JOINTS SHALL BE SPACED AT A MAXIMUM OF 24'-0" ON CENTER AND NOT LESS THAN 2'-0" FROM THE EDGE OF ANY OPENING. ALL HORIZONTAL JOINT REINFORCING SHALL BE DISCONTINUOUS AT CONTROL JOINTS. ALL BOND BEAM HORIZONTAL REINFORCING SHALL BE CONTINUOUS THROUGH CONTROL JOINTS. CONTRACTOR SHALL COORDINATE AND VERIFY ALL CONTROL JOINT LOCATIONS.

MASONRY VERTICAL REINFORCING SCHEDULE

FOR LOAD BEARING MASONRY (CMU) WALLS

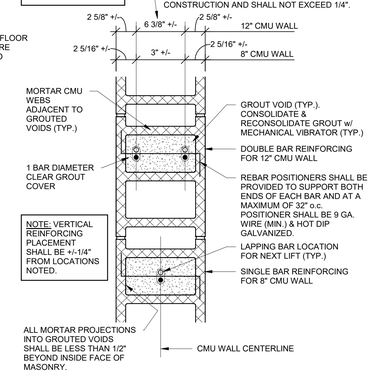
WALL THICKNESS	LOCATION	VERTICAL REINF. (IN GROUTED CELLS)	SPACING
8"	ALL 8" WALLS (U.N.O.)	1- #5	32"oc
12"	ALL 12" WALLS (U.N.O.)	2- #5	16"oc

NOTES:
1. IN ADDITION TO SPACING SHOWN IN SCHEDULE, VERTICAL REINFORCING SHALL BE PROVIDED IN GROUTED CELLS AT THE FOLLOWING LOCATIONS
   - A.) IN THE FIRST 2 CELLS ADJACENT TO EACH OPENING
   - B.) IN THE END CELLS ON EACH SIDE OF VERTICAL CONTROL JOINTS
   - C.) IN THE END CELLS OF EACH LENGTH OF WALL
   - D.) AT EACH CORNER OF WALLS
2. ALL MASONRY VOIDS AND BOND BEAMS TO BE GROUTED SHALL BE FREE OF DEBRIS AND MORTAR DROPPINGS PRIOR TO GROUTING. ANY MASONRY w/ DROPPINGS OR DEBRIS OBSERVED IN VOIDS SHALL BE REJECTED.

A CMU WALL ELEVATION
1 1/2" = 1'-0"

NOTE: REINFORCING SHALL BE PLACED IN POSITIONEERS PRIOR TO GROUTING.

ADJUSTMENTS TO DIMENSIONS TO PROVIDE DEFINED CLEAR GROUT COVER ARE ACCEPTABLE, BUT ALL ADJUSTMENTS SHALL BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION AND SHALL NOT EXCEED 1/4".



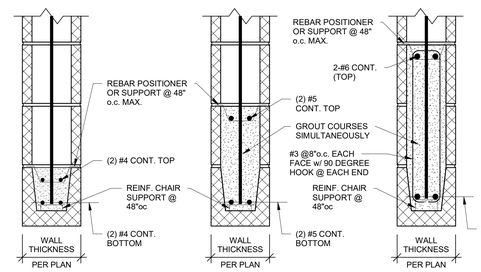
NOTE: ALL MASONRY VOIDS AND BOND BEAMS TO BE GROUTED SHALL BE FREE OF DEBRIS AND MORTAR DROPPINGS PRIOR TO GROUTING. ANY MASONRY w/ DROPPINGS OR DEBRIS OBSERVED IN VOIDS SHALL BE REJECTED.

TYPICAL REBAR POSITIONING DETAIL

B SECTION
1 1/2" = 1'-0"

TYPICAL MASONRY REINFORCING NOTE:

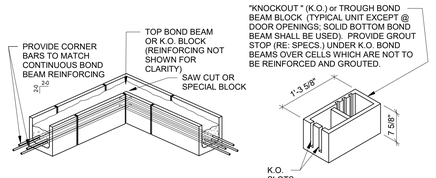
ALL INTERIOR & EXTERIOR MASONRY WALLS SHOWN ON ARCHITECTURAL AND STRUCTURAL DRAWINGS ARE TO BE REINFORCED HORIZONTALLY WITH BOND BEAMS (2 - #5 BOTTOM) AT BOTTOM COURSE, TOP COURSE, JOIST BEARING ELEVATION AND AT 6'-0" MAXIMUM O.C. AND VERTICALLY AS INDICATED ON DRAWINGS. THESE WALLS ARE TO BE ANCHORED TOP AND BOTTOM TO THE FOUNDATION, FLOOR, OR ROOF PER TYPICAL DETAILS. THE VERTICAL REINFORCING IS CONTINUOUS (IN 6'-6" MAXIMUM LENGTHS, LAPPED 2'-0" MINIMUM). FILL BLOCK CELLS AND BOND BEAMS WITH 2,500psi GROUT. RE: DETAILS "A" THROUGH "E" ON THIS SHEET.



OPENINGS UP TO 4'-0" | OPENINGS 4'-0" TO 7'-4" | OPENINGS 7'-4" TO 12'-0"

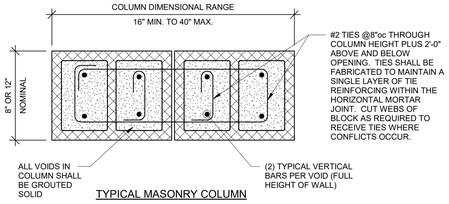
TYPICAL LINTELS AT ALL CMU WALLS (U.N.O.)

C SECTION
1 1/2" = 1'-0"



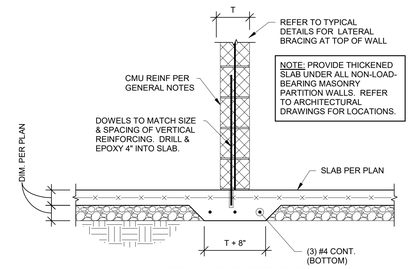
TYPICAL BOND BEAM DETAIL AT CORNER OF CMU WALL

D DETAIL
3/4" = 1'-0"



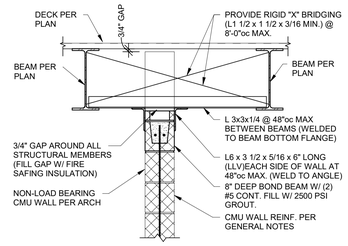
TYPICAL MASONRY COLUMN

E SECTION
1 1/2" = 1'-0"



TYPICAL THICKENED SLAB
(UNDER NON-LOAD-BEARING MASONRY)

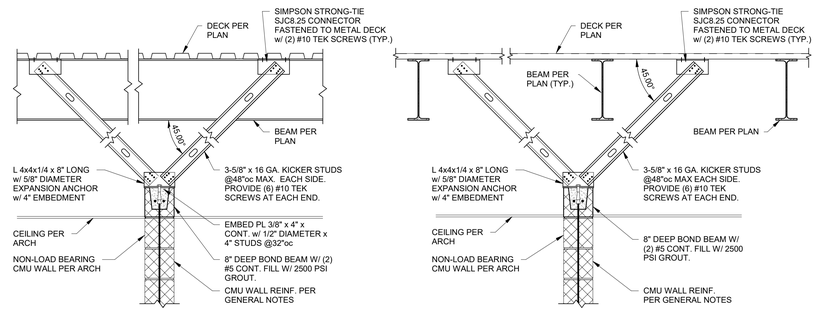
1 SECTION
3/4" = 1'-0"



WALL PARALLEL TO BEAM | WALL PERPENDICULAR TO BEAM

TYPICAL BRACING DETAILS FOR NON-LOAD-BEARING CMU WALLS THAT EXTEND TO DECK
(REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION)

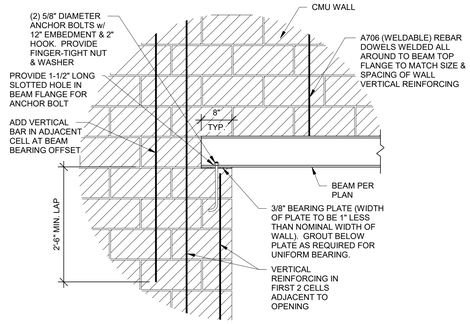
2 SECTION
3/4" = 1'-0"



WALL PERPENDICULAR TO BEAM | WALL PARALLEL TO BEAM

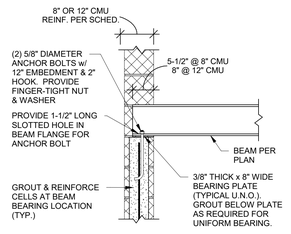
TYPICAL BRACING DETAILS FOR NON-LOAD-BEARING CMU WALLS THAT DO NOT EXTEND TO DECK
(REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION)

3 SECTION
3/4" = 1'-0"



TYPICAL STEEL LINTEL DETAIL AT CMU WALL

4 SECTION
3/4" = 1'-0"



TYPICAL WIDE FLANGE BEAM BEARING ON CMU (U.N.O.)

5 SECTION
3/4" = 1'-0"

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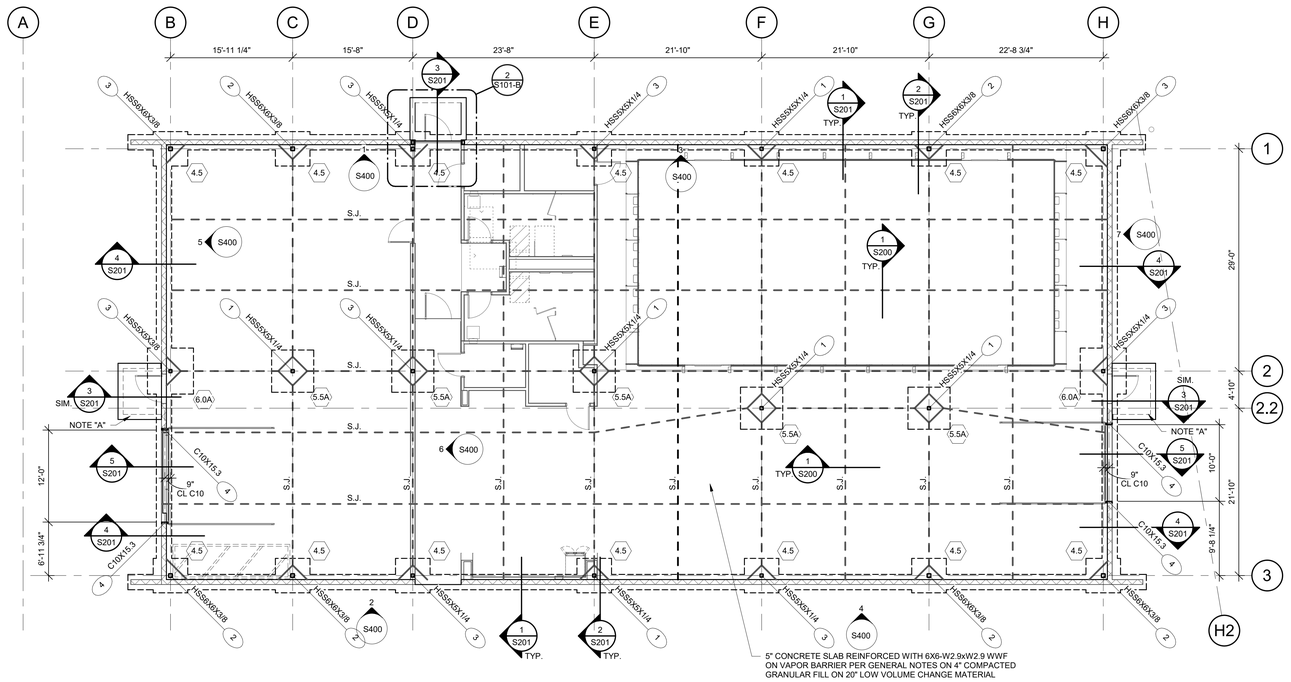
CMU DETAILS

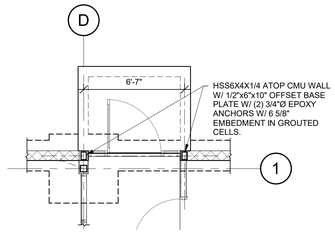
S002



1 LSN/LSW FOUNDATION PLAN

1/8" = 1'-0"

NOTES:
1. REFER TO GENERAL NOTES AND LEGEND ON SHEET S001.
2. TOP OF EXTERIOR FOOTING ELEVATION = 99'-4" U.N.O.
3. TOP OF INTERIOR FOOTING ELEVATION = 99'-3" U.N.O.
4. NOTE "A" - POUR STOOP SLAB WITH ADJACENT SIDEWALK. COORDINATE STOOP WITH SIDEWALK JOINT PATTERN



2 LSN/LSW FOUNDATION PLAN

1/4" = 1'-0"

Structural Foundation Schedule

NOTE:
1) EXTERIOR FOOTINGS OR FOOTING AT GRADE BEAM SHALL MATCH GRADE BEAM DEPTH AND BE PLACED WITH GRADE BEAM. PROVIDE SPECIFIED REBAR TOP AND BOTTOM WITH 4 STANDEES TO SUPPORT MATS.
2.) PROVIDE REINFORCING PER SCHEDULE EACH WAY IN TOP OF FTG. AT ALL MOMENT FRAME AND BRACED BAY COLUMNS.
3.) CENTER FOOTINGS ON COLUMNS AND/OR WALL CENTER LINES PER PLAN UNLESS NOTED OTHERWISE (U.N.O.).

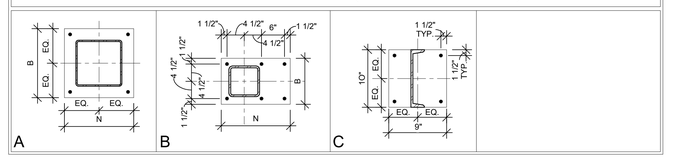
Type Mark	Length	Width	Footing Thickness	Bottom Bars	Quantity (E.W. Top & Bott)	
4.5	4'-6"	4'-6"	2'-8"	Rebar : # 4	9	
5.5A	5'-6"	5'-6"	2'-8"	Rebar : # 5	7	
6.0A	6'-0"	6'-0"	2'-8"	Rebar : # 5	8	

COLUMN BASE PLATE SCHEDULE

TYPE	COLUMN	BASE PLATE (txBxN)	SHAPE	ANCHOR RODS	EMBEDMENT
1	PER PLAN	3/4"x11"x11"	A	(4) 3/4"Ø	9"
2	PER PLAN	3/4"x12"x12"	A	(4) 3/4"Ø	9"
3	PER PLAN	1"x12"x18"	B	(6) 3/4"Ø	1'-6"
4	PER PLAN	3/4"x9"x10"	C	(4) 3/4"Ø	9"

NOTES:
1. SEE PLAN FOR ORIENTATION OF COLUMNS.
2. PROVIDE PLATE WASHER & EMBEDDED PLATE PER SCHEDULE @ ALL ANCHOR BOLTS.
3. U.N.O. ALL THREADED ROD A.B's SHALL BE F1554 (36ksi) MATERIAL.

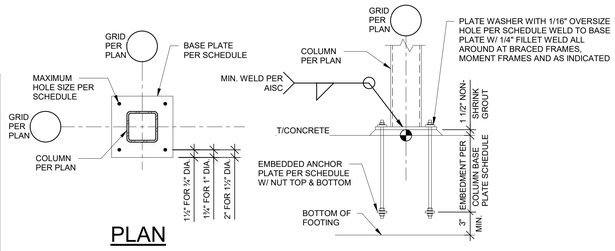
BASE PLATE SHAPE (NOT TO SCALE)



COLUMN BASE PLATE AND ANCHOR-ROD CRITERIA

ANCHOR-ROD DIAMETER.	MAX. BASE PLATE HOLE DIAMETER.	MIN. PLATE WASHER SIZE.	MIN. PLATE WASHER THICKNESS	EMBEDDED ANCHOR PLATE SIZE
3/4"	1 5/16"	2"	1/4"	1/2"x2 1/2"x2 1/2"
7/8"	1 9/16"	2 1/2"	5/16"	1/2"x2 1/2"x2 1/2"
1"	1 7/8"	3"	3/8"	5/8"x3"x3"
1 1/4"	2 1/8"	3 1/2"	1/2"	5/8"x3 1/2"x3 1/2"
1 1/2"	2 3/8"	4"	1/2"	5/8"x3 1/2"x3 1/2"
1 3/4"	2 7/8"	4 1/2"	5/8"	3/4"x3 1/2"x3 1/2"
2"	3 1/4"	5"	3/4"	3/4"x3 1/2"x3 1/2"
2 1/2"	3 3/4"	5 1/2"	7/8"	3/4"x3 1/2"x3 1/2"

NOTES:
1. HOLE SIZES PROVIDED ARE BASED ON ANCHOR ROD SIZE AND CORRELEATE WITH ACI 117 (ACI, 2010)
2. CIRCULAR OR SQUARE WASHERS MEETING THE WASHER SIZE ARE ACCEPTABLE.
3. HOLE IN PLATE WASHER SHALL BE 1/16" LARGER THAN ANCHOR DIAMETER.



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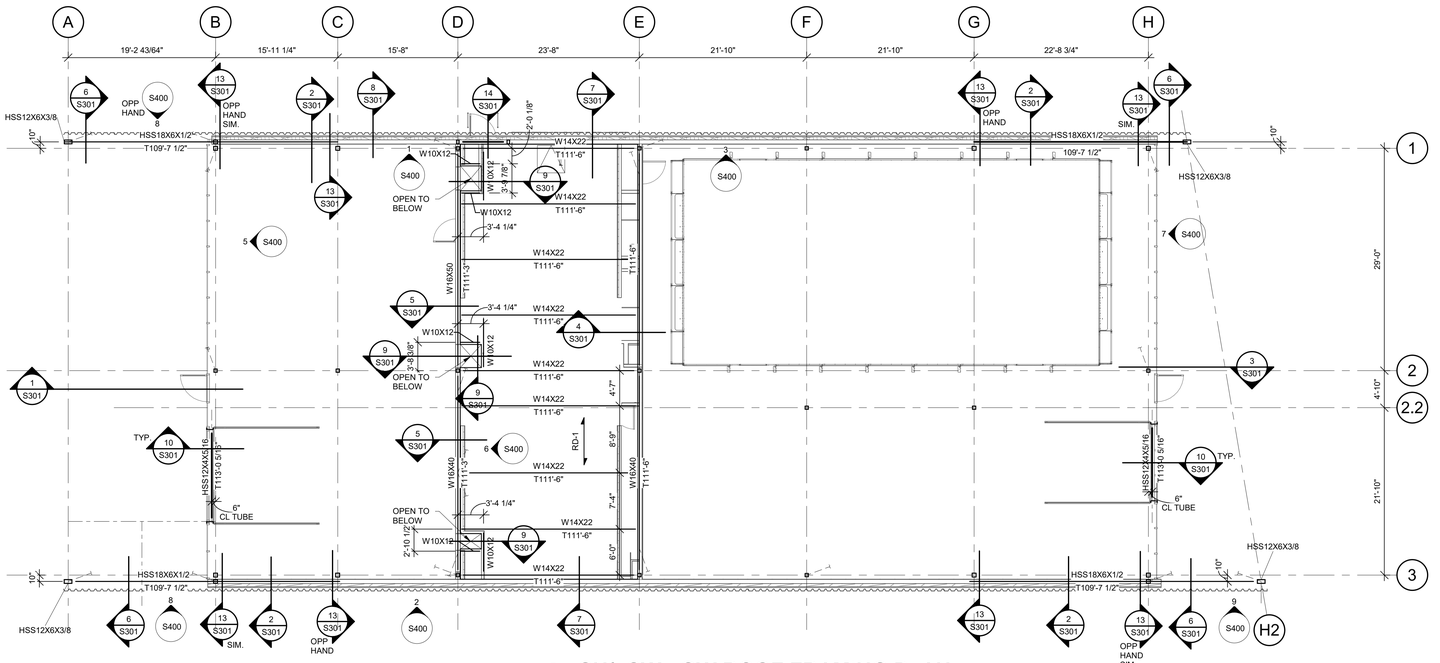
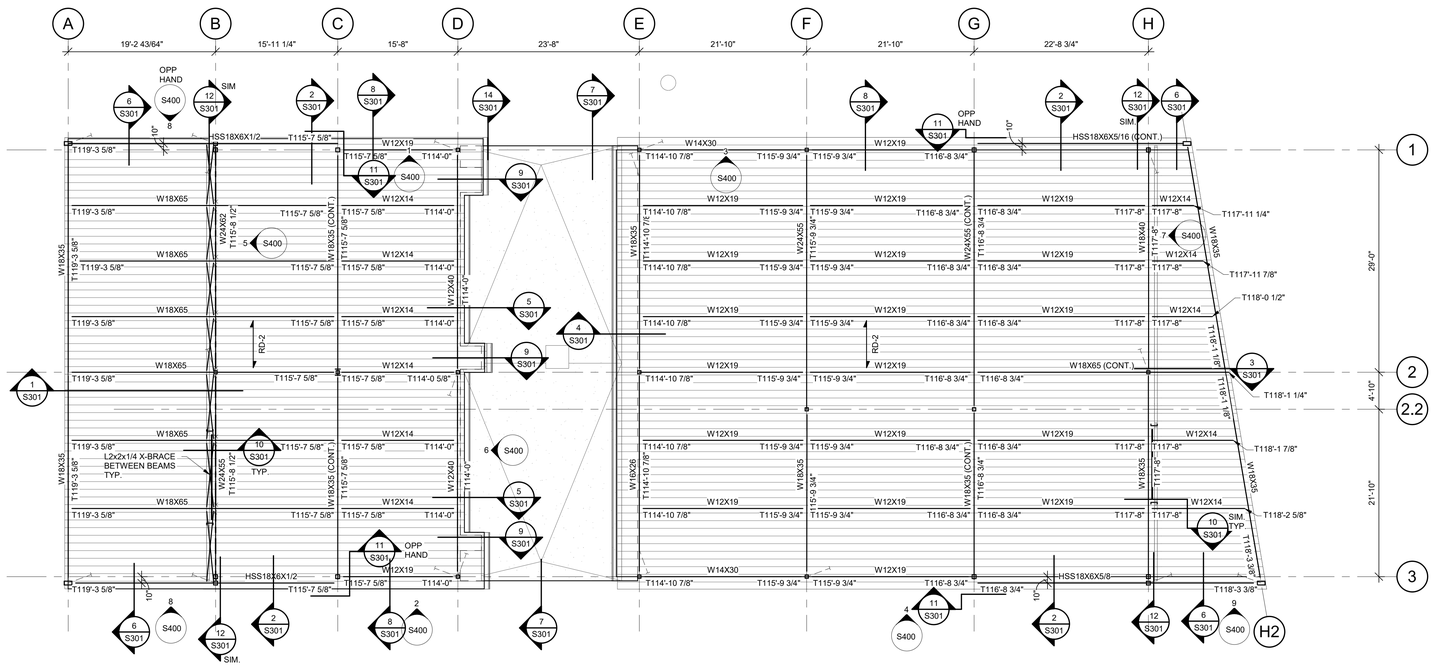
FOUNDATION PLAN

S101-B



1 LSN/LSW LOW ROOF FRAMING PLAN

1/8" = 1'-0"



2 LSN/LSW ROOF FRAMING PLAN

1/8" = 1'-0"

NOTES:
1. REFER TO GENERAL NOTES AND LEGEND ON SHEET S001.

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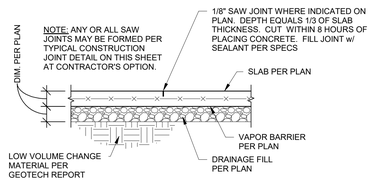
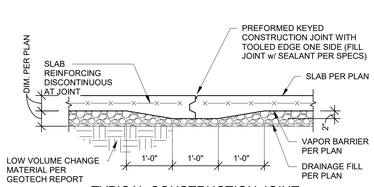
LOW ROOF AND ROOF FRAMING PLAN

S111-B



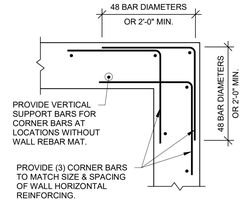
TYPICAL SAW JOINT
NOTED "SJ" ON PLAN

1 SECTION
3/4" = 1'-0"

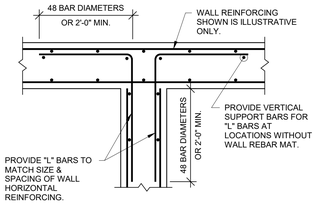


TYPICAL CONSTRUCTION JOINT
NOTED "CJ" ON PLAN

2 SECTION
3/4" = 1'-0"

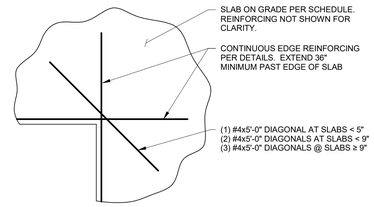


TYPICAL CORNER BARS AT
CONCRETE WALLS & FOUNDATIONS



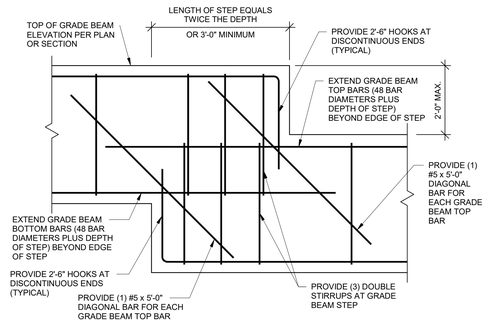
TYPICAL T-INTERSECTION REINFORCING
AT CONCRETE WALLS & FOUNDATIONS

3 TYPICAL INTERSECTING CONCRETE WALL REINFORCING
3/4" = 1'-0"

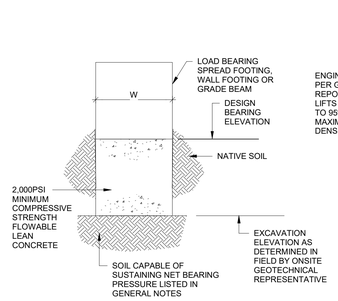


TYPICAL SLAB ON GRADE RE-ENTRANT CORNER BARS

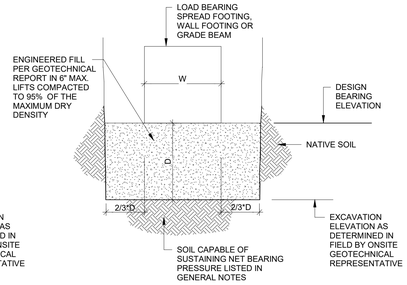
4 DETAIL
1/2" = 1'-0"



5 TYPICAL GRADE BEAM STEP
3/4" = 1'-0"

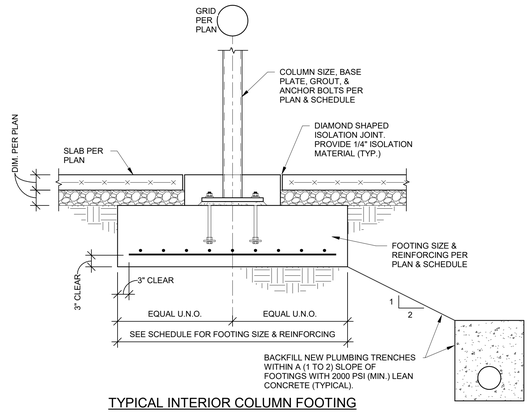


LEAN CONCRETE BACKFILL



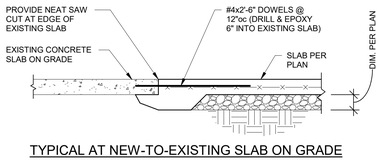
ENGINEERED FILL BACKFILL

6 OVEREXCAVATION DETAIL
3/4" = 1'-0"



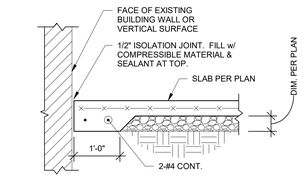
TYPICAL INTERIOR COLUMN FOOTING

7 SECTION
3/4" = 1'-0"



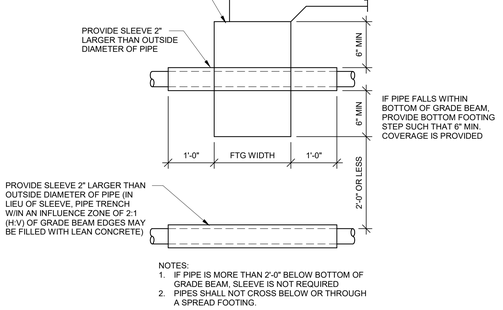
TYPICAL AT NEW-TO-EXISTING SLAB ON GRADE

8 SECTION
3/4" = 1'-0"



TYPICAL SLAB EDGE DETAIL AGAINST EXISTING
BUILDING WALL OR VERTICAL SURFACE

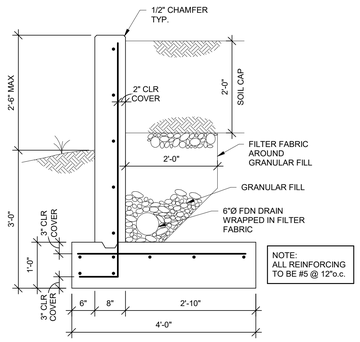
9 SECTION
3/4" = 1'-0"



NOTES:
1. IF PIPE IS MORE THAN 2'-0" BELOW BOTTOM OF GRADE BEAM, SLEEVE IS NOT REQUIRED
2. PIPES SHALL NOT CROSS BELOW OR THROUGH A SPREAD FOOTING.

TYPICAL GRADE BEAM SLEEVE

10 SECTION
3/4" = 1'-0"



11 LSW-SITE WALL SECTION
3/4" = 1'-0"

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Revisions

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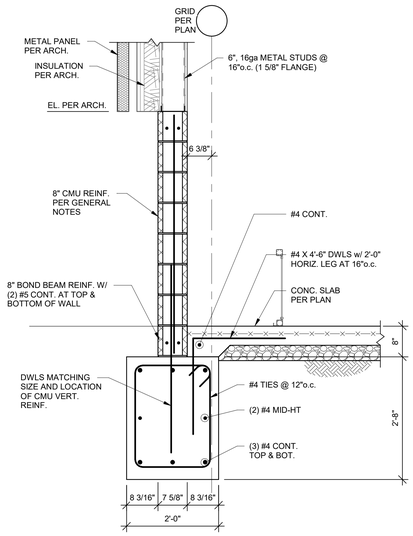
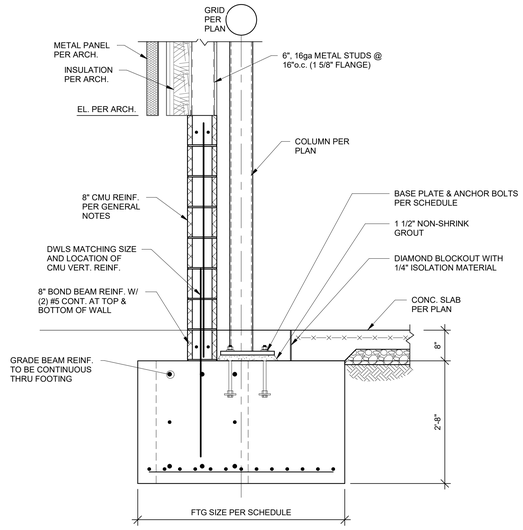
FOUNDATION SECTIONS

S200



1 SECTION
3/4" = 1'-0"



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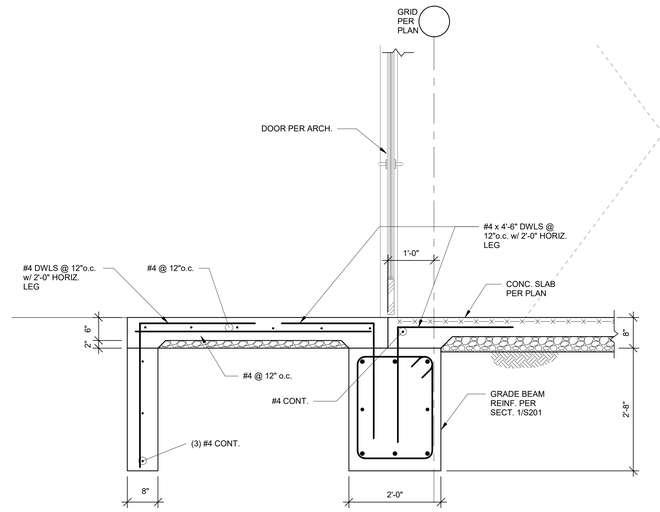
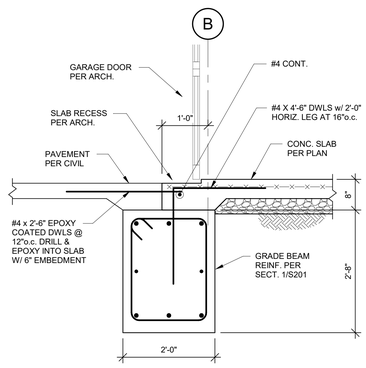


3 SECTION
3/4" = 1'-0"

4 SECTION
3/4" = 1'-0"



5 SECTION
3/4" = 1'-0"

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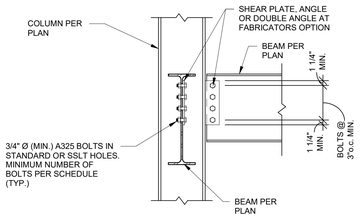
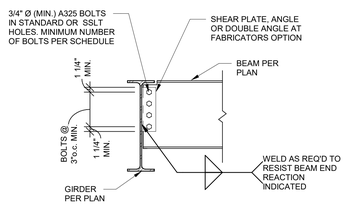
FOUNDATION SECTIONS

S201



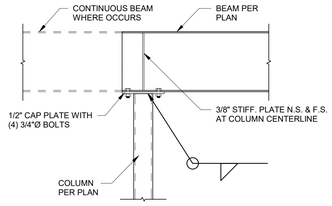
TYPICAL BEAM TO COLUMN SHEAR CONNECTION

1 DETAIL
3/4" = 1'-0"



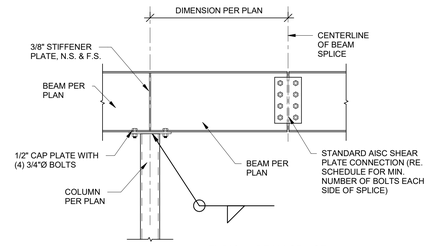
TYPICAL BEAM TO GIRDER CONNECTION

2 DETAIL
3/4" = 1'-0"



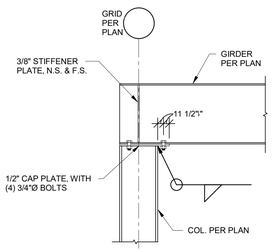
TYPICAL BEAM TO COLUMN CONNECTION

3 DETAIL
3/4" = 1'-0"

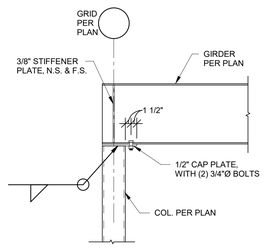


TYPICAL BEAM SPLICE

4 DETAIL
3/4" = 1'-0"



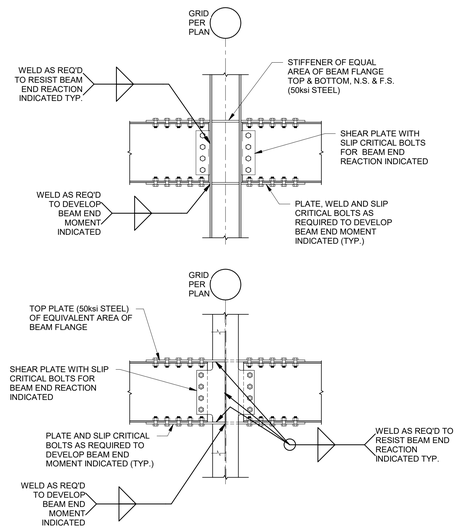
@ WIDE FLANGE COLUMN



@ HSS COLUMN

TYPICAL ROOF BEAM TO COLUMN CONNECTION AT EXTERIOR WALL

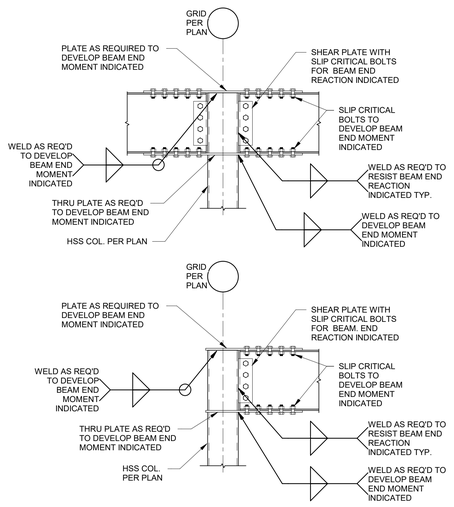
5 SECTION
3/4" = 1'-0"



TYP. BEAM TO WIDE FLANGE COL. MOMENT CONNECTIONS

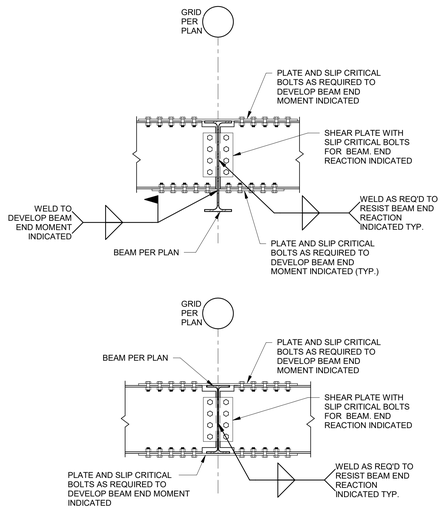
NOTE: FLANGE PLATES MAY BE FULL PENETRATION WELDED TO COLUMN AT CONTRACTORS OPTION

6 SECTION
3/4" = 1'-0"



TYPICAL BEAM TO HSS COLUMN MOMENT CONNECTIONS

7 SECTION
3/4" = 1'-0"



TYP. BEAM TO BEAM MOMENT CONNECTIONS

8 SECTION
3/4" = 1'-0"

BEAM SHEAR CONNECTION SCHEDULE		
BEAM SIZE	MINIMUM ROWS OF BOLTS	END REACTION (kips)(U.N.O.)
W8,C8	2	16
W10,C10	2	16
W12,C12	2	16
W14	3	24
W16, C15	3	24
W18	4	32
W21	5	40
W24	5	40
W27	6	48
W30	7	56
W33	8	64
W36	8	64

STEEL CONNECTION NOTES:

1. REFER TO GENERAL NOTES ON SHEET S001.
2. CONNECTIONS SHOWN IN THESE DETAILS ARE MINIMUM REQUIREMENTS.
3. FABRICATOR SHALL BE RESPONSIBLE FOR THE ENGINEERING, DESIGNING, AND DETAILING OF EACH CONNECTION FOR LOADS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE SPECIFICATIONS AND THE STRUCTURAL GENERAL NOTES.
4. SUGGESTED CONNECTION DETAILS ARE SHOWN. FINAL CONNECTION CONFIGURATION AND DESIGN SHALL BE COMPLETED BY THE CONNECTION ENGINEER. CONNECTION DESIGN SHALL INCLUDE COLUMN OR BEAM CONTINUITY PLATES, WEB STIFFENERS, AND/OR DOUBLER PLATES AS REQUIRED FOR THE FORCES INDICATED.
5. FABRICATOR MAY OPT TO USE OTHER AISC APPROVED CONNECTIONS IN LIEU OF THESE SHOWN HEREIN TO MEET END REACTION REQUIREMENTS (i.e. DOUBLE ANGLE CONNECTION).
6. CONNECTION DETAILING SHALL COMPLY WITH THE STANDARD DETAILS SHOWN IN THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION.
7. ALL BOLTS SHALL BE 3/4" Ø ASTM A325 MINIMUM.
8. ALL BOLTS SHALL BE SPACED AT 3"o.c. MINIMUM.
9. ALL BOLTS SHALL HAVE HEAVY HEX NUTS.
10. ALL BOLTS SHALL BE FULLY PRE-TENSIONED.
11. BOLT SPACING AND EDGE DISTANCES SHALL BE ADJUSTED PER AISC MANUAL FOR BOLTS LARGER THAN 3/4" DIAMETER.
12. CLIP ANGLES MAY BE SHOP WELDED TO BEAM WEB PER AISC.
13. FOR BEAMS WITH AXIAL LOADS PER DRAWINGS, BOLTS AND CONNECTIONS SHALL BE SLIP-CRITICAL PER AISC GUIDELINES. INCREASE NUMBER OF BOLTS AND/OR PROVIDE EXTENDED SHEAR PLATE CONNECTION W/ AN ADDITIONAL COLUMN OF BOLTS TO ACCOMODATE COMBINED FORCES.
14. PROVIDE ASTM A490 BOLTS IF REQUIRED TO MEET END REACTION LOAD REQUIREMENTS.
15. REFER TO ELEVATIONS ON SHEET S___ FOR BRACE FORCES. REFER TO PLANS FOR ADDITIONAL BEAM AXIAL FORCES. BRACE AND BEAM FORCES INDICATED ARE UNFACTORED (ASD) LOADS AND SHALL BE CONSIDERED CONCURRENT W/ BEAM SHEAR DESIGN FORCES LISTED IN THE BEAM SHEAR CONNECTION SCHEDULE.
16. COORDINATE BRACED FRAME CONNECTION W/ ARCHITECTURAL WALLS AS REQUIRED TO AVOID CONFLICT OR EXPOSURE OUTSIDE OF WALL OR FINISH.
17. ALL END REACTIONS INDICATED ARE UNFACTORED (ASD) LOADS.

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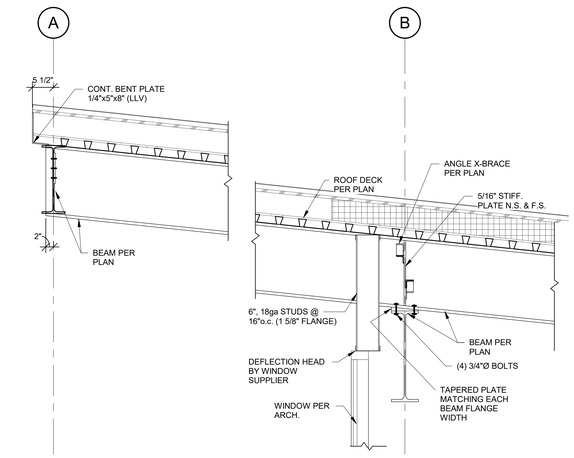
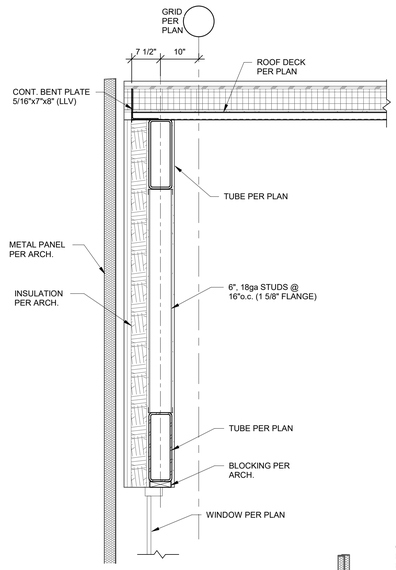
FRAMING SECTIONS

S300



1 SECTION
3/4" = 1'-0"



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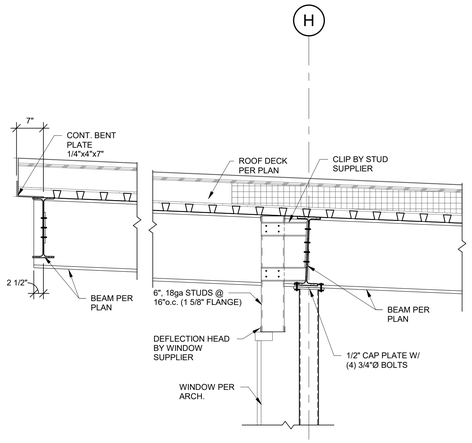

3 SECTION
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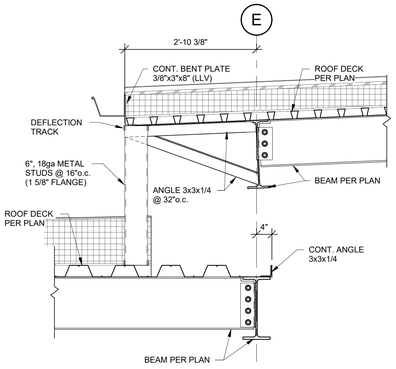
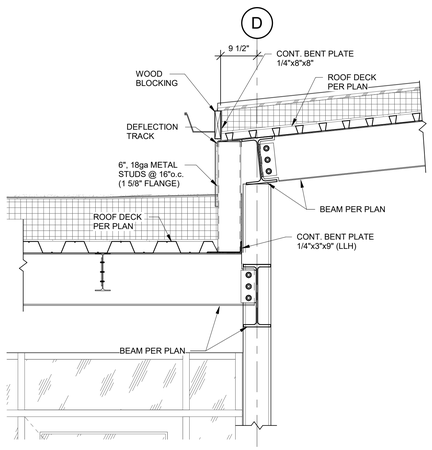
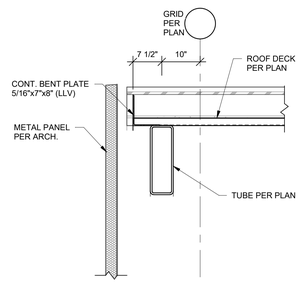


4 SECTION
3/4" = 1'-0"



5 SECTION
3/4" = 1'-0"



6 SECTION
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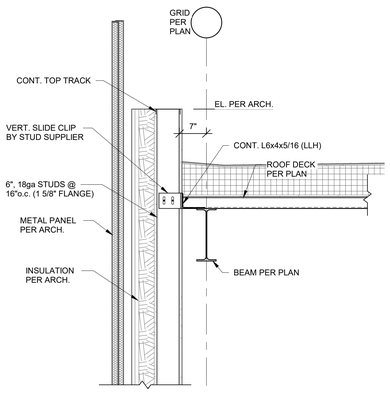
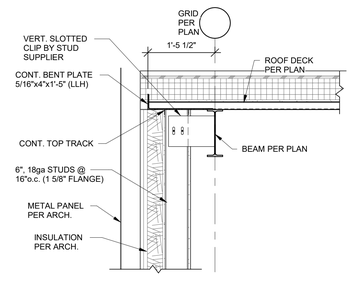


7 SECTION
3/4" = 1'-0"



8 SECTION
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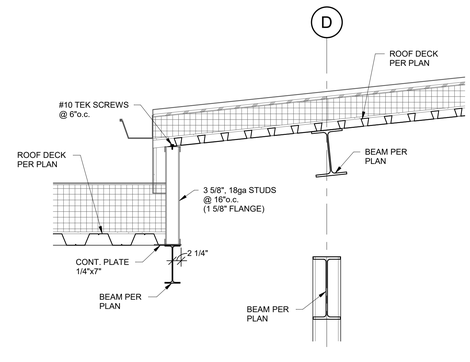

9 SECTION
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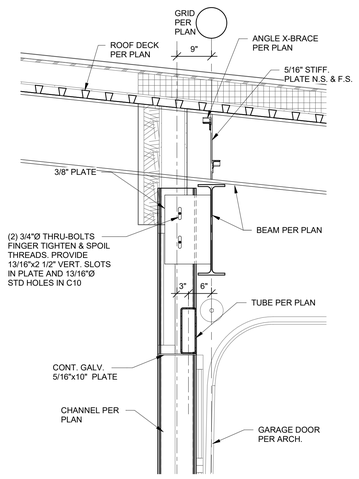

10 SECTION
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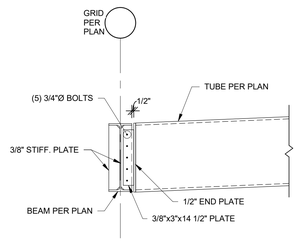

11 SECTION
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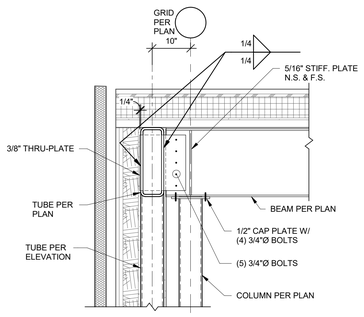

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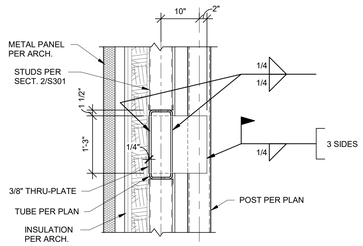

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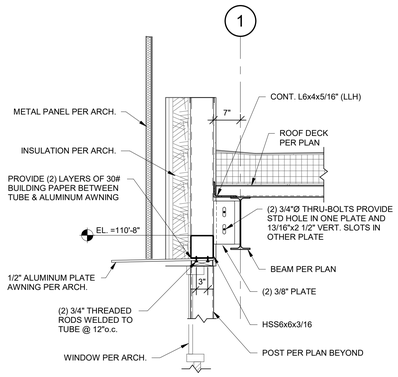

14 SECTION
3/4" = 1'-0"

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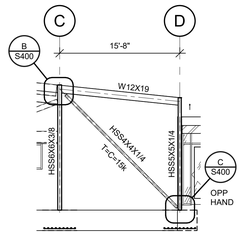
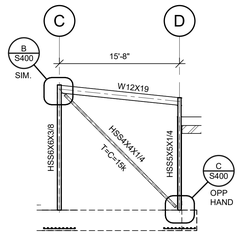
FRAMING SECTIONS

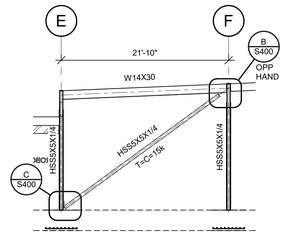
S301



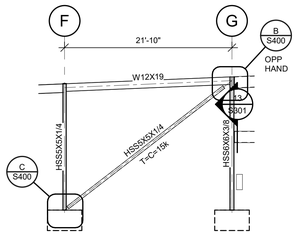
1 ELEVATION
1/8" = 1'-0"



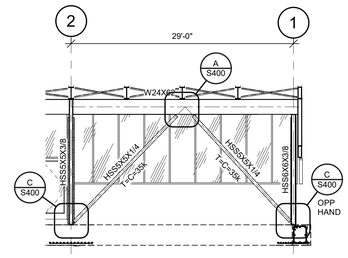
2 ELEVATION
1/8" = 1'-0"



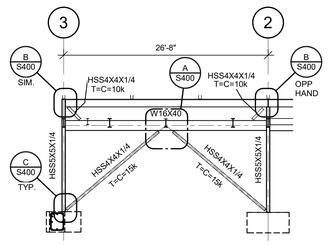
3 ELEVATION
1/8" = 1'-0"



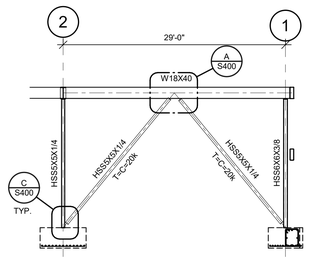
4 ELEVATION
1/8" = 1'-0"



5 ELEVATION
1/8" = 1'-0"



6 ELEVATION
1/8" = 1'-0"



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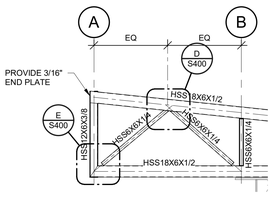
1/8" = 1'-0"



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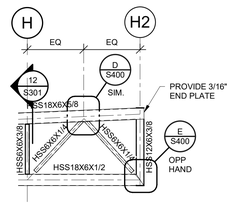
1/8" = 1'-0"



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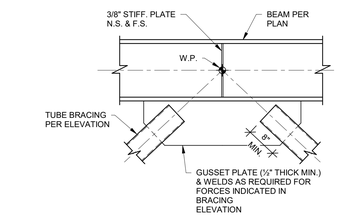
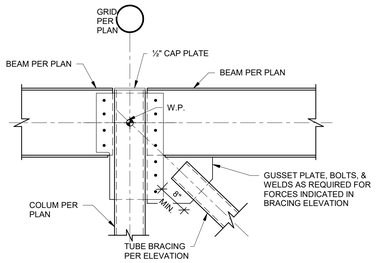
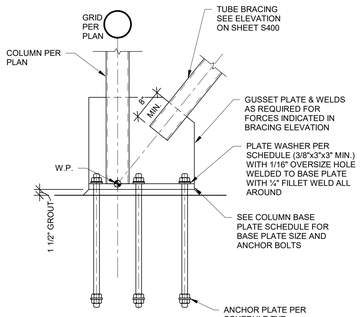
1/8" = 1'-0"



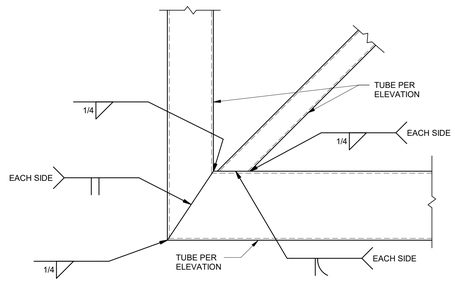
A DETAIL
3/4" = 1'-0"



B DETAIL
3/4" = 1'-0"

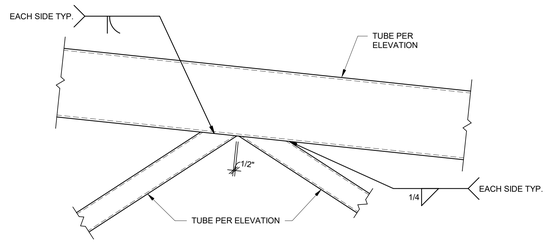


C DETAIL
3/4" = 1'-0"



NOTE: GRIND ALL WELDS SMOOTH

E SECTION
3/4" = 1'-0"



NOTE: GRIND ALL WELDS SMOOTH

D SECTION
3/4" = 1'-0"

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LSR7 Robotics, GiC & Phys Education

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Revisions

NUMBER	DESCRIPTION	DATE

9-9-22

FRAMING ELEVATIONS

S400

Abbreviations

A	
@	AT
A/C	AIR CONDITION(ING) (ED)
A/C UNIT	AIR CONDITIONING UNIT
AB	ANCHOR BOLT
ABBVR	
ACC	ACCESSIBLE
ACCU	AIR COOLED CONDENSING UNIT
ACI	AMERICAN CONCRETE INSTITUTE
ACOUS INSUL	ACOUSTICAL INSULATION
ACOUS PNL	ACOUSTICAL PANEL
ACST	ACOUSTIC
ACT	ACOUSTICAL CEILING TILE
ADA	AMERICANS WITH DISABILITIES ACT
ADDL	ADDITIONAL
ADDM	ADDENDUM
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
AE	ARCHITECT/ ENGINEER
AFF	ABOVE FINISHED FLOOR
AGGR	AGGREGATE
AHJ	AUTHORITIY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALT	ALTERNATE
ALUM	ALUMINUM
ANOD	ANNODIZED
APC	ACOUSTICAL PANEL CEILING
ARCH	ARCHITECT(URAL)
ASL	ABOVE STRUCTURAL LEVEL
AWT	ACOUSTICAL WALL TREATMENT
B	
B BD	BASE BOARD
B/B	BACK-TO-BACK
BAT	BATTEN
BD	BOARD
BDRM	BEDROOM
BITUM	BITUMINOUS
BLDG	BUILDING
BLKG	BLOCKING
BM	BENCHMARK, BEAM
BOT	BOTTOM
BRG	BEARING
BRZ	BRONZE
BSMT	BASEMENT
BTWN	BETWEEN
BUR	BUILT-UP ROOFING
BW	BOTH WAYS
C	
CAB	CABINET
CB	CARRIAGE BOLT, CATCH BASIN
CCTV	CLOSED-CIRCUIT TELEVISION
CD	CONSTRUCTION DOCUMENTS, CONTRACT DOCUMENTS
CEM	CEMENT
CERT	CERTIFY, CERTIFICATE, CERTIFICATION
CF/CI	CONRACTOR FURNISHED/ CONTRACTOR INSTALLED
CF/OI	CONTRACTOR FURNISHED/ OWNER INSTALLED
CG	CORNER GUARD
CH	COAT HOOK
CHBD	CHALK BOARD
CHEM	CHEMICAL
CI	CAST IRON
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT, CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CLRM	CLASSROOM
CMU	CONCRETE MASONRY UNIT
CNR	CORNER
CNTR	COUNTER
COL	COLUMN
CONC	CONCRETE
CONF	CONFERENCE
CONN	CONNECT(ION)
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRCT(OR)
COORD	COORDINATE, COORDINATION
CORR	CORRIDOR
CPT	CARPET
CSK	COUNTERSINK
CSWK	CASEWORK
CT	CERAMIC TILE
CTR	CENTER
CTRL	CONTROL
CU	CUBIC
CUH	CABINET UNIT HEATER
CUST	CUSTODIAL
CW	COLD WATER, CASEMENT WINDOW

D	
D	DEEP, DEPTH
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DH	DOUBLE HUNG
DIA or Ø	DIAMETER
DIFF	DIFFERENCE
DIM	DIMENSION
DIR	DIRECTION
DISP	DISPENSER
DIST	DISTANCE
DIV	DIVIDE, DIVISION
DL	DEAD LOAD
DMPF	DAMPPROOFING
DMPR	DAMPER
DN	DOWN
DO	DITTO
DOC	DOCUMENT
DOZ	DOZEN
DR	DOOR
DS	DOWNSPOUT
DSGN	DESIGN
DT	DRAIN TILE
DW	DISH WASHER
DWG	DRAWING
E	
E	EAST
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EACH FACE
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC(AL)
ELEM	ELEMENTARY
ELEV	ELEVATOR
ENAM	ENAMEL
ENCL	ENCLOSURE
ENGR	ENGINEER
ENVIR	ENVIRONMENT
EOS	EDGE OF SLAB
EP	ELECTRIC PANEL
EPDM	ETHYLENE PROPYLENE DIENE MONOMER
EPS	EXPANDED POLYSTYRENE BOARD
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ETC	ET CETERA
ETR	EXISTING TO REMAIN
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EXC	EXCAVATE
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPAND, EXPANSION
EXT	EXTERIOR
F	
F/F	FACE-TO-FACE
FA	FIRE ALARM
FAAP	FIRA ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FIN	FINISH
FIXT	FIXTURE
FLOUR	FLOURESCENT
FLR	FLOOR
FNDN	FOUNDATION
FO	FINISHED OPENING
FRIS	FIRE RESISTIVE JOINT SYSTEM
FRP	FIBERGLASS REINFORCED PLASTIC
FRTW	FIRE RETARDANT TREATED WOOD
FT	FOOT, FEET
FTG	FOOTING
FURN	FURNITURE
FW	FIRE WALL
FWC	FABRIC WALL COVERING
G	
GA	GAGE
GAL	GALLON
GALV	GALVANIZED
GALV STL	GALVANIZED STEEL
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GEN	GENERAL, GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFRC	GLASS FIBER RINFORCED CONCRETE
GFRG	GLASS FIBER REINFORCED GYPSUM
GL	GLASS, GROUND LEVEL
GL BLK	GLASS BLOCK
GLU LAM	GLUED LAMINATED BEAM
GLZ	GLAZING
GWT	GLAZED WALL TILE
GYM	GYMNASIUM
GYP	GYPSUM
GYP BD	GYPSUM BOARD
GYP PLAS	GYPSUM PLASTER

H	
HB	HOSE BIBB
HC	HANDICAP, HOLLOW CORE
HCP	HANDICAPPED
HD	HEAVY DUTY
HDW	HARDWARE
HDWD	HARDWOOD
HM	HOLLOW METAL
HO	HOLD OPEN
HORIZ	HORIZON
HR	HOUR
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HW	HOT WATER
HYD	HYDRANT
I	
ID	INSIDE DIAMETER
IN	INCHES
INCAND	INCANDESCENT
INCL	INCLUDE
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
INTERM	INTERMEDIATE
J	
JAN	JANITOR
JAN CLO	JANITOR CLOSET
JNT	JOINT
JR	JUNIOR
JST	JOIST
K	
KD	KNOCK DOWN
KIP	1000 POUNDS
KIT	KITCHEN
KO	KNOCK OUT
KPL	KICK PLATE
L	
L	LITER, ANGLE
LAB	LABORATORY
LAM	LAMINATE(D)
LAV	LAVATORY
LBL	LABEL
LBS	POUND
LD	LOAD
LF	LINEAR FEET
LH	LATENT HEAT, LEFT HAND
LIB	LIBRARY
LIN	LINEAR
LKR	LOCKER
LKR RM	LOCKER ROOM
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LT	LINOLEUM TILE, LIGHT
LTG	LIGHTING
M	
MACH	MATCHLINE
MACH RM	MACHINE ROOM
MAHOG	MAHOGANY
MAINT	MAINTENANCE
MATL	MATERIAL
MAX	MAXIMUM
MB or MKR BD	MARKERBOARD
MC	MECHANICAL CONTRACTOR
MDF	MEDIUM DENSITY FIBERBAORD
MDO	MEDIUM DENSITY OVERLAY
ME	MATCH EXISTING
MECH	MECHANICAL
MECH RM	MECHANICAL ROOM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MM	MILIMETER
MO	MASONRY OPENING
MOD BIT	MODIFIED BITUMEN
MTD	MOUNTED
MTL	METAL, MATERIAL
MULL	MULLION
N	
N	NORTH
NA	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO or #	NUMBER
NOM	NOMINAL
NORM	NORMAL
NTS	NOT TO SCALE
O	
O/A	OVERALL
O/O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF/ OI	OWNER FURNISHED/ OWNER INSTALLED
OF/CI	OWNER FURNISEHD/ CONTRACTOR INSTALLED
OFF	OFFICE
OH	OVERHANG
OH DR	OVERHEAD DOOR
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OPT	OPTIONAL, OPTIMUM

P	
PA	PUBLIC ADDRESS
PAR	PARALLEL
PART	PARTIAL
PAT	PATTERN
PC	PLUMBING CONTRACTOR
PERF	PERFORATED
PERIM	PERIMETER
PL	PLATE, PROPERTY LINE
PL GL	PLATE GLASS
PLAM	PLASTIC LAMINATE
PLAS	PLASTER, PLASTIC
PLBG	PLUMBING
PLYWD	PLYWOOD
PNL	PANEL
POL	POLISHED
POLY	POLYETHYLENE (PLASTIC)
PORC	PORCELAIN
PORT	PORTABLE
POS	POSITIVE
PR	PAIR
PRCST	PRECAST
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PRELIM	PRELIMINARY
PRKG	PARKING
PROJ	PROJECT
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST TENSIONED
PTD	PAPER TOWER DISPENSER
PTN	PARTITION
PVC	POLYVINYL CHLORIDE (PLASTIC)
PWR	POWER
Q	
QT	QUARRY TILE
QTR	QUARTER
QTY	QUANTITY
R	
R	RISER, RADIUS, HEAT RESISTANCE
RA	RETURN AIR
RAD	RADIATOR
RB	RUBBER BASE, RESILIENT BASE
RC	ROOFING CONTRACTOR
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REC	RECESSED
REC RM	RECREATION ROOM
REF	REFRIGERATOR
REG	REGISTER, REGULATION
REINF	REINFORCE
REQD	REQUIRED
RESIL	RESILIENT
REV	REVISION
RFG	ROOFING
RFI	REQUEST FOR INFORMATION
RFP	REQUEST FOR PROPOSAL
RH	RIGHT HAND, ROOF HATCH
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RTF	RUBBER TILE FLOOR
RTU	ROOF TOP UNIT
RV	ROOF VENT
RW	RESCUE WINDOW
RWB	RUBBER WALL BASE
S	
S	SOUTH
SAB	SOUND ATTENUATION BATTS
SAN	SANITARY
SC	SOLID CORE, SHADING COEFFICIENT
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SF	SQUARE FOOT, SAFETY FACTOR
SGT	STRUCTURAL GLAZED TILE
SHR	SHOWER
SHT	SHEET
SIM	SIMILAR
SND	SANITARY NAPKIN DISPENSER
SOG	SLAB ON GRADE
SPC	SUSPENDED SPLASTER CEILING
SPEC	SPECIFICATION(S)
SPKR	SPEAKER
SQ	SQUARE
SST	STAINLESS STEEL
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STOR	STORAGE
STRM	STOREROOM
STRUCT	STRUCTURAL
SUB	UBSTITUTE
SUB FL	SUBFLOOR
SUSP	SUSPENDED
SUSP CLG	SUSPENDED CEILING
SV	SAFETY VALVE, SHEET VINYL
SWBD	SWITCHBOARD
SY	SQUARE YARD
SYM	SYMBOL
SYS	SYSTEM

T	
T	TREAD
T & B	TOP AND BOTTOM
T & G	TONGUE AND GROOVE
TB	THROUGH BOLT, TOWEL BAR
TECH	TECHNICAL, TECHNOLOGY
TEL	TELEPHONE
TEMP	TEMPORARY, TEMPERATURE
TERR	TERRAZZO
THERM	THERMAL
THK	THICKNESS
THRU	THROUGH
TK BD	TACK BOARD
TMPD	TEMPERED
TMPD GL	TEMPERED GLASS
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING, TOP OF FLOOR, TOP OF FRAME
TOM	TOP OF MASONRY
TOPO	TOPOGRAPHY
TOS	TOP OF STEEL
TPD	TOILET PAPER DISPENSER
TV	TELEVISION
TYP	TYPICAL
U	
U	HEAT TRANSFER COEFFICIENT
UC	UNDERCUT
UGND	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UNFIN	UNFINISH(ED)
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
UV	UNIT VENTILATOR
V	
V	VOLT
VAR	VARIES, VARIATION
VB	VINYL BASE
VCT	VINYL COMPOSITE TILE
VENT	VENTILATION
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
VOC	VOLATILE ORGANIC COMPOUND
VOL	VOLUME
VR	VAPOR RETARDER
VUH	VERTICAL UNIT HEATER
VWC	VERTICAL WALL COVERING
W	
W	WATT, WEST
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
WB	WOOD BASE
WC	WALL COVERING, WATER CLOSET
WD	WOOD
WDW	WINDOW
WF	WIDE FLANGE
WH	WATER HEATER, WALL HUNG
WI	WROUGHT IRON
WM	WIRE MESH
WP	WATER PROOFING, WEATHERPROOF
WR	WATER REPELENT, WEATHER RESISTANT
WSCT	WAINSCOT
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
X	
X	BY
Y	
Y	YD

Graphic Symbols

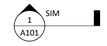
01 GENERAL

NEW WALL

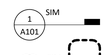
EXISTING WALL TO BE REMOVED

EXISTING WALL

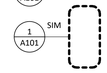
BUILDING SECTION



WALL SECTION

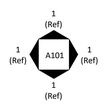


DETAIL SECTION



DETAIL REFERENCE

EXTERIOR ELEVATION TAG



INTERIOR ELEVATION TAG


BREAK LINE

ROOM TAG

INTERIOR PARTITION TYPE SYMBOL

WINDOW TYPE SYMBOL

BENCHMARK/SPOT ELEV. SYMBOL

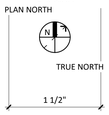
COLUMN LINE/GRID INDICATOR

REVISION INDICATOR

DOOR TAG

FLOOR LEVEL SYMBOL

CEILING HEIGHT SYMBOL



NORTH ARROWS

DIMENSION

ALIGN TWO WALLS OR OBJECTS

Materials Graphics

02 SITE CONSTRUCTION

EARTH (existing)

EARTH (backfill)

DRAINAGE FILL

03 CONCRETE

CAST-IN-PLACE CONCRETE

PRECAST CONCRETE

04 MASONRY

BRICK

CONCRETE MASONRY UNITS

GLASS BLOCK

STONE

CAST STONE

GROUT

05 METALS

ALUMINUM

STEEL

06 WOODS AND PLASTICS

CONTINUOUS WOOD

INTERMITTENT WOOD

FINISH WOOD

HARDBOARD

MEDIUM DENSITY FIBER BOARD (MDF)

PARTICLE BOARD

PLYWOOD

SOLID SURFACE MATERIAL

07 THERMAL & MOISTURE PROTECTION

BATT INSULATION

LOOSE FILL INSULATION

RIGID INSULATION

08 GLAZING

GLASS

09 FINISHES

LATH AND PLASTER

GYPSUM BOARD

General Architectural Drawing Notes:

1. VERIFY DIMENSIONS AND EXISTING CONDITIONS BEFORE COMMENCING WORK. REPORT DISCREPANCIES TO THE ARCHITECT PRIOR TO PROCEEDING WITH AFFECTED WORK.
2. BUILDING FLOOR PLAN DIMENSIONS ARE REFERENCED FROM STRUCTURAL GRID, FACE OF CONCRETE, FACE OF MASONRY, OR FACE OF FINISHED SURFACE, UNLESS NOTED OTHERWISE.
3. REFLECTED CEILING PLAN DIMENSIONS ARE REFERENCED FROM FINISHED SURFACES UNLESS NOTED OTHERWISE. CEILING HEIGHTS ARE DIMENSIONED FROM FLOOR TO FINISHED CEILING HEIGHT.
4. CASEWORK, PLUMBING FIXTURES, TOILET PARTITIONS, AND OTHER FIXTURES AND EQUIPMENT ARE DIMENSIONED FROM FINISHED SURFACES UNLESS NOTED OTHERWISE.
5. DIMENSIONS NOTED AS "FIELD VERIFY" SHALL BE CHECKED AT THE SITE BY THE CONTRACTOR AND REVIEWED WITH THE ARCHITECT BEFORE INCORPORATING INTO THE WORK.
6. DIMENSIONS NOTED AS "CLEAR" REQUIRE SPECIFIC COORDINATION BETWEEN DISCIPLINES AND/OR MANUFACTURERS.
7. DRAWINGS NOTED AT "N.T.S." ARE NOT TO SCALE.
8. DO NOT SCALE DRAWING. WRITTEN DIMENSIONS TAKE PRECEDENCE. IF CLARIFICATION IS REQUIRED IN ORDER TO DETERMINE THE INTENT OF THE CONTRACT DOCUMENTS, CONTACT THE ARCHITECT.
9. NOTES OR DIMENSIONS LABELED "TYPICAL" SHALL APPLY TO SITUATIONS THAT ARE THE SAME OR SIMILAR.

General Materials & Equipment Notes:

1. PROVIDE GALVANIC PROTECTION BETWEEN DISSIMILAR METALS.
2. INSTALL PIPING AND CONDUIT TIGHT TO WALLS, COLUMNS AND ROOF DECK.
3. SEAL ALL PIPE OR CONDUIT PENETRATIONS WITH APPROPRIATE SEALANT. PROVIDE FIRE SEALANT AT RATED PARTITIONS.
4. PLYWOOD AND WOOD BLOCKING SHALL BE FIRE RESISTANT.
5. DO NOT CUT OR DRILL ANY STRUCTURAL MEMBER, OTHER THAN DESCRIBED ON THE STRUCTURAL DRAWINGS, WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER.

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8345 Lenexa Drive, Suite 300
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816.742.5000
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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

UNLESS A PROFESSIONAL SEAL WITH SIGNATURE AND DATE IS AFFIXED, THIS DOCUMENT IS PRELIMINARY AND IS NOT INTENDED FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

Graphic Symbols, Abbreviations, and General Information

A001

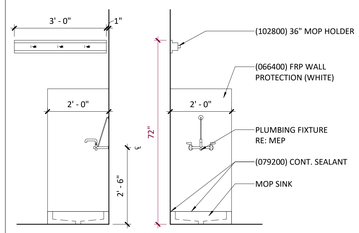
Specialty Equipment Schedule

Mark	Description	Comments
102600 - WALL AND DOOR PROTECTION		
CG01	3/4" X 3/4" ANODIZED ALUMNIMUM CORNER GUARD 8' TALL	
102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES		
GB-18V	STRAIGHT GRAB BAR 18" (VERTICAL)	CONTRACTOR PROVIDED AND INSTALLED
GB-36	STRAIGHT GRAB BAR 36"	CONTRACTOR PROVIDED AND INSTALLED
GB-42	STRAIGHT GRAB BAR 42"	CONTRACTOR PROVIDED AND INSTALLED
MR01	MIRROR	CONTRACTOR PROVIDED AND INSTALLED
PTD01	PAPER TOWEL DISPENSER	OWNER PROVIDED, CONTRACTOR INSTALLED
SD01	AUTOMATIC SOAP DISPENSER	OWNER PROVIDED, CONTRACTOR INSTALLED
SND01	SURFACE MOUNTED SANITARY NAPKIN DISPOSAL	CONTRACTOR PROVIDED AND INSTALLED
TPD01	TOILET TISSUE DISPENSER	OWNER PROVIDED, CONTRACTOR INSTALLED
104413 - FIRE PROTECTION CABINET		
FE01	FIRE EXTINGUISHER CABINET	SEMI-RECESSED
FE02	FIRE EXTINGUISHER CABINET	WALL MOUNTED

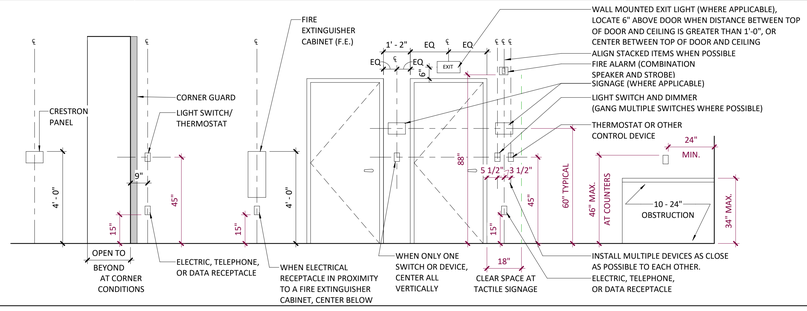
2

Specialty Equipment Notes:

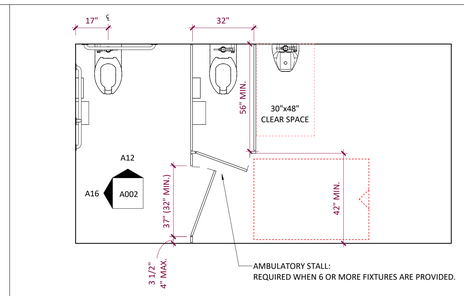
1. THIS PROJECT WILL COMPLY WITH ALL AMERICAN WITH DISABILITIES REGULATIONS AND ALL LOCAL ACCESSIBILITY CODE REQUIREMENTS.
2. ALL MOUNTING HEIGHTS ARE TO COMPLY WITH ICC/ANSI-A117.1 REFER TO FIXTURE HEIGHT GUIDELINES FOR TYPICAL MOUNTING HEIGHTS. COORDINATE WITH OWNER/ARCHITECT FOR ANY ITEMS IN CONFLICT OR NOT EXPLICITLY INDICATED.
3. PROVIDE WOOD BLOCKING AT ALL EQUIPMENT FIXTURES, AND ACCESSORIES INCLUDED OWNER PROVIDED ITEMS WHETHER OR NOT SUCH BLOCKING IS NOTED OR SPECIFIED.
4. ACCESSORIES SHOWN ARE GENERIC. REFER TO SCHEDULE SPECIFIED MODEL.
5. FIXTURES ACCESSORIES SHOWN ARE GENERIC. REFER TO PLUMBING DRAWINGS FOR SCHEDULED FIXTURES.



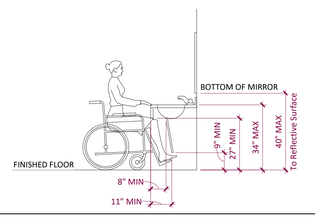
Typical Janitor Closet G9
1/2" = 1'-0"



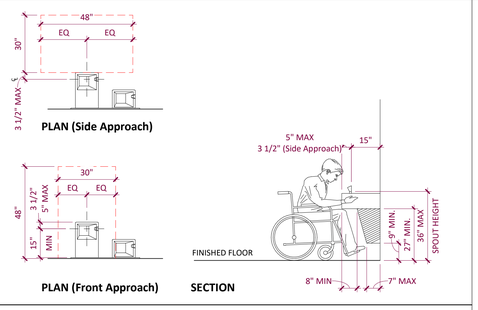
Miscellaneous Heights G1
3/8" = 1'-0"



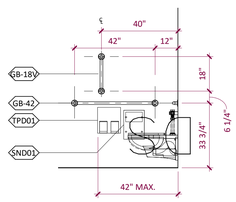
Floor Plan - Toilet Fixture Standard D12
3/8" = 1'-0"



Lavatory Guidelines D9
3/8" = 1'-0"

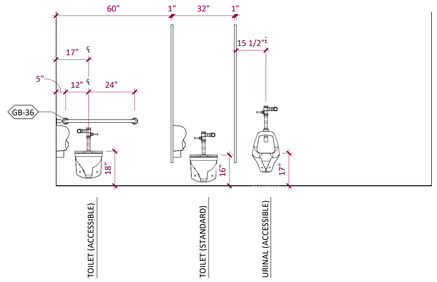


Drinking Fountain Guidelines D5
3/8" = 1'-0"

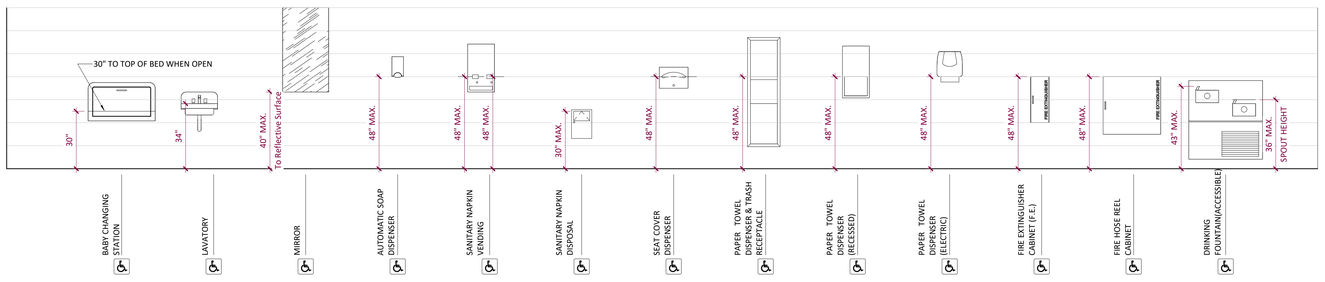


* 12 INCH ONLY REQUIRED WHERE USED FOR ACCESSIBLE TOE CLEARANCE

ADA Stall A16
3/8" = 1'-0"



Interior Elevation - Toilet Fixture Standards A12
3/8" = 1'-0"



Fixture Height Guidelines A1
3/8" = 1'-0"

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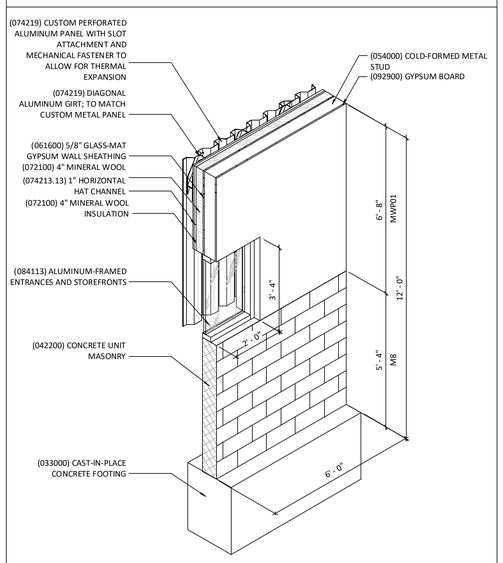
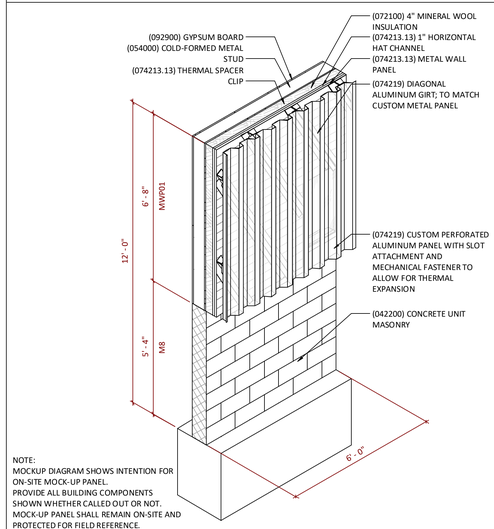
Accessibility Standards
A002

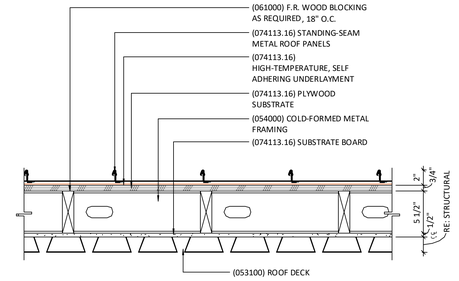


Exterior Envelope Mockup - Back Face F11

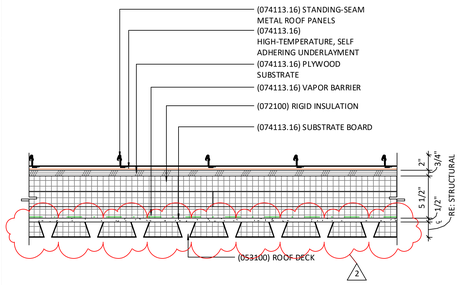


NOTE:
MOCKUP DIAGRAM SHOWS INTENTION FOR ON-SITE MOCK-UP PANEL.
PROVIDE ALL BUILDING COMPONENTS SHOWN WHETHER CALLED OUT OR NOT.
MOCK-UP PANEL SHALL REMAIN ON-SITE AND PROTECTED FOR FIELD REFERENCE.
REFERENCE THE DETAILS AND SPECIFICATIONS FOR FULL ASSEMBLY REQUIREMENTS.

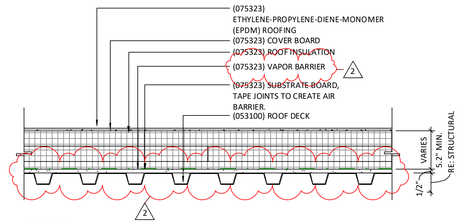
Exterior Envelope Mockup - Front Face A11



ROOF03
STANDING SEAM METAL ROOFING (INSULATED R30 MINIMUM) OVER METAL DECK

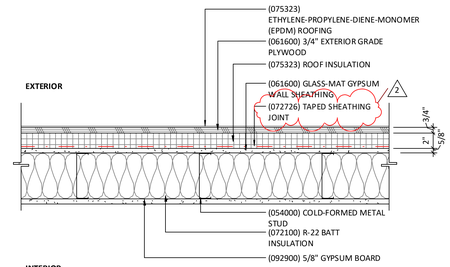


ROOF02
STANDING SEAM METAL ROOFING (INSULATED R30 MINIMUM) OVER METAL DECK

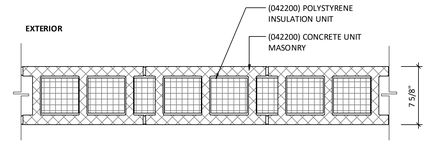


ROOF01
(EPDM) (INSULATED R30 MINIMUM) OVER METAL DECK

Roof Types A7
1 1/2" = 1'-0"

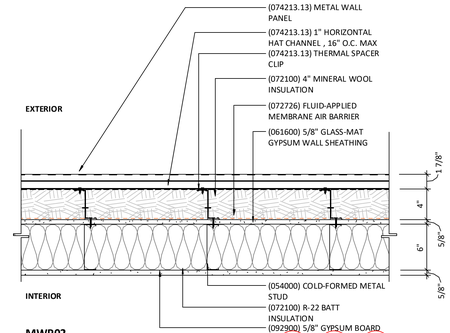


SPM1
SINGLE PLY MEMBRANE ON METAL STUDS

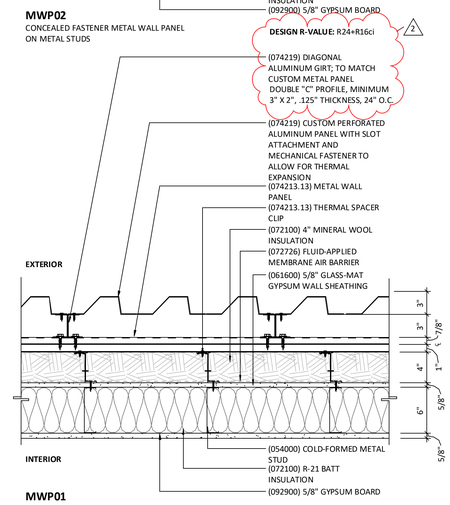


M8
INSULATED CMU WALL

NOTE: MIMIMUM R-VALUE OF R-8.6



MWP02
CONCEALED FASTENER METAL WALL PANEL ON METAL STUDS



MWP01
PERFORATED CORRUGATED METAL PANEL OVER FORMED METAL WALL PANEL ON METAL STUDS

NOTE: REFER TO SHEET A331 FOR CUSTOM METAL PANEL PROFILE AND PERFORATION PATTERNS.

Exterior Wall Types A3
1 1/2" = 1'-0"

General Notes (Exterior Enclosure):

1. ALL OPENINGS, FLASHING, COUNTER FLASHING, AND EXPANSION JOINTS SHALL BE WATERTIGHT.
2. ALL OPEN JOINTS, PENETRATIONS, AND OTHER OPENINGS IN THE ENVELOPE SHALL BE SEALED, GASKETED, OR WEATHER-STRIPPED TO LIMIT AIR LEAKAGE.
3. PROVIDE MOLD RESISTANT GYPSUM BOARD AT ALL EXTERIOR WALLS.

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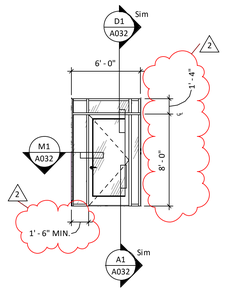
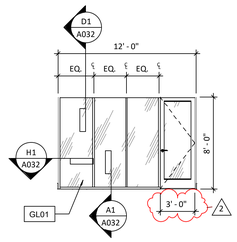
Exterior Enclosure Types

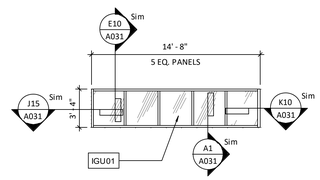
A020



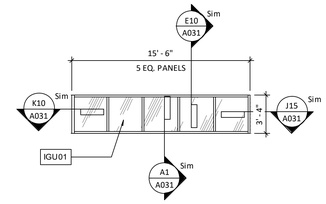
Interior Storefront Glazing - Type G J15
3/16" = 1'-0"



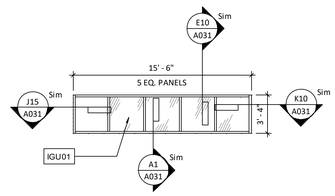
Interior Storefront Glazing - Type F J11
3/16" = 1'-0"



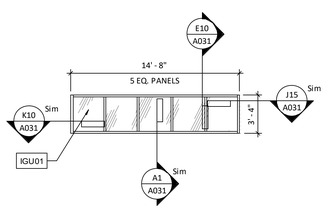
Exterior Storefront Glazing - Type E.4 J7
3/16" = 1'-0"



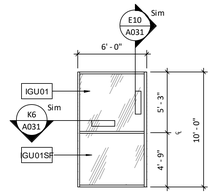
Exterior Storefront Glazing - Type E.3 J3
3/16" = 1'-0"



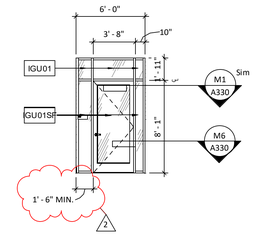
Exterior Storefront Glazing - Type E.2 E15
3/16" = 1'-0"



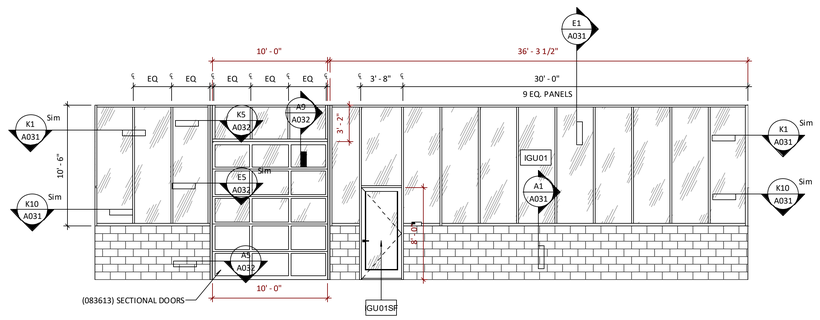
Exterior Storefront Glazing - Type E.1 E11
3/16" = 1'-0"



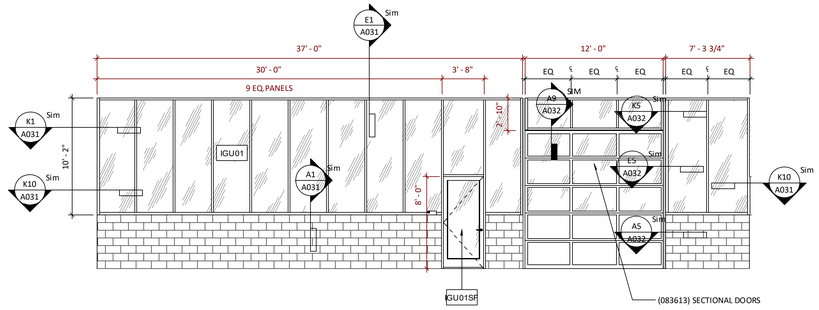
Exterior Storefront Glazing - Type D E7
3/16" = 1'-0"



Exterior Storefront Glazing - Type C E3
3/16" = 1'-0"



Exterior Storefront Glazing - Type B A11
3/16" = 1'-0"



Exterior Storefront Glazing - Type A A3
3/16" = 1'-0"

General Notes (Windows):

1. ALL EXTERIOR GLAZING SHALL BE SCHEDULED IN PROJECT MANUAL.
2. CONTRACTOR TO COORDINATE SILL HEIGHTS AND FIELD VERIFY ALL CORNER CONDITIONS WITH ELEVATIONS AND WALL SECTIONS.
3. CONTRACTOR TO VERIFY ALL WINDOW COUNTS AND TYPES.
4. PROVIDE SAFETY GLAZING IN ALL OPERABLE OR FIXED PANELS WHERE REQUIRED.
5. BUTT-GLAZED JOINTS SHALL BE 3/8" NOMINAL, UNLESS NOTED OTHERWISE.

Glazing Schedule - Basic

Mark	Description
GL01	1/4" CLEAR (TEMPERED)
IGU01	1" INSULATED GLASS
IGU01SF	1" INSULATED GLASS (SECURITY GLASS)

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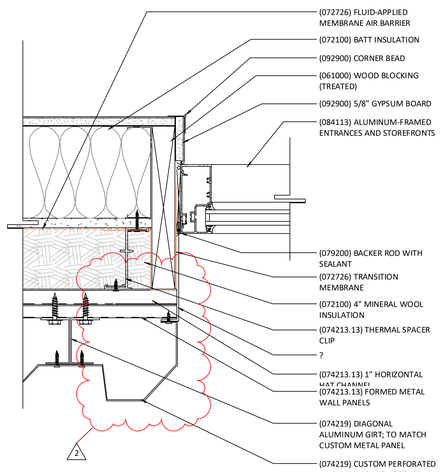
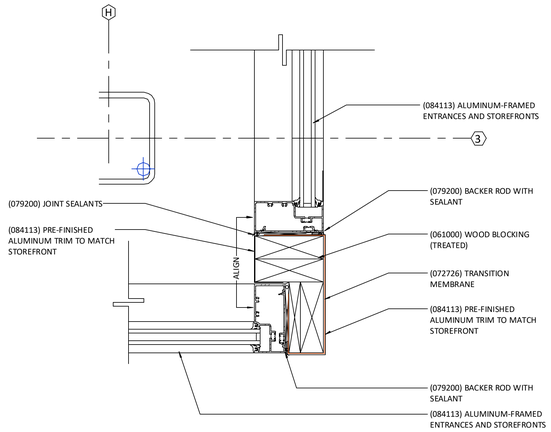
Interior & Exterior Window Schedule & Types

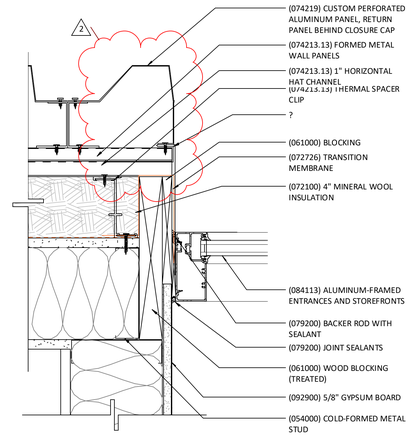
A030



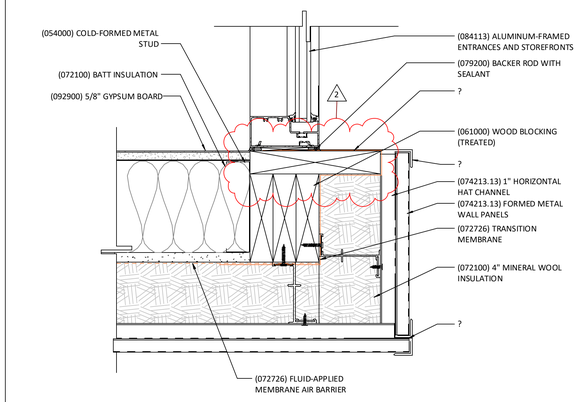
Window Jamb Detail @ Type E Jamb J15
3" = 1'-0"



Window Jamb Detail @ Corner Glass K10
3" = 1'-0"



Window Jamb Detail @ Entry K6
3" = 1'-0"

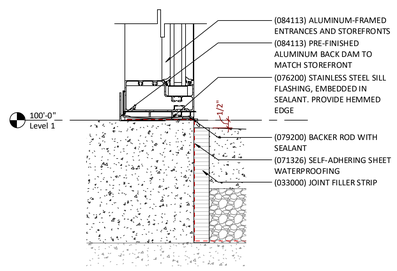


Window Jamb Detail @ Canopy Metal Panel K1
3" = 1'-0"

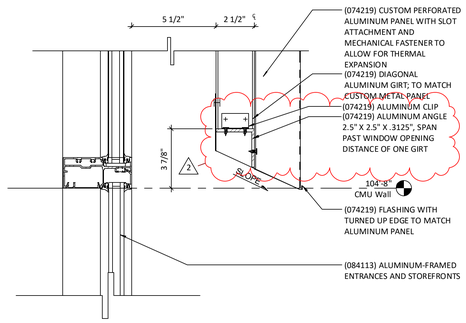
Window Head Detail @ Custom Metal Panel, Typ. E10
3" = 1'-0"

Window Head Detail @ Entry E6
3" = 1'-0"

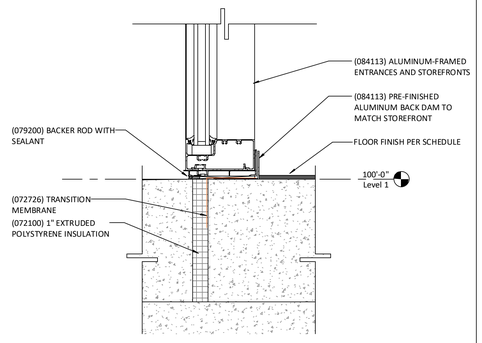
Window Head Detail @ Canopy Metal Panel, Typ. E1
3" = 1'-0"



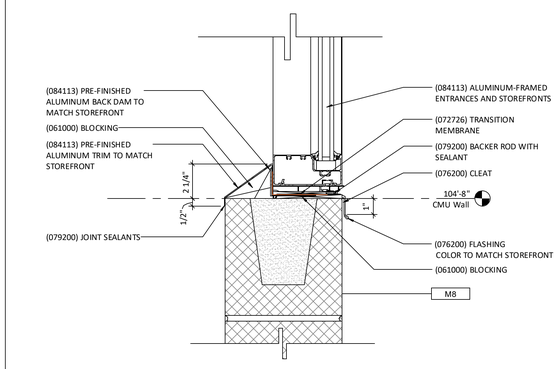
Sill Detail @ Grade A15
3" = 1'-0"



Horizontal Mullion Detail @ Metal Panel A10
3" = 1'-0"



Window Sill Detail @ Entry A6
3" = 1'-0"



Window Sill Detail @ CMU Typ. A1
3" = 1'-0"

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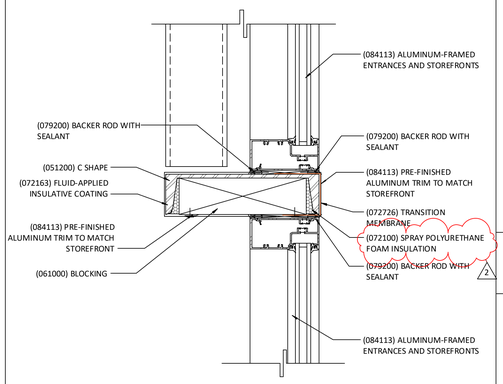
STATE OF MISSOURI
ADAM LEE STERNS
NUMBER A-7490
REGISTERED ARCHITECT

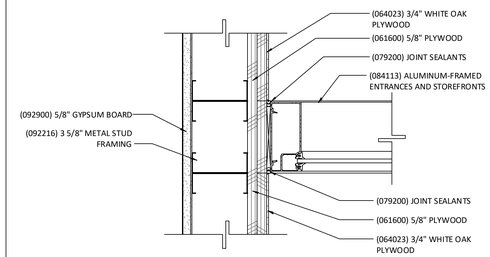
Interior & Exterior Storefront Details

A031



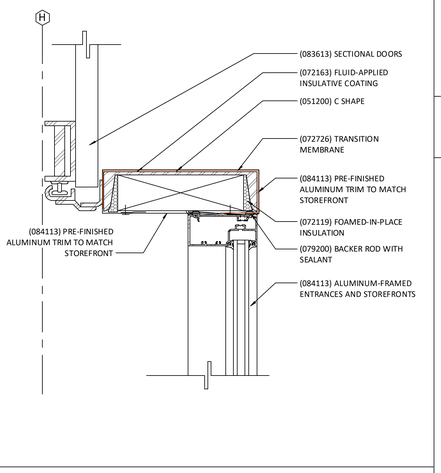
Plan Detail @ Canopy Storefront to Steel Connection K5

3" = 1'-0"



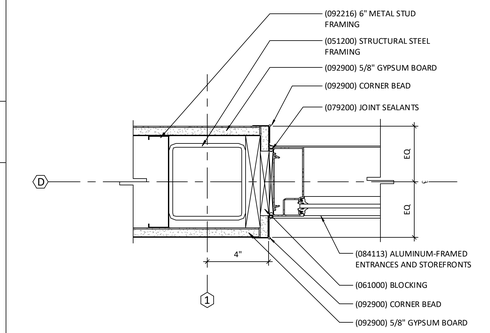
Interior Window Jamb Detail @ Wood M1

3" = 1'-0"



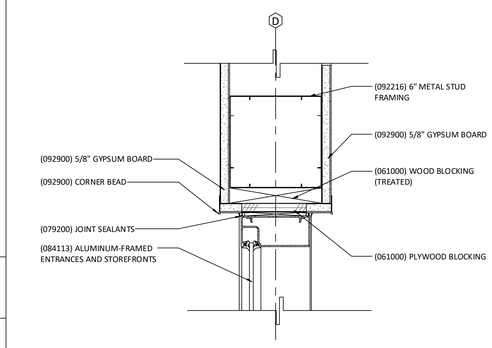
Plan Detail of Sectional Door @ Storefront E5

3" = 1'-0"



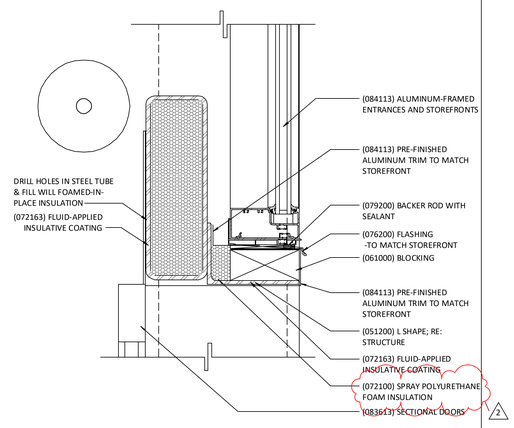
Interior Window Jamb Detail @ Gyp. H1

3" = 1'-0"



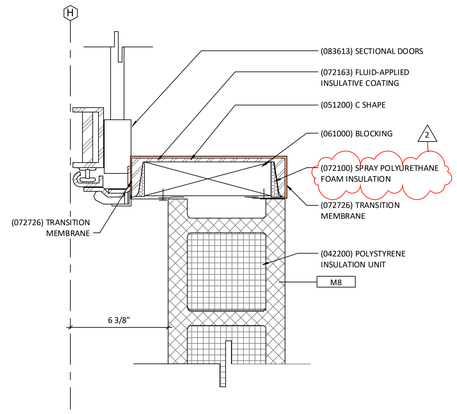
Interior Window Head Detail D1

3" = 1'-0"



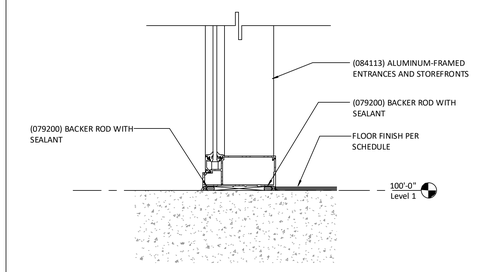
Window Sill Detail above Sectional Door A9

3" = 1'-0"



Plan Detail of Sectional Door @ CMU A5

3" = 1'-0"



Interior Window Sill Detail A1

3" = 1'-0"

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LSR7 Robotics, GiC & Phys Education

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LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

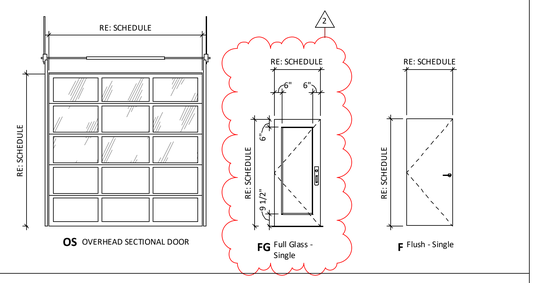
Interior & Exterior Storefront Details

A032

Door Schedule LSN / LSW

Mark	Room From:	Room To:	Assembly Hardware Set	Assembly Fire Rating	Assembly Detail Type	Size Finished Opening Width	Size Finished Opening Height	Size Thickness	Door Type Mark	Door Material	Door Finish	Frame Type	Frame Material	Frame Finish	Comments
R101.1		R101	01	NR	B/C	3' - 6"	8' - 0"	1 3/4"	FG	AL/GL	ANNO / IGU-01	AL	AL	ANNO	
R101.2	R101	R105	07	NR	C	3' - 6"	7' - 11 19/64"	1 3/4"	FG	AL/GL	ANNO / IGU-01	AL	AL	ANNO	
R102	R101	R102	08	NR	A	3' - 0"	8' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R103	R101A	R103	15	NR	A	3' - 0"	7' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R104	R101A	R104	15	NR	A	3' - 0"	7' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R105.1		R105	05	NR	B/C	3' - 6"	8' - 0"	1 3/4"	FG	AL/GL	ANNO / IGU-01SF	AL	AL	ANNO	
R105.2			16	NR	-	10' - 2"	12' - 0"	1 3/4"	OS	AL/GL	ANNO / IGU-01 / IGU-01SF	STL	STEEL	PT-02	OVERHEAD SECTIONAL DOOR (083613)
R106	R106		09	NR	A	3' - 0"	8' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R107	R107	R105	10	NR	A	3' - 0"	8' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R108	R105	R108	06	NR	A	3' - 0"	8' - 0"	1 3/4"	F	WD	WD-02	HM	HM	PT-02	
R109.1	R109	R101	13	NR	C	3' - 0 1/2"	8' - 0"	1 3/4"	FG	AL/GL	ANNO / IGU-01	AL	AL	ANNO	
R109.2		R109	02	NR	B/C	3' - 6"	8' - 0"	1 3/4"	FG	AL/GL	ANNO / IGU-01SF	AL	AL	ANNO	
R109.3			16	NR	-	12' - 2"	12' - 0"	1 3/4"	OS	AL/GL	ANNO / IGU-01/IGU-01SF	STL	STEEL	PT-02	OVERHEAD SECTIONAL DOOR (083613)

2



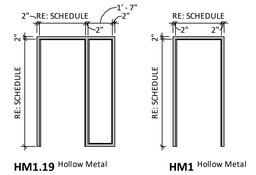
OS OVERHEAD SECTIONAL DOOR

FG Full Glass - Single

F Flush - Single

Door Types - LSN M3

1/4" = 1'-0"



HM1.19 Hollow Metal

HM1 Hollow Metal

Frame Types

1/4" = 1'-0"

General Notes (Door Schedule):

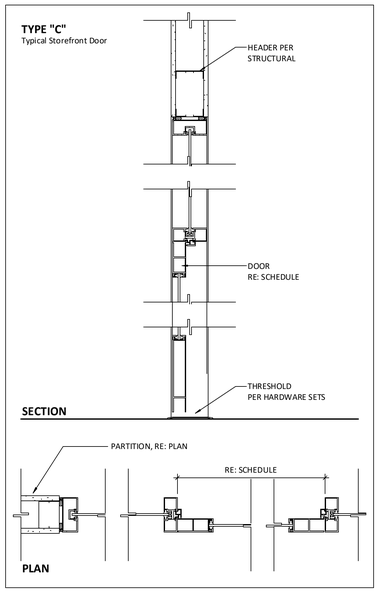
Note: SHADED CELLS IN THE SCHEDULE ARE ELEMENTS OF THE DOOR THAT ARE EXISTING TO REMAIN AND FOR INFORMATION ONLY.

1. THRESHOLDS SHALL COMPLY WITH ACCESSIBILITY REGULATIONS.
2. ALL DOOR FRAMES ARE TO BE WELDED.
3. EDGE CLEARANCES IN ACCORDANCE WITH AWI QUALITY STANDARDS.
4. DOORS LOCATED IN CORNERS ARE TO HAVE THE INSIDE FACE OF JAMB LOCATED 4 INCHES FROM THE ADJACENT WALL FINISH (8 INCHES IN MASONRY WALLS) UNLESS NOTED OTHERWISE.
5. PROVIDE BLOCKING AT ALL WALL MOUNTED DOOR STOPS.
6. GLAZING STOPS IN WOOD DOORS: SAME SPECIES AS DOOR FACE, MITERED CORNERS, CONCEALED FASTENERS.
7. FACTORY FINISH WOOD DOORS.
8. ALL EXIT DOORS SHALL BE OPERABLE FROM INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT AND SHALL BE LABELED "THIS DOOR TO REMAIN UNLOCKED DURING BUSINESS HOURS." THIS SIGN SHALL BE IN LETTERS NOT LESS THAN ONE INCH HIGH ON A CONTRASTING BACKGROUND. SPECIAL LOCKING DEVICES SHALL BE OF AN APPROVED TYPE, MANUALLY OPERATED. FLUSH BOLTS OR SURFACE BOLTS ARE PROHIBITED.
9. PROVIDE CLOSERS AT ALL FIRE RATED AND EXTERIOR DOORS. COORDINATE WITH HARDWARE SETS.
10. PROVIDE SAFETY GLAZING IN ALL DOORS AND ASSOCIATED ACTIVE/FIXED PANELS.
11. PROVIDE SAFETY GLAZING IN FIXED OR OPERABLE PANELS WHERE WITHIN 24 INCHES OF EITHER EDGE OF AN OPERABLE DOOR.
12. PROVIDE SAFETY GLAZING IN FIXED OR OPERABLE PANELS WHERE WITHIN 18 INCHES FROM AND RAMP/STAIR LANDING OR HAND/GUARDRAIL.
13. ANY DOOR CARRYING A U.L. RATING SHALL BE INSTALLED IN A U.L. RATED FRAME CARRYING THE SAME DESIGNATION.
14. PROVIDE FIRE RATED GLAZING IN PANELS LOCATED WITHIN A RATED WALL.
15. CONTRACTOR TO COORDINATE SILL HEIGHTS WITH ELEVATIONS AND WALL SECTIONS.
16. PAINT METAL DOORS AND FRAMES TO MATCH ADJACENT WALLS UNLESS OTHERWISE NOTED. REFER TO FINISH LEGEND FOR ADDITIONAL INFORMATION.
17. REFER TO "PROJECT MANUAL" FOR HARDWARE SETS AND ADDITIONAL DOOR REQUIREMENTS.

DOOR LEGEND:

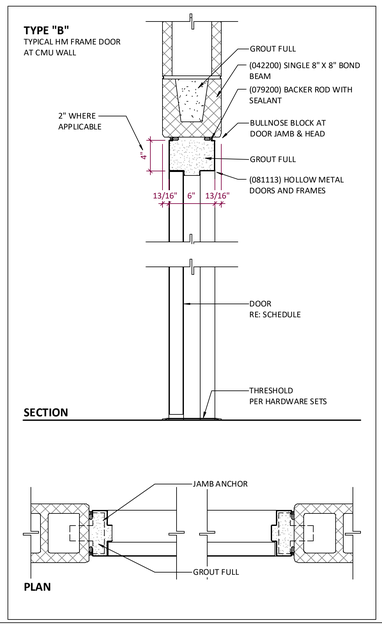
AL	ALUMINUM
ANNO	ANODIZED
CA	CARD ACCESS DEVICE
CL	CLOSER
FRP	FIBERGLASS
GL	GLASS
HC	HOLLOW CORE
HM	HOLLOW METAL
IMP	INSULATED METAL PANEL
L	LOUVER
PF	PRE-FINISHED/FACTORY FINISHED
PH	PANIC HARDWARE
PR	PAIR
PTD	PAINTED
SD	SMOKE & DRAFT CONTROL
SS	STAINLESS STEEL
STL	STEEL
T	TEMPERED GLASS
V	VISION
WD	WOOD

2



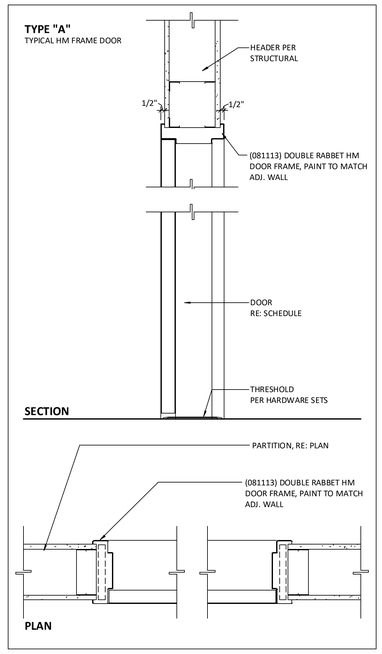
Assembly Detail - Type C A11

1 1/2" = 1'-0"



Assembly Detail - Type B A8

1 1/2" = 1'-0"



Assembly Detail - Type A A3

1 1/2" = 1'-0"

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Issue Date: September 9, 2022

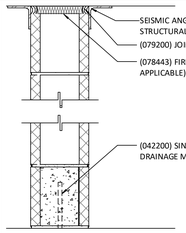
Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

Door Types & Details.

A080

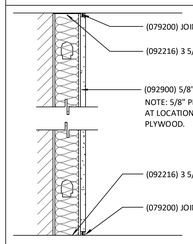
NOTES:
1. REFER TO STRUCTURAL FOR ADDITIONAL INFORMATION



PARTITION SYSTEM:
CONCRETE MASONRY UNIT PARTITION **M**

PARTITION IDENTIFICATION PLAN SYMBOL	M8
BASE PARTITION THICKNESS	7 5/8"
MASONRY MATERIAL	CMU
MASONRY SIZE (NOMINAL)	8X16
BEARING WALL	-
FIRE RATING (HRS)	-
FIRE TEST NUMBER	-
FIRE TEST NUMBER (HEAD OF WALL)	-
(078443) FIRE RESISTIVE JOINTS	-
	-
	-
	-
	-
TO 6" ABOVE CEILING	NO
TO STRUCTURE ABOVE	YES
REMARKS:	

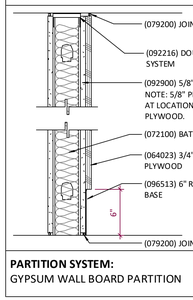
NOTES:
1. PLYWOOD SUBSTRATE TO STOP 2" FROM TOP OF FINISH PLYWOOD, GWB TO DECK.



PARTITION SYSTEM:
GYPSUM FURING PARTITION **F**

PARTITION IDENTIFICATION PLAN SYMBOL	F1	F1P	F4	F4P
BASE PARTITION THICKNESS	2 1/4"	3"	4 1/4"	5"
STUD SPACING (O.C.)	16"	16"	16"	16"
STUD SIZE	1 5/8"	1 5/8"	3 5/8"	3 5/8"
GYPSUM WALLBOARD	5/8"	-	5/8"	-
PLYWOOD SHEATHING	-	5/8"	-	5/8"
PLYWOOD FINISH	-	3/4"	-	3/4"
FIRE RATING (HRS)	-	-	-	-
FIRE TEST NUMBER	-	-	-	-
FIRE TEST NUMBER (HEAD OF WALL)	-	-	-	-
FIRE RESISTIVE JOINTS (079500)	-	-	-	-
ACOUSTIC RATING (STC)	-	-	-	-
ACOUSTICAL TEST NUMBER	-	-	-	-
RESILIENT CHANNELS	-	-	-	-
INSULATION THICKNES	-	-	-	-
(079219) ACOUSTICAL JOINTS	-	-	-	-
TO 6" ABOVE CEILING	YES	NO	YES	NO
GWB STRUCTURE ABOVE	NO	YES	NO	YES
STUDS TO STRUCTURE ABOVE	YES	YES	YES	YES
REMARKS:		SEE NOTE 1		SEE NOTE 1

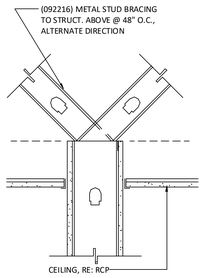
NOTES:
1. PLYWOOD SUBSTRATE TO STOP 2" FROM TOP OF FINISH PLYWOOD, GWB TO DECK.
2. PROVIDE MOISTURE RESISTANT GWB IN WET AREAS
3. EXTEND ALL FIRE RATED WALLS STRUCTURE TO STRUCTURE.
4. USE TYPE "X" GWB FOR ALL FIRE RATED PARTITIONS

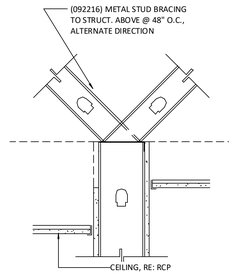


PARTITION SYSTEM:
GYPSUM WALL BOARD PARTITION **G**

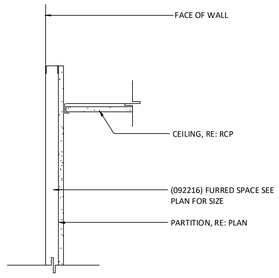
PARTITION IDENTIFICATION PLAN SYMBOL	G4	G4a	G4P	G4Pa	G6	G6a
BASE PARTITION THICKNESS	4 7/8"	4 7/8"	5 5/8"	5 5/8"	7 1/4"	7 1/4"
STUD SPACING (O.C.)	16"	16"	16"	16"	16"	16"
STUD SIZE	3 5/8"	3 5/8"	3 5/8"	3 5/8"	6"	6"
GYPSUM WALLBOARD, EACH SIDE	5/8"	5/8"	-	-	5/8"	5/8"
GYPSUM WALLBOARD, ONE SIDE	-	-	5/8"	5/8"	-	-
PLYWOOD SHEATHING, ONE SIDE	-	-	5/8"	5/8"	-	-
PLYWOOD FINISH, ONE SIDE	-	-	3/4"	3/4"	-	-
FIRE RATING (HRS)	-	-	-	-	-	-
FIRE TEST NUMBER	-	-	-	-	-	-
FIRE TEST NUMBER (HEAD OF WALL)	-	-	-	-	-	-
(078443) FIRE RESISTIVE JOINTS	-	-	-	-	-	-
ACOUSTIC RATING (STC)	-	44	-	44	-	44
ACOUSTICAL TEST NUMBER	-	NGC2514	-	NGC2514	-	NGC2514
RESILIENT CHANNELS	-	NO	-	NO	-	NO
INSULATION THICKNES	-	2 1/2"	-	2 1/2"	-	2 1/2"
ACOUSTICAL JOINTS (079219)	-	YES	-	YES	-	YES
TO 6" ABOVE CEILING	YES	NO	NO	NO	YES	YES
GWB STRUCTURE ABOVE	NO	YES	YES	YES	NO	NO
STUDS TO STRUCTURE ABOVE	YES	YES	YES	YES	YES	NO
REMARKS:				SEE NOTE 1		

Interior Partition Types A10
1 1/2" = 1'-0"

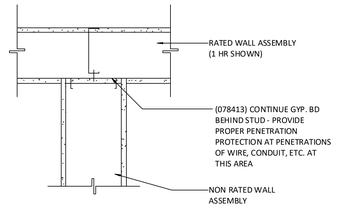


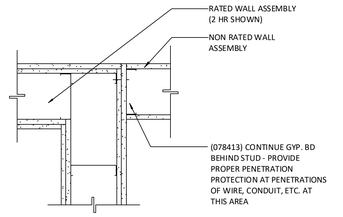


Non-rated Partition 6" Above Ceiling M3
1 1/2" = 1'-0"

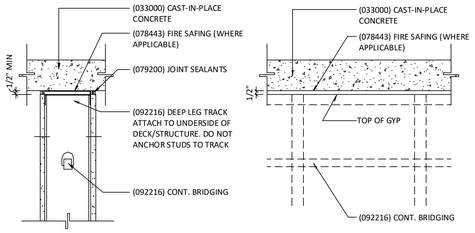


Top of Furring Wall F7
1 1/2" = 1'-0"

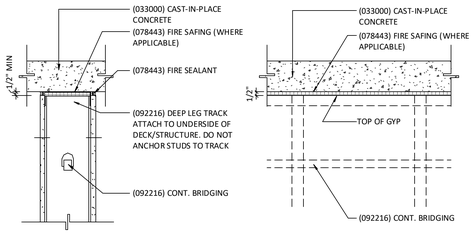




Wall Intersections F3
1 1/2" = 1'-0"



Partition to Underside of Deck - Non-Rated D3
1 1/2" = 1'-0"



Partition to Underside of Deck - Rated A3
1 1/2" = 1'-0"

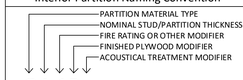
General Notes (Interior Partitions):

1. REFER TO PLANS/CODE PLANS FOR PARTITION TYPE LOCATIONS.
2. PARTITION TYPES DESIGNATED ON PLANS SHALL RUN FROM CORNER TO CORNER UNLESS OTHERWISE NOTED.
3. PARTITIONS SHALL EXTEND TO STRUCTURE ABOVE AND SHALL BE CONSTRUCTED TO ACCOMMODATE DEFLECTION UNLESS NOTED OTHERWISE.
4. FIRE-RESISTANCE-RATED PARTITIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REFERENCED ASSEMBLY DESCRIPTION. REFER TO CODE PLANS FOR MORE INFORMATION.
5. FIRE-RATED WALLS REQUIRED TO HAVE PROTECTED OPENINGS SHALL BE PERMANENTLY IDENTIFIED WITH SIGNS OR STENCILING ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION. SUCH SIGNAGE SHOULD BE ABOVE ACCESSIBLE CEILINGS AND/OR BELOW ACCESSIBLE FLOORS.
6. WHERE DIFFERENT PARTITION TYPES INTERSECT, THE PARTITION TYPE WITH THE GREATER FIRE-RESISTANCE RATING SHALL CONTINUE WITHOUT INTERRUPTION.
7. PENETRATIONS OF FIRE-RESISTANCE-RATED ASSEMBLIES SHALL BE PROVIDED WITH FIRE-RATED PENETRATION PROTECTION IN ACCORDANCE WITH AN APPROVED UNDERWRITERS LABORATORY SYSTEM.
8. FIRE DAMPERS OR FIRE DOORS SHALL BE PROVIDED WHERE AIR DUCTS OR OPENINGS PENETRATE FIRE-RATED PARTITIONS.
9. AT ALL WET AREAS AND LOCATIONS TO RECEIVE TILE. COORDINATE THE SUBSTRATE MATERIAL WITH PROJECT MANUAL. EXTEND THE SUBSTRATE A MINIMUM OF 4'-0" BEYOND THE WET AREA.
10. USE ACOUSTICAL SEALANT AROUND ALL PIPES, DUCTS, CONDUIT, JUNCTION BOXES, ETC. ON BOTH SIDES OF CROSSING / PENETRATING WALLS WITH ACOUSTICAL RATINGS. COLOR MATCH SEALANT TO THE ADJACENT WALL COLOR.
11. PROVIDE IMPACT RESISTANT TRIM OR CASING AT ALL EDGES OF PLASTER AND GYPSUM BOARD SURFACES WHERE IT TERMINATES OR MEETS ANY OTHER MATERIAL, UNLESS NOTED OTHERWISE
12. PROVIDE IMPACT RESISTANT CORNER BEADS AT ALL OUTSIDE CORNERS OF PLASTER AND GYPSUM BOARD SURFACES, UNLESS NOTED OTHERWISE.
13. CONTRACTOR TO PROVIDE WOOD BLOCKING BEHIND ALL TOILET ROOM ACCESSORIES, GRAB BARS, HANDRAILS, WOOD TRIM, AND WALL MOUNTED FIXTURES.
14. INSTALL CONTROL JOINTS IN GYPSUM BOARD CONSTRUCTION AS SHOWN ON THE DRAWINGS AND IN PARTITIONS AND WALL FURRING RUNS EXCEEDING 30 FEET, SPACING CONTROL JOINTS NOT MORE THAN 30 FEET O.C. VERIFY LOCATIONS WITH ARCHITECT. INSTALL CONTROL JOINTS IN FURRED ASSEMBLIES WHERE CONTROL JOINTS OCCUR IN BASE EXTERIOR WALL.

Gypsum Board Schedule

5/8" GYPSUM BOARD	ALL LOCATIONS UNLESS NOTED BELOW OR DETAILED OTHERWISE.
5/8" ABUSE RESISTANT GYPSUM	HIGH TRAFFIC AREAS SUCH AS LOBBIES, PUBLIC CORRIDORS AND WORK ROOMS SUCH AS: JANITOR, HOUSEKEEPING, MECHANICAL, ETC.
5/8" GLASS MAT BACKING BOARD	"WET" WALLS NON-RATED WITH PLUMBING FIXTURES, DRINKING FOUNTAINS, TOILETS, LAVATORIES, URINALS, ETC.
1/2" FIBER CEMENT BACKING PANELS	WALLS EXPOSED DIRECTLY TO RUNNING WATER AND SCHEDULE TO RECIEVE TILE. BATHTUBS, SHOWERS, ETC.
5/8" PLYWOOD SHEATHING	WHERE INDICATED ON PARTITION SCHEDULE
5/8" RATED PLYWOOD SHEATHING	WHERE INDICATED ON PARTITION SCHEDULE

Interior Partition Naming Convention



G4.1Pa

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LSR7 Robotics, GiC & Phys Education

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
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301 NE Tudor Road
Lee's Summit, MO 64086

architect:
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structural engineer:
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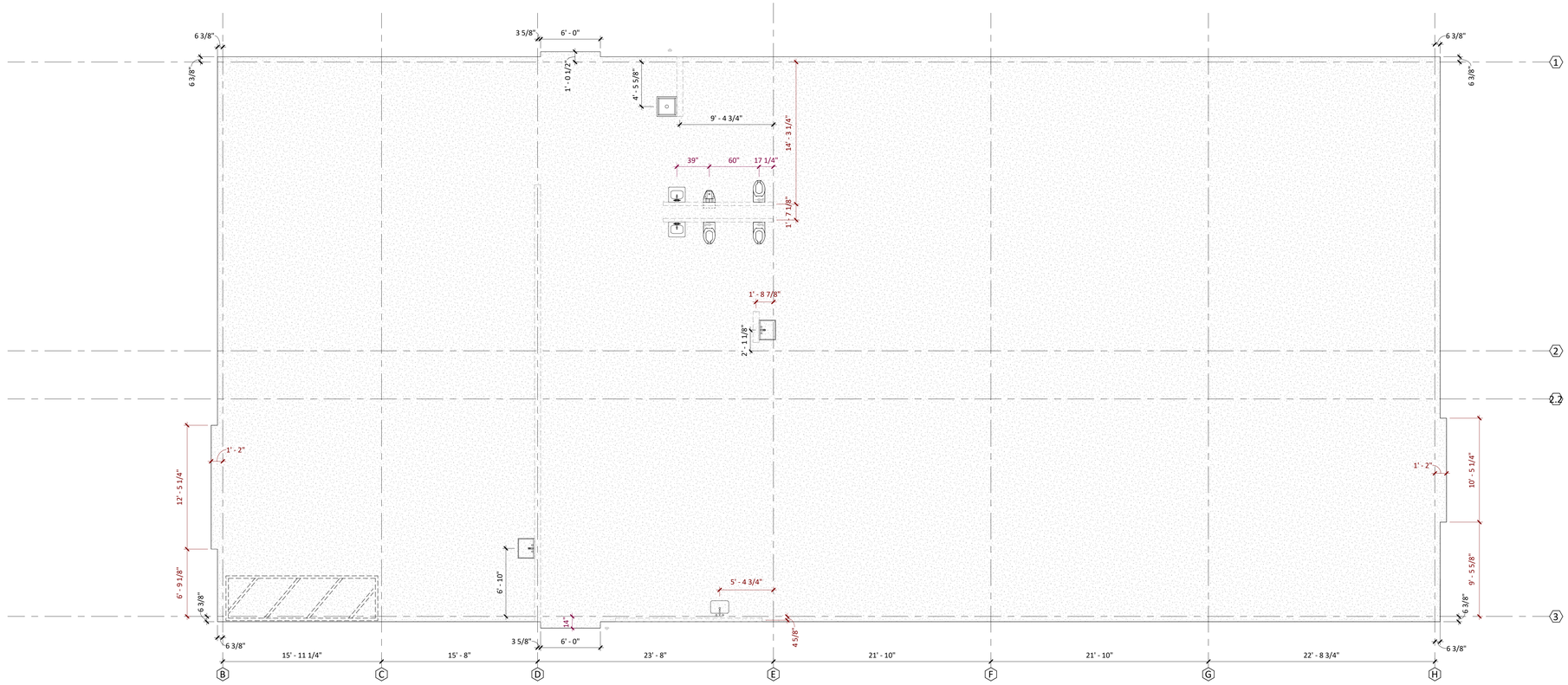
Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/19/2022
2	Addendum 02	09/23/2022

STATE OF MISSOURI
ADAM LEE STERNS
NUMBER A-7460
REGISTERED ARCHITECT

Interior Partition Types
A090



LSN / LSW - Level 1 Slab Plan A1
3/16" = 1'-0"

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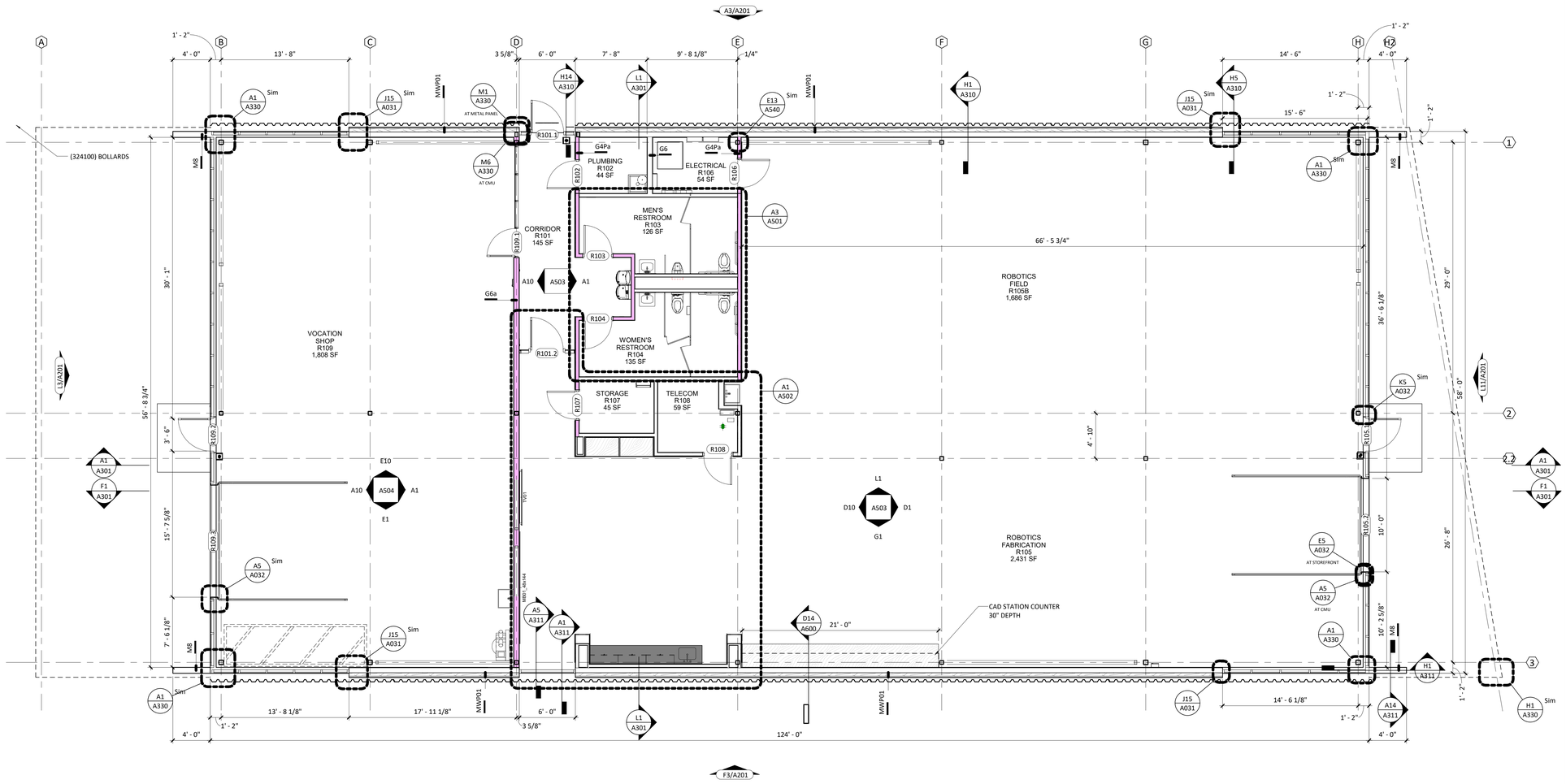
Slab Plan
A100



General Notes (Floor Plans):

1. ALL WALL TYPES TO BE G4.1 UNLESS OTHERWISE NOTED.
2. ALL WALL DIMENSIONS ARE TO FACE OF WALL UNLESS OTHERWISE NOTED.
3. MASONRY WALLS ARE NOMINALLY CENTERED ON GRID LINES AND MASONRY DIMENSIONS ARE NOMINAL UNLESS OTHERWISE NOTED
4. DOORS IN STUD WALLS NEAR PERPENDICULAR WALLS ARE LOCATED 4" OFF FACE OF PERPENDICULAR WALL UNLESS OTHERWISE NOTED.
5. DOORS IN MASONRY WALLS ARE LOCATED IN ROUGH OPENINGS DIMENSIONED ON SHEET
6. SEE GENERAL ACCESSIBILITY SHEET FOR HEIGHTS AND LOCATIONS OF TOILET ACCESSORIES NOT SHOWN ON ELSEWHERE.
7. CONTRACTOR TO FIELD VERIFY ALL MEASUREMENTS AND CONDITIONS NEW AND EXISTING. NOTIFY THE ARCHITECT/OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES.
8. ENLARGED PLANS MAY BE ROTATED OR MIRRORED COORDINATE WITH MAIN FLOOR PLAN.
9. CONTRACTOR TO PROVIDE 4'-0" HIGH PLYWOOD BACKER BOARD IN ALL MECHANICAL AND ELECTRICAL ROOMS MOUNTED 3'-6" A.F.F. FOR PERIMETER OF ROOM

LSN / LSW - Level 1 Floor Plan A3
3/16" = 1'-0"

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Revisions

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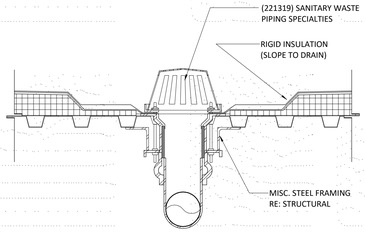
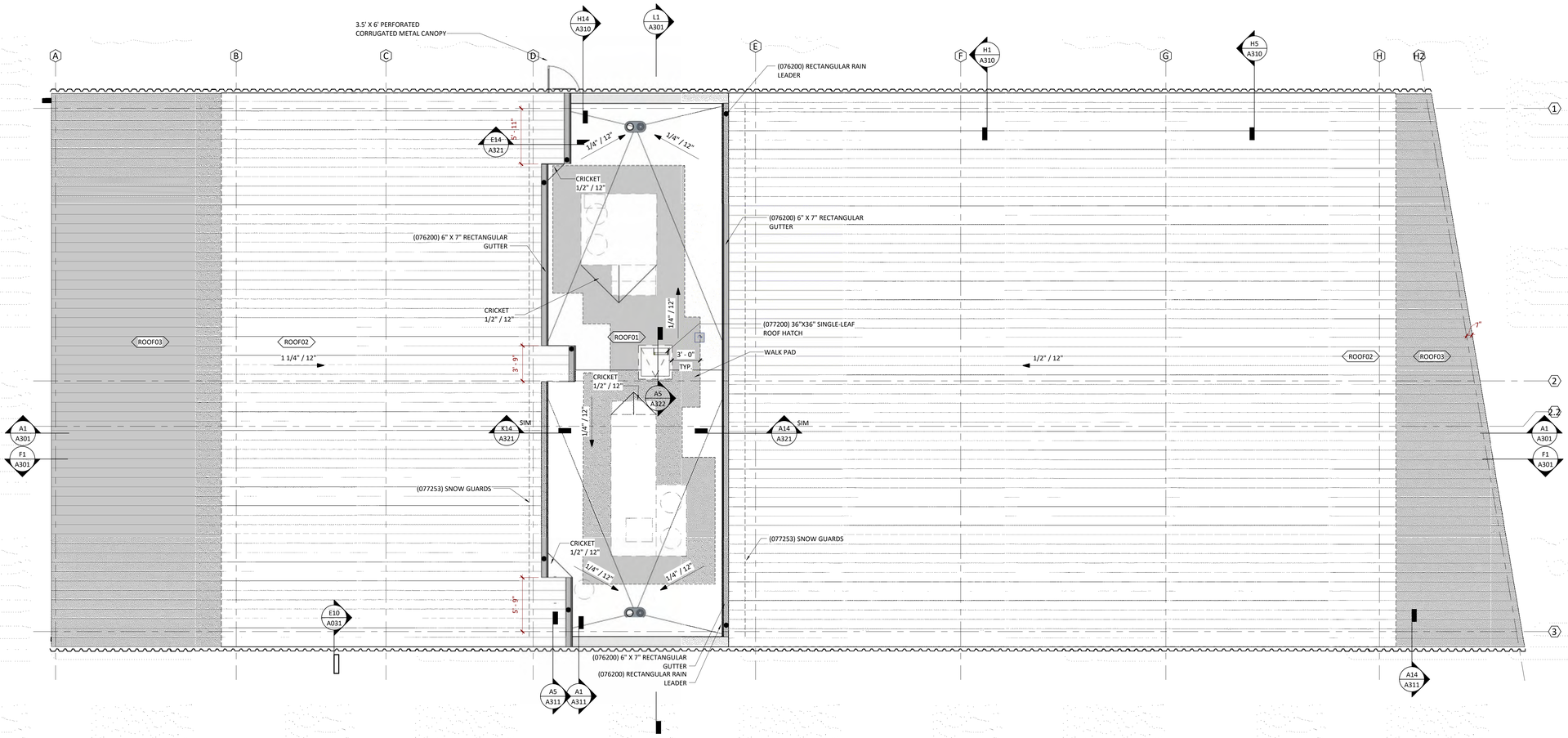
Floor Plan
A101



Section Detail - Typical Roof Drain M3

1 1/2" = 1'-0"



LSN / LSW - Roof Plan A3

3/16" = 1'-0"

General Notes: (Roof Plan)

1. REFER TO EXTERIOR ENCLOSURE TYPES FOR ROOF DETAILS.
2. MINIMUM SLOPES ON ROOF SHALL BE 1/4" PER FOOT IN DIRECTION OF DRAINS OR ROOF EDGE
3. ELEVATION ABBREVIATIONS AS FOLLOWS: **BOD** = BOTTOM OF DECK, **TOS** = TOP OF STEEL, **TOP** = TOP OF PARAPET
4. OBJECT ABBREVIATIONS AS FOLLOWS: **RD** = ROOF DRAIN, **RTU** = ROOFTOP UNIT, **RH** = ROOF HATCH
5. PROVIDE ALL ROOFING DETAILS BY MANUFACTURERS WARRANTED SYSTEMS.
6. PROVIDE WALKWAY PADS AT ALL ROOF LADDERS AND AT ALL ROOFTOP EQUIPMENT WORKING AREAS.
7. PROVIDE CRICKETS AT ALL ROOFTOP EQUIPMENT TO FACILITATE DRAINAGE.

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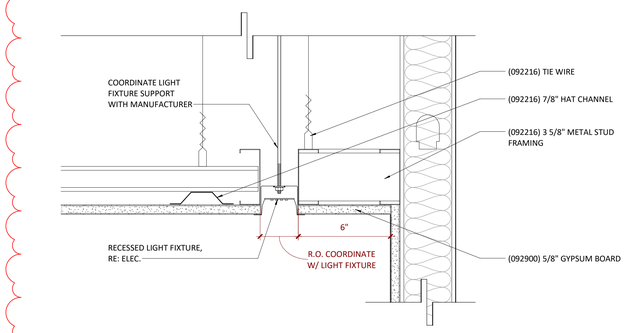
Revisions

NUMBER	DESCRIPTION	DATE

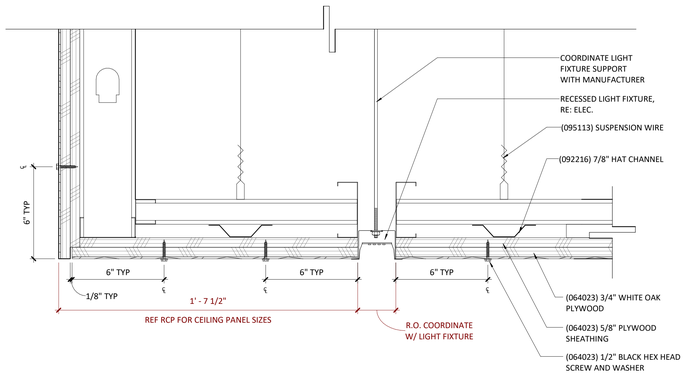
Roof Plan

A111



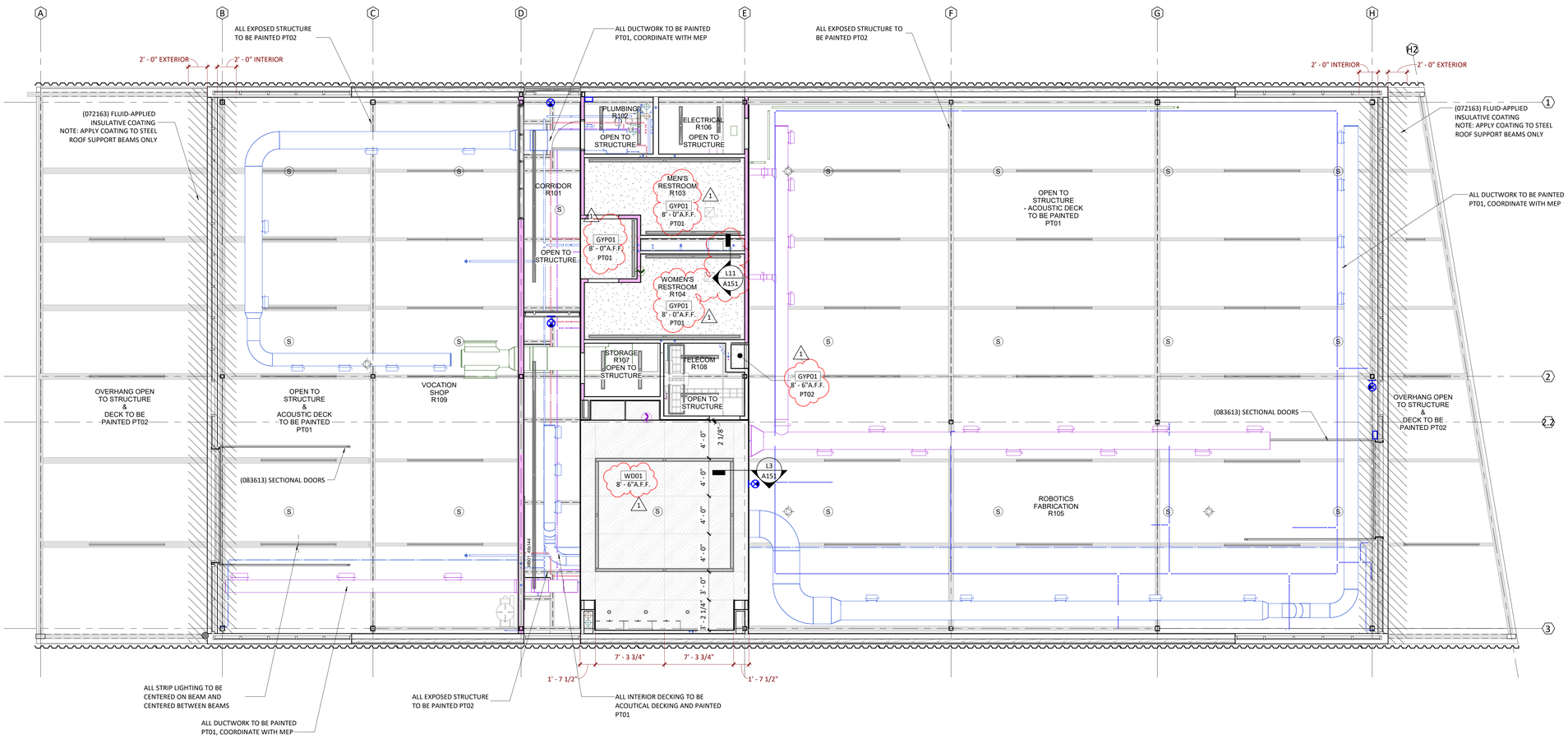
Restroom Ceiling Detail @ Recessed Light L11

3" = 1'-0"



Classroom Ceiling Detail @ Recessed Light L3

3" = 1'-0"



LSN / LSW - Level 1 RCP A3

3/16" = 1'-0"

General Notes (Reflected Ceiling Plans):

1. ALL CEILING AND SOFFIT HEIGHTS ARE GIVEN ABOVE FINISHED FLOOR ELEVATION (EL. 0'-0")
2. GENERALLY ONLY CEILING MOUNTED FIXTURES ARE SHOWN ON THIS PLAN. COORDINATE WITH MEP PLANS FOR ADDITIONAL INFORMATION.
3. SOME OR ALL SPRINKLERS MAY NOT BE SHOWN ON THIS PLAN. COORDINATE WITH MEP DRAWINGS FOR ADDITIONAL INFORMATION. SPRINKLER HEADS TO BE CENTERED ON CEILING TILE, TYP.
4. VERIFY LOCATIONS OF ALL CEILING ACCESS PANELS WITH MEP DRAWINGS. COORDINATE LOCATIONS OF PANELS WITH ARCHITECT PRIOR TO INSTALLATION. ACCESS PANEL FIRE RATINGS MUST MATCH CEILING ASSEMBLY FIRE RATINGS.
5. LIGHTING FIXTURES TO BE CENTERED AND SPACED EQUALLY UNLESS NOTED OTHERWISE.
6. LIGHT FIXTURES ARE SHOWN FOR DIMENSIONAL PURPOSES ONLY COORDINATE WITH ELECTRICAL DRAWINGS FOR FIXTURE DESIGNATIONS.
7. IF PROJECT INCLUDES FIRE RATED CEILINGS, LIGHT FIXTURES LOCATED IN RATED CEILING ASSEMBLIES ARE TO BE TENTED OR OTHERWISE RATED TO MATCH THE CEILING.

Lighting Fixture Legend:

- 2X4 FLORESCENT
- 2X2 FLORESCENT
- STRIP FLORESCENT (RE: PLAN)
- RECESSED CAN LIGHT
- CEILING FAN
- EMERGENCY WALL PACK (PLAN / ELEVATION)
- TRACK LIGHTING
- STEP LIGHT
- COVE LIGHT

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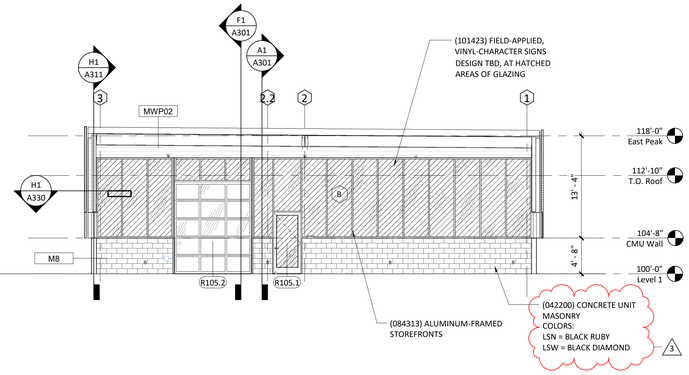
Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/19/2022

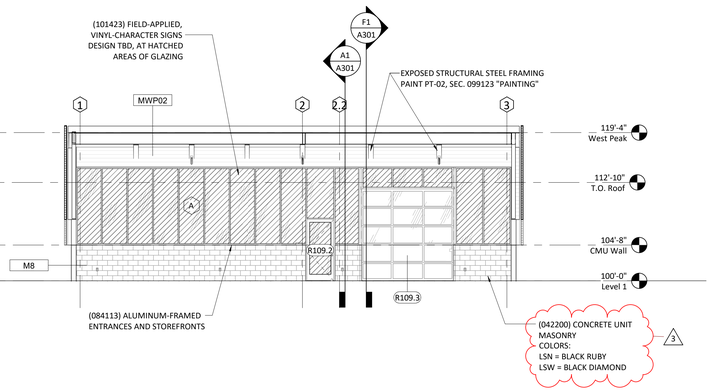
Reflected Ceiling Plan

A151



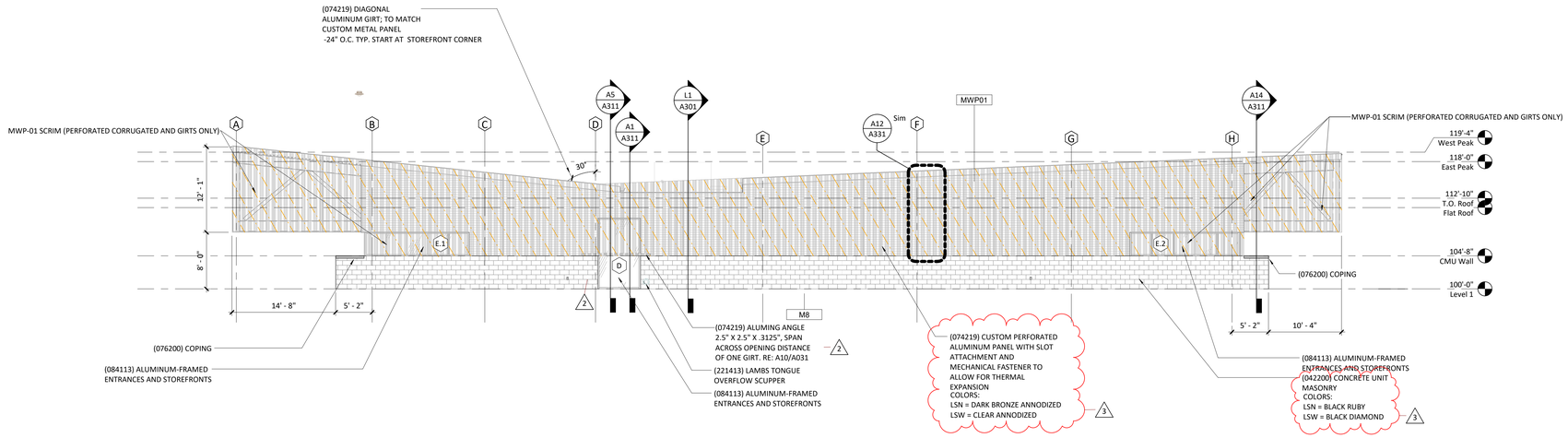
LSN / LSW - East Exterior Elevation L11

1/8" = 1'-0"



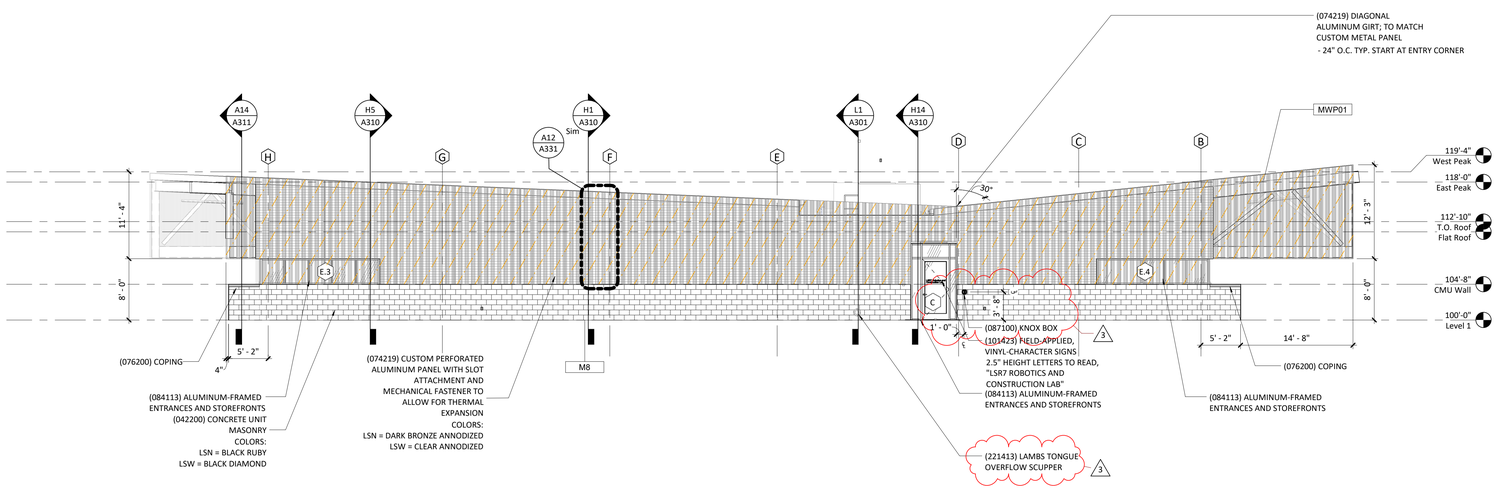
LSN / LSW - West Exterior Elevation L3

1/8" = 1'-0"



LSN / LSW - South Exterior Elevation F3

1/8" = 1'-0"



LSN / LSW - North Exterior Elevation A3

1/8" = 1'-0"

General Notes (Exterior Elevations):

1. MATERIALS AND FINISHES INDICATED APPLY TO ALL SIMILAR ELEMENTS.
2. COORDINATE EXTERIOR LIGHTING FIXTURE TYPES AND LOCATIONS WITH ELECTRICAL DRAWINGS.

Finish Legend - Exterior

MARK	MODEL
042200 CONCRETE MASONRY UNIT	
M8	CONCRETE MASONRY UNIT
074113 STANDING SEAM METAL ROOF PANELS	
ROOF02	STANDING SEAM METAL ROOF
074213.13 FORMED METAL WALL PANEL	
MWP02	CORRUGATED METAL PANEL
074219 CUSTOM PERFORATED ALUMINUM PANEL	
MWP01	METAL RAINSREEN PANEL - CUSTOM
088000 GLAZING	
IGU01	1" INSULATED GLASS
IGU01SF	1" INSULATED GLASS (SECURITY GLASS)

(074219) ALUMINUM RAINSCREEN GIRTS 2'-0" O.C. START AT POINT INDICATED ON ELEVATIONS

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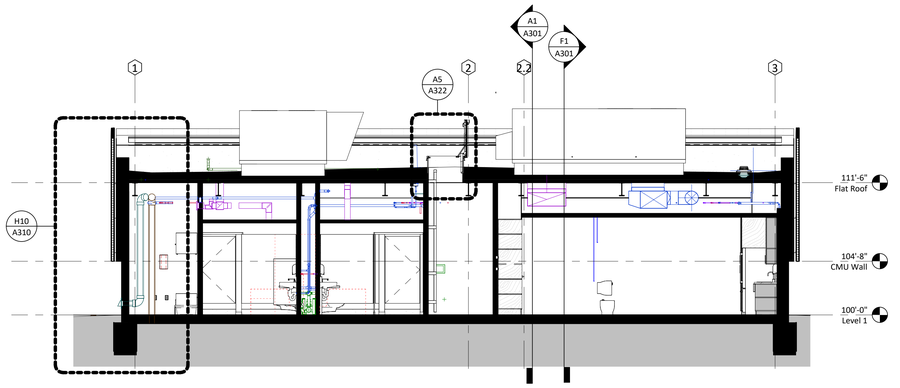
Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022
3	ASI03 - Code Comments	11/09/2022

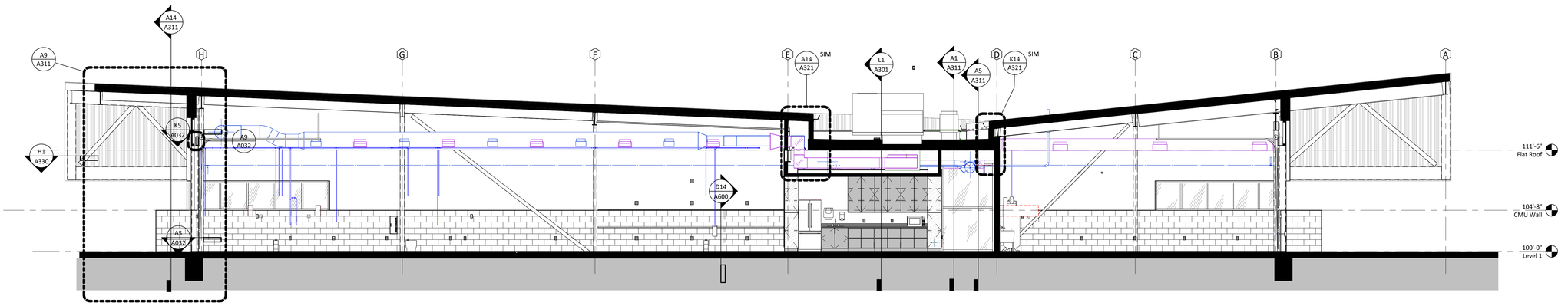
Exterior Elevations

A201



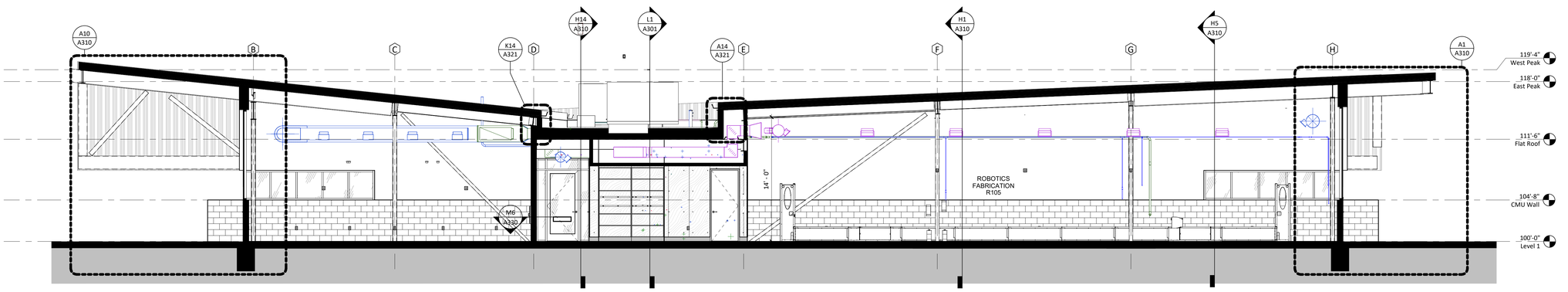
LSN / LSW - Building Section 3 **L1**

3/16" = 1'-0"



LSN / LSW - Building Section 2 **F1**

3/16" = 1'-0"



LSN / LSW - Building Section 1 **A1**

3/16" = 1'-0"

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Revisions

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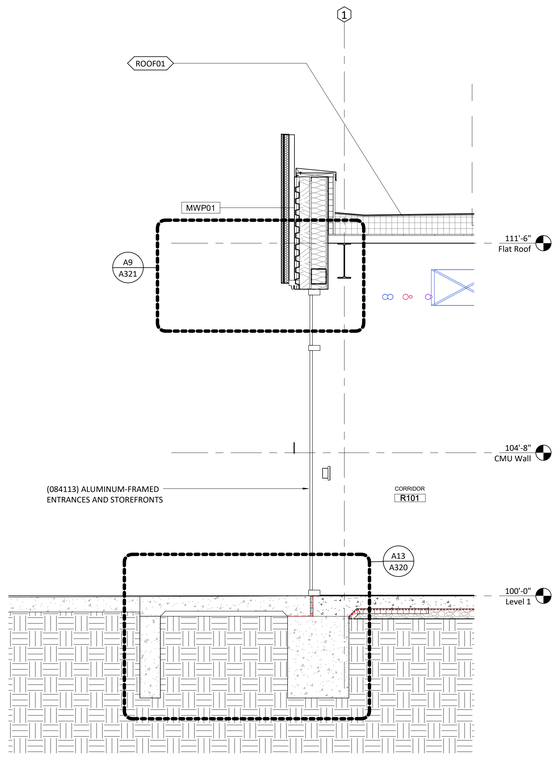
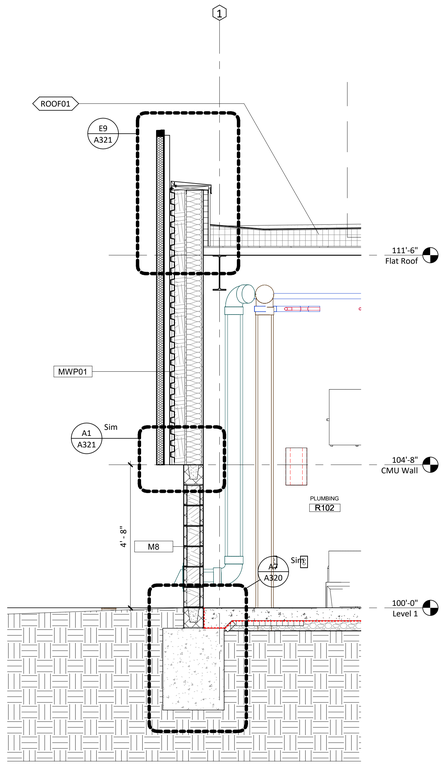
Building Sections

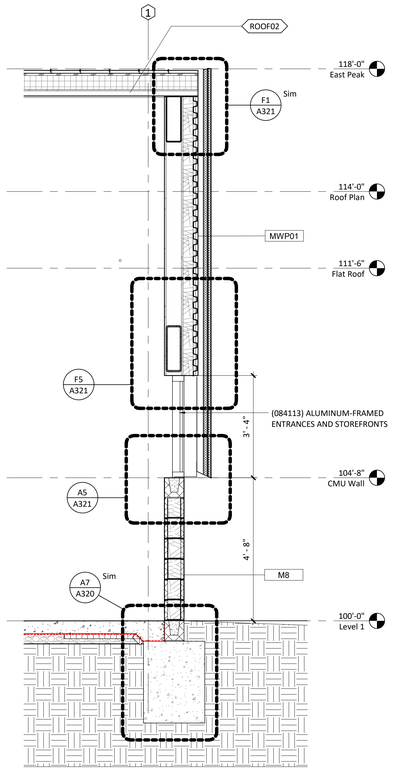
A301



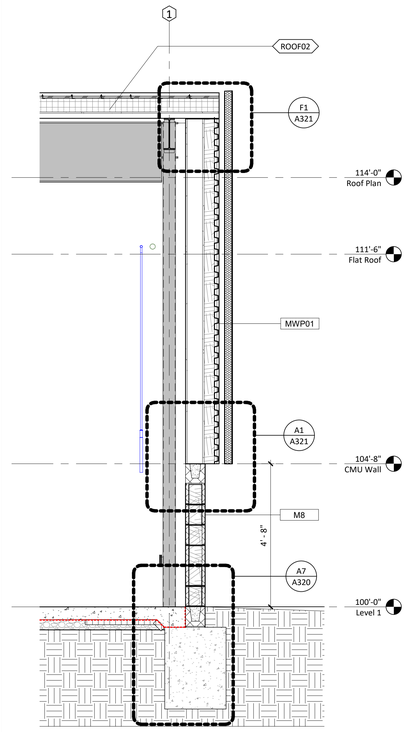
Wall Section @ North Entry H14
1/2" = 1'-0"



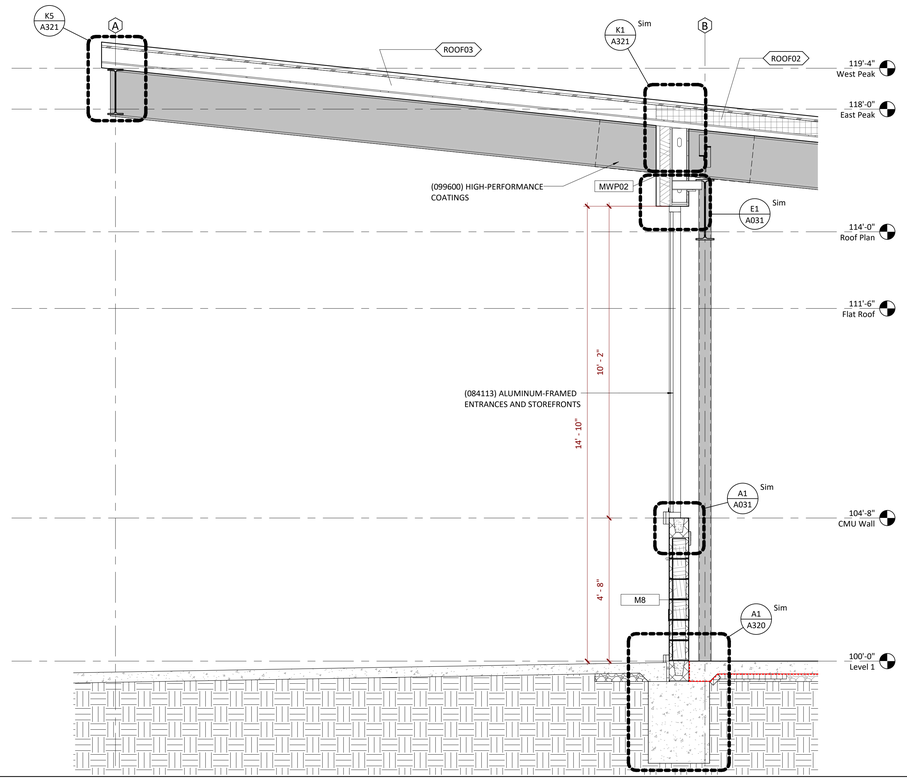
Wall Section @ Mechanical Roof H10
1/2" = 1'-0"



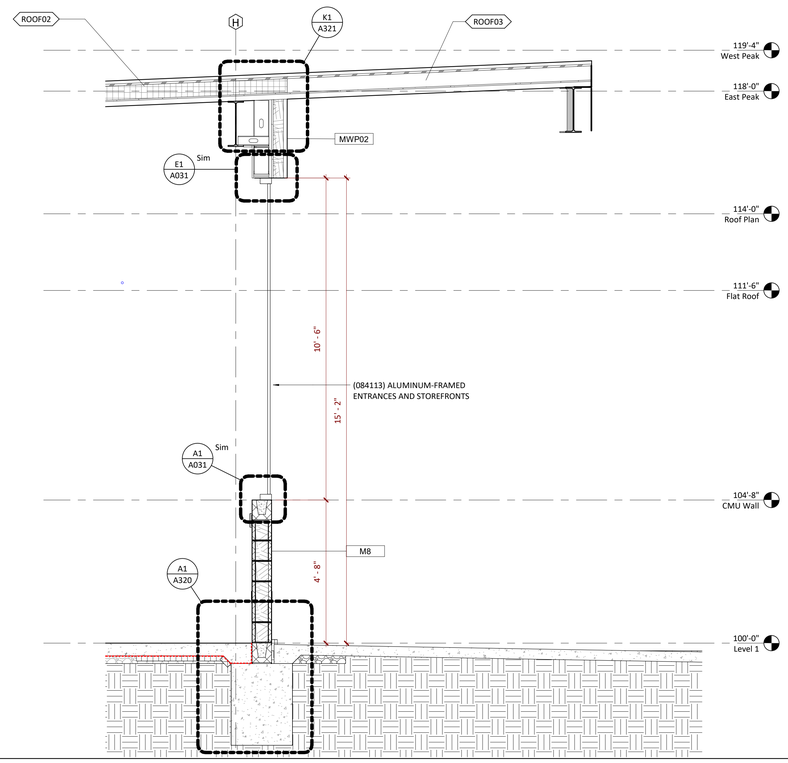
Wall Section @ Metal Panel & Storefront H5
1/2" = 1'-0"



Wall Section @ Metal Panel H1
1/2" = 1'-0"



Wall Section @ GIC Canopy A10
1/2" = 1'-0"



Wall Section @ Robotics Canopy A1
1/2" = 1'-0"

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Revisions

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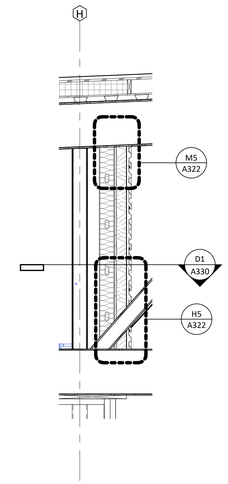
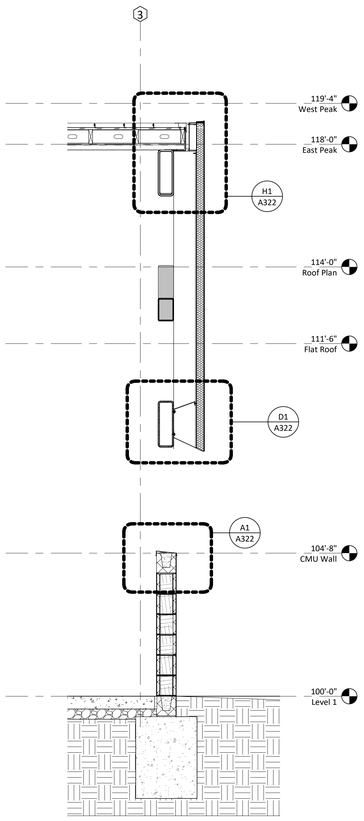
Wall Sections

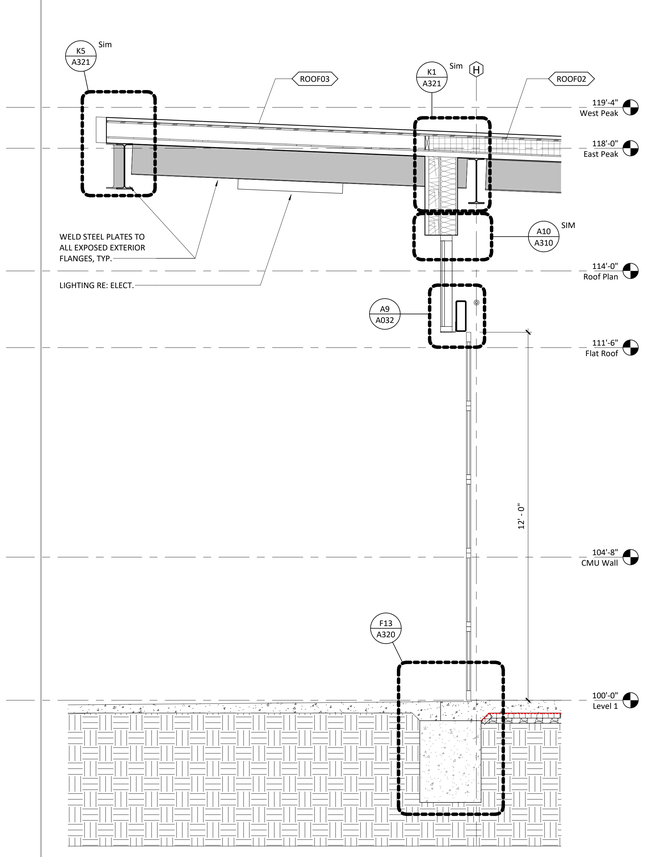
A310



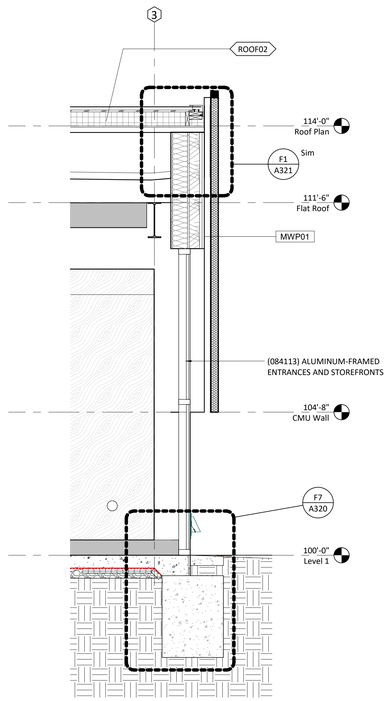
Wall Section - Steel Penetration at Truss **H1**
1/2" = 1'-0"



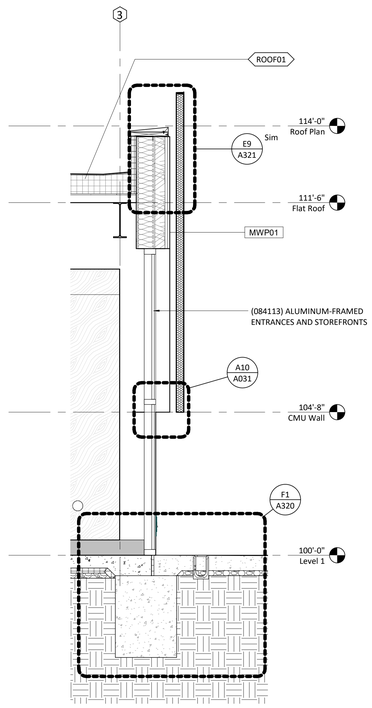
Wall Section @ Canopy Metal Skin Extention **A14**
1/2" = 1'-0"



Wall Section @ Robotics Canopy Garage Door **A9**
1/2" = 1'-0"



Wall Section @ South Window High Roof **A5**
1/2" = 1'-0"



Wall Section @ South Window Low Roof **A1**
1/2" = 1'-0"

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Project Number: 0121-0100

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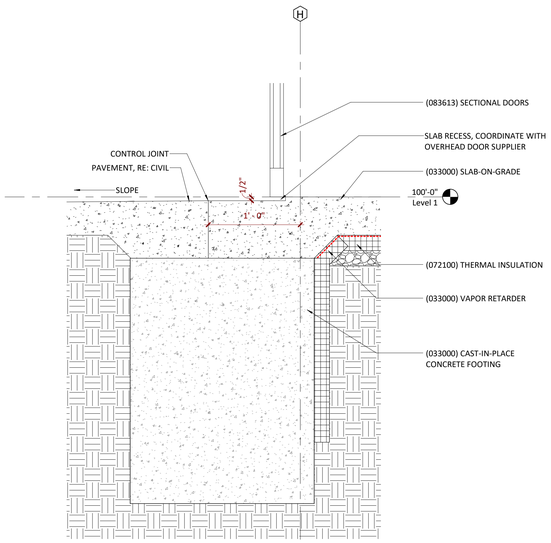
Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

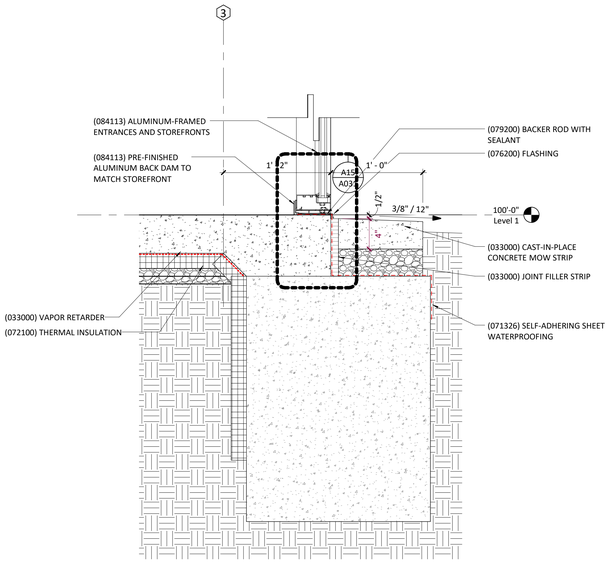
Wall Sections

A311



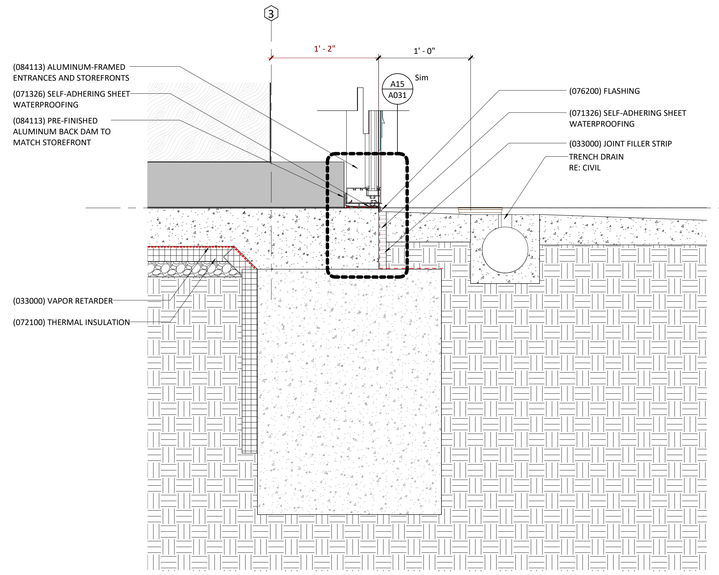
Foundation Detail @ Overhead Door F13

1 1/2" = 1'-0"



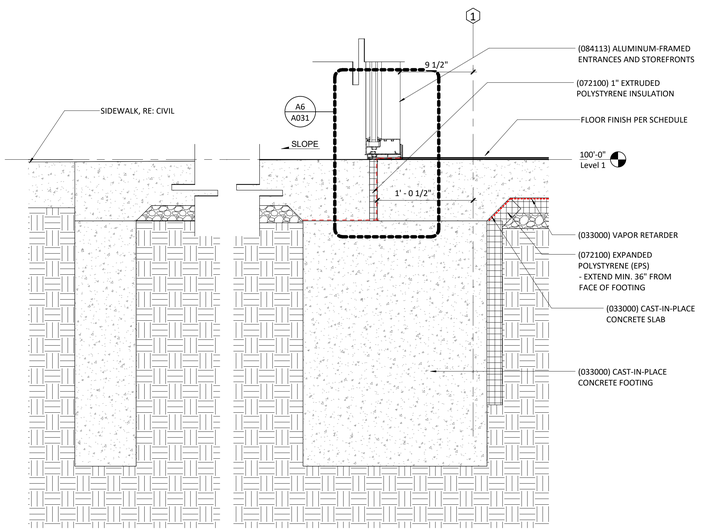
Foundation Detail @ Lee's Summit North F7

1 1/2" = 1'-0"



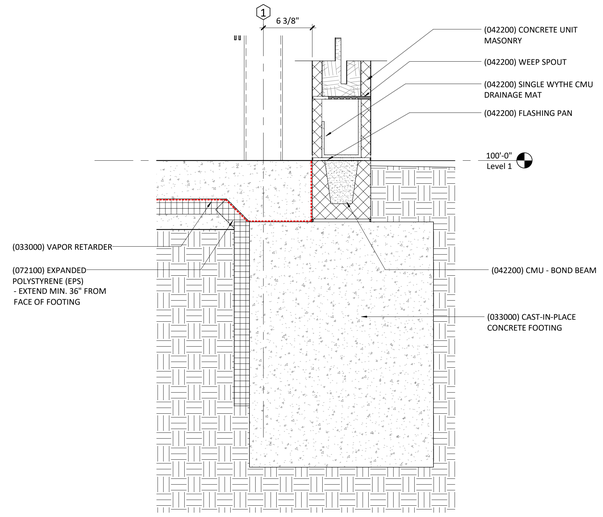
Foundation Detail @ Lee's Summit West F1

1 1/2" = 1'-0"



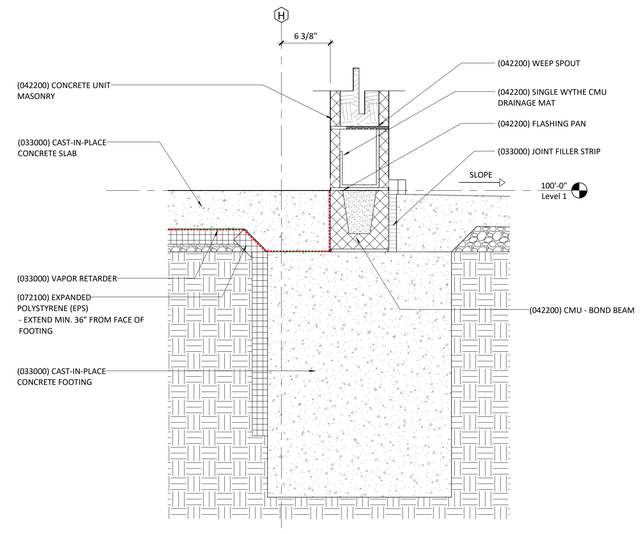
Foundation Detail @ Storefront Entry A13

1 1/2" = 1'-0"



Typical Foundation Detail @ Grade A7

1 1/2" = 1'-0"



Typical Foundation Detail @ Exterior Concrete A1

1 1/2" = 1'-0"

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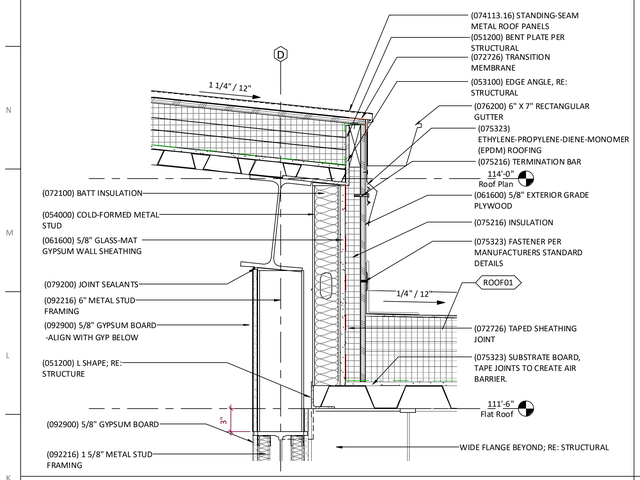
Issue Date: September 9, 2022

Revisions

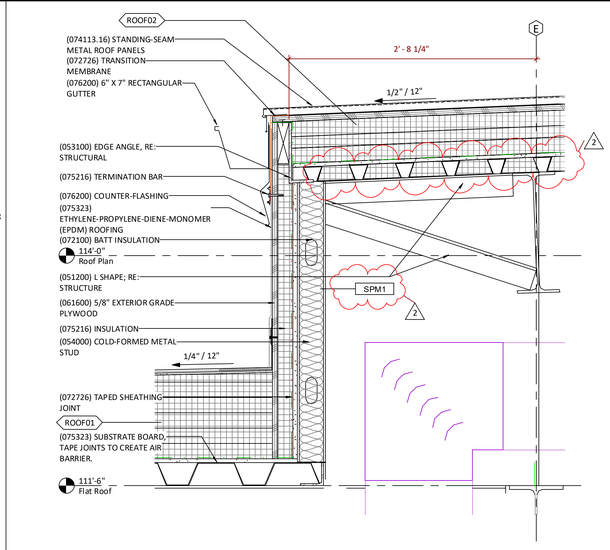
NUMBER	DESCRIPTION	DATE

Exterior Section Details - Foundation

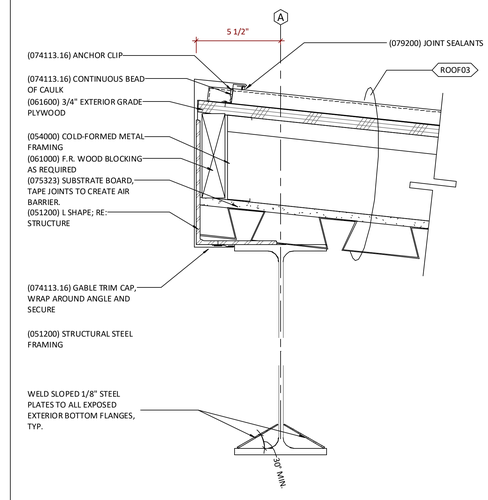
A320



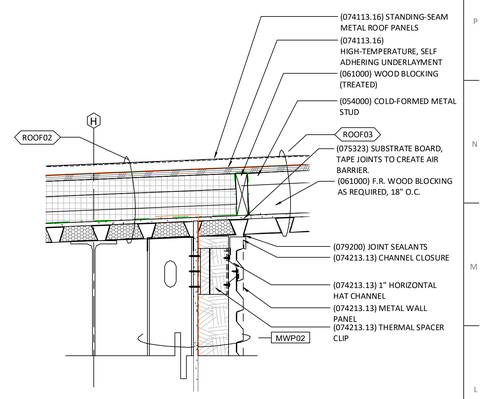
Section Detail @ Lower Roof West Transition K14
1 1/2" = 1'-0"



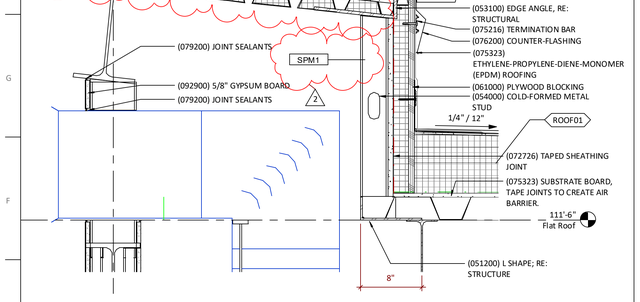
Section Detail @ Lower Roof East Transition A14
1 1/2" = 1'-0"



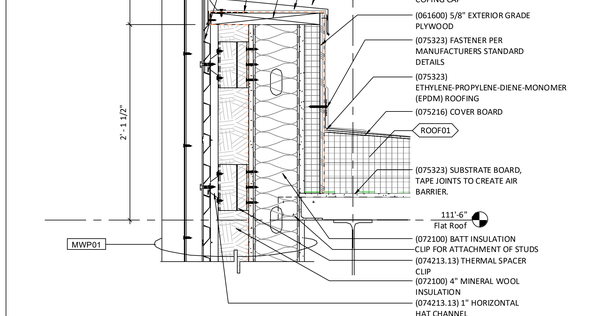
Section Detail @ Rake K5
3" = 1'-0"



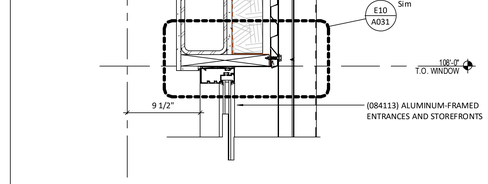
Section Detail @ Canopy Wall K1
1 1/2" = 1'-0"



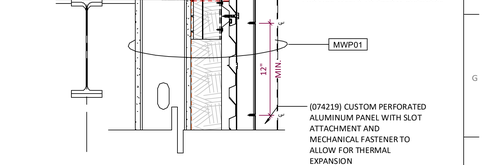
Section Detail @ Lower Roof Duct East Chase Transitions E14
1 1/2" = 1'-0"



Section Detail @ Parapet E9
1 1/2" = 1'-0"



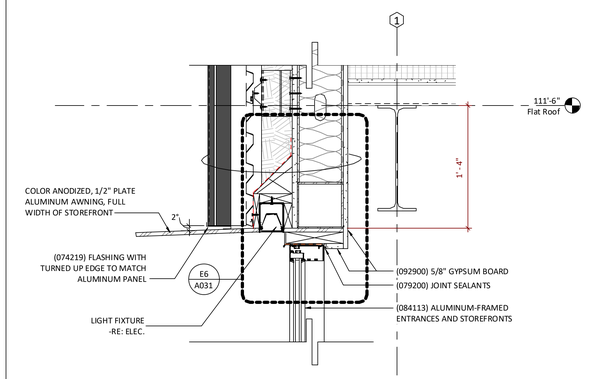
Section Detail @ T.O. Window behind Metal Panel F5
1 1/2" = 1'-0"



Section Detail @ T.O. Metal Panel F1
1 1/2" = 1'-0"

Section Detail @ B.O. Metal Panel Window Overlay A5
1 1/2" = 1'-0"

Section Detail @ B.O. Metal Panel A1
1 1/2" = 1'-0"



Section Detail @ Entry Canopy A9
1 1/2" = 1'-0"

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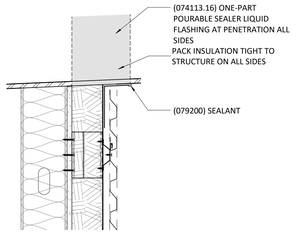
Revisions

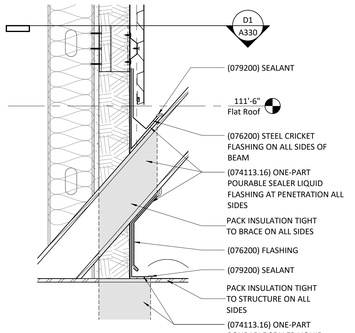
NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/28/2022

Exterior Section Details

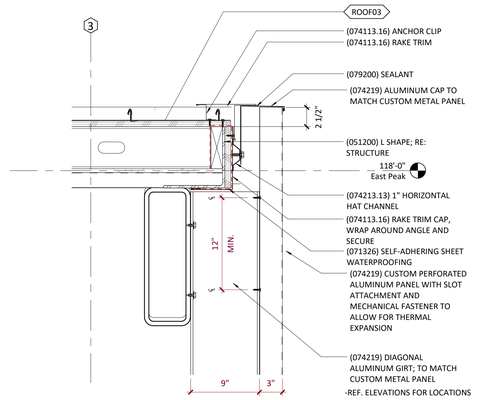
A321



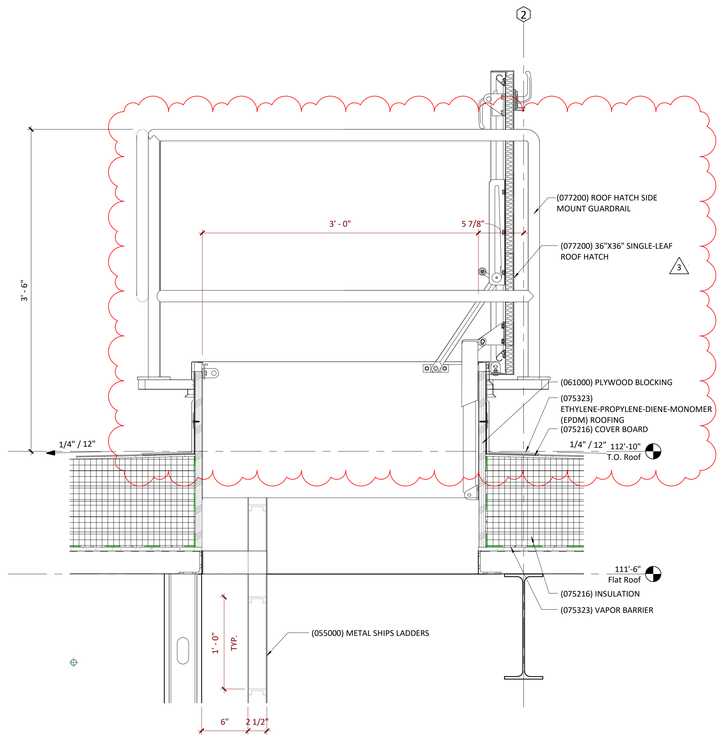
Truss Penetrations Through MWP02 **M5** 1 1/2" = 1'-0"



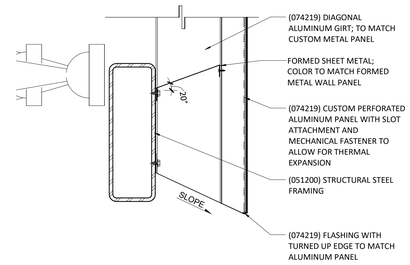
Truss Penetrations Through MWP02 **H5** 1 1/2" = 1'-0"



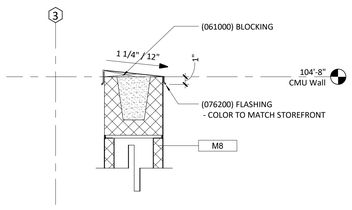
Section Detail @ Top of Metal Skin at Canopy **H1** 1 1/2" = 1'-0"



Section Detail @ Roof Hatch **A5** 1 1/2" = 1'-0"



Section Detail @ Bottom of Metal Skin at Canopy **D1** 1 1/2" = 1'-0"



Section Detail @ Top of CMU at Canopy **A1** 1 1/2" = 1'-0"

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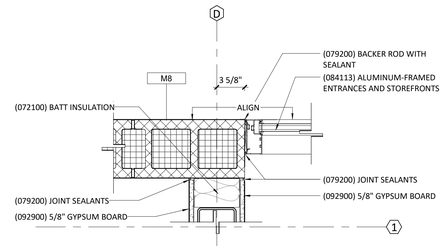
Issue Date: September 9, 2022

Revisions

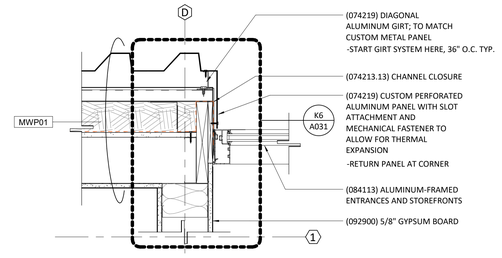
NUMBER	DESCRIPTION	DATE
3	ASI01 - Code Comments	11/09/2022

Exterior Section Details

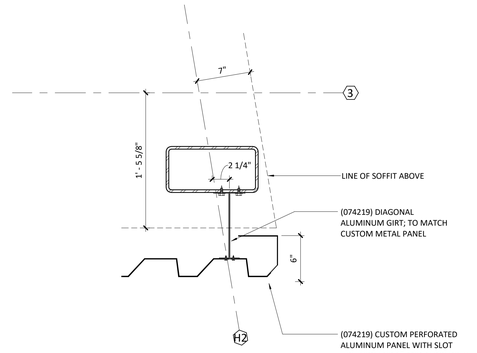
A322



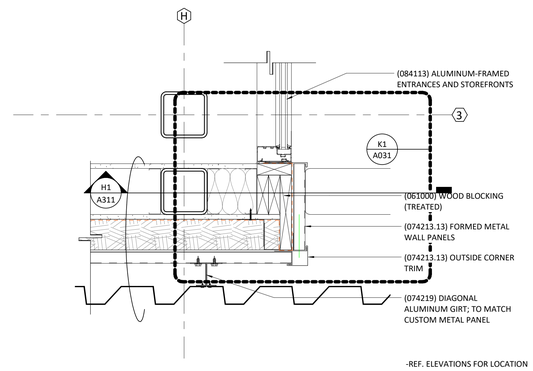
Plan Detail @ Entry Corner at CMU **M6**
1 1/2" = 1'-0"



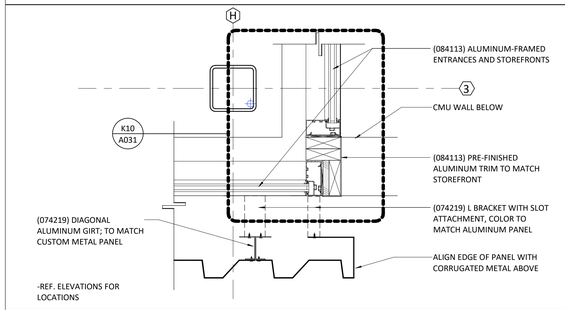
Plan Detail @ Entry Corner at Metal Panel **M1**
1 1/2" = 1'-0"



Plan Detail @ End of Metal Panel Canopy **H1**
1 1/2" = 1'-0"



Plan Detail @ Canopy Corner **D1**
1 1/2" = 1'-0"



Plan Detail @ Canopy Window Corner **A1**
1 1/2" = 1'-0"

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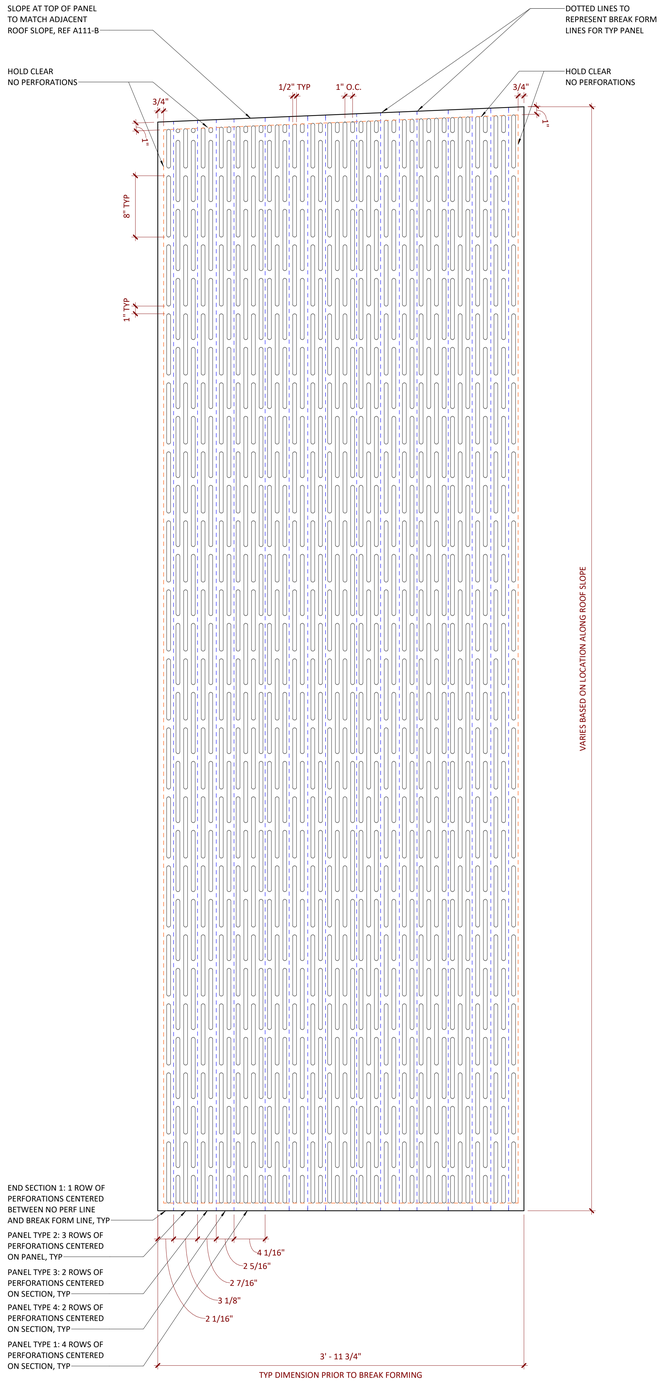
Revisions

NUMBER	DESCRIPTION	DATE

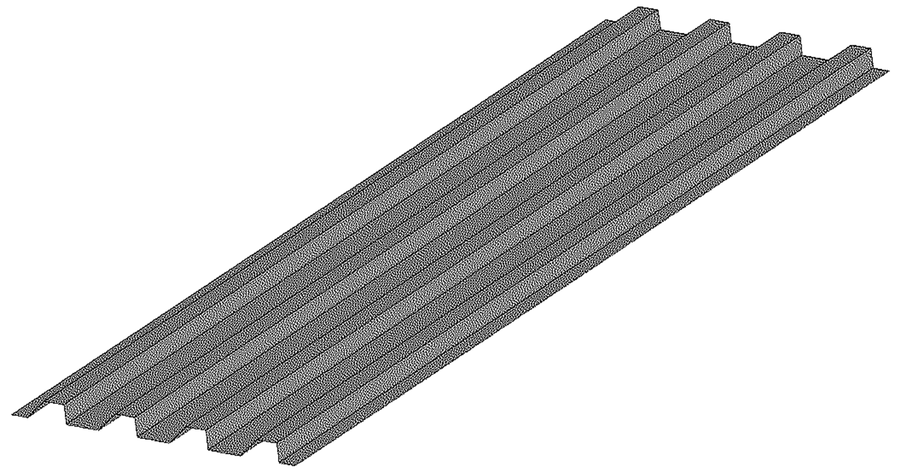
Exterior Plan & Section Details

A330

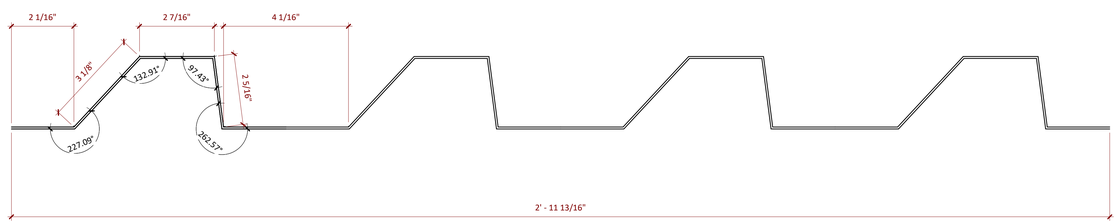
NOTE: 40% PERFORATION



Plan Detail @ Typical Perforation Pattern Prior To Break Forming A12
1 1/2" = 1'-0"



Axon Detail @ Typical Skin Panel E1
1 1/2" = 1'-0"



Section Detail @ Typical Skin Panel A1
6" = 1'-0"

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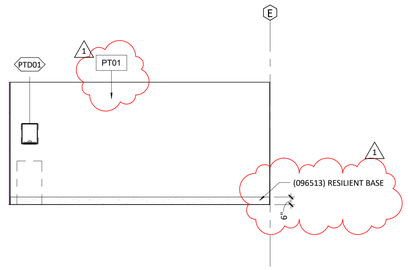
Exterior Envelope Section & Details

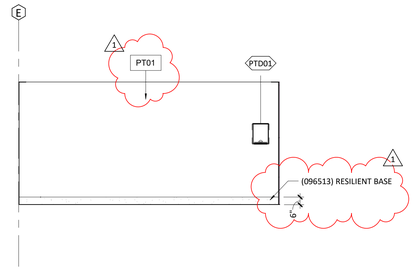
A331

General Notes (Interior Elevations):

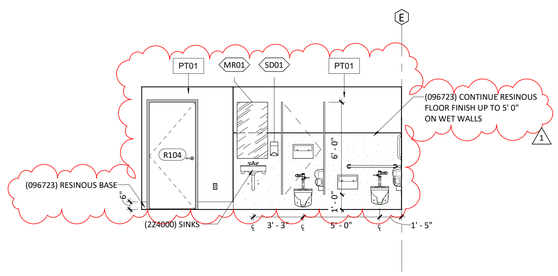
1. REFER TO FINISH LEGEND/SCHEDULE FOR COMPLETE LISTING OF FINISHES
2. REFER TO PROJECT STANDARDS FOR INSTALLATION INFORMATION FOR ACCESSORIES, TOILET FIXTURES, ETC.
3. REFER TO PROJECT STANDARDS FOR DEVICES FOR TYPICAL INSTALLATION INFORMATION.
4. AT GYP SOFFIT CONTROL JOINTS, CONTINUE CONTROL JOINT UP BOTH VERTICAL FACES OF SOFFIT.



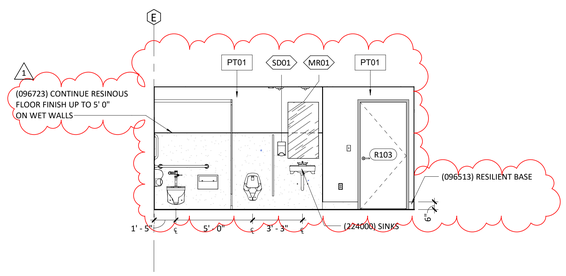
LSN/LSW Men's Restroom - Interior Elevation 2 **F9**
1/4" = 1'-0"



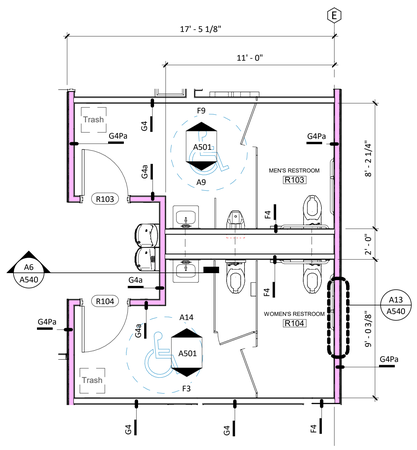
LSN/LSW Women's Restroom - Interior Elevation 2 **F3**
1/4" = 1'-0"



LSN/LSW Women's Restroom - Interior Elevation 1 **A14**
1/4" = 1'-0"



LSN/LSW Men's Restroom - Interior Elevation 1 **A9**
1/4" = 1'-0"



LSN / LSW - Enlarged Restroom Plan **A3**
1/4" = 1'-0"

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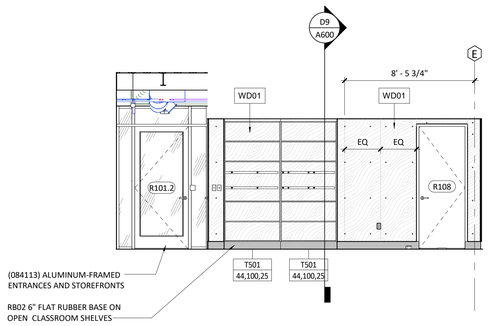
Revisions

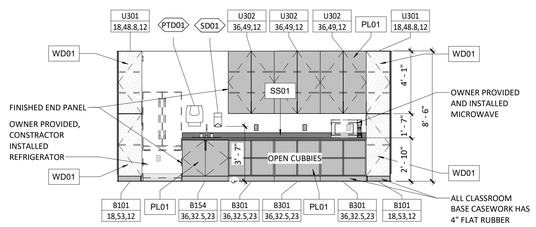
NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/19/2022

Enlarged Restroom Plans & Elevations

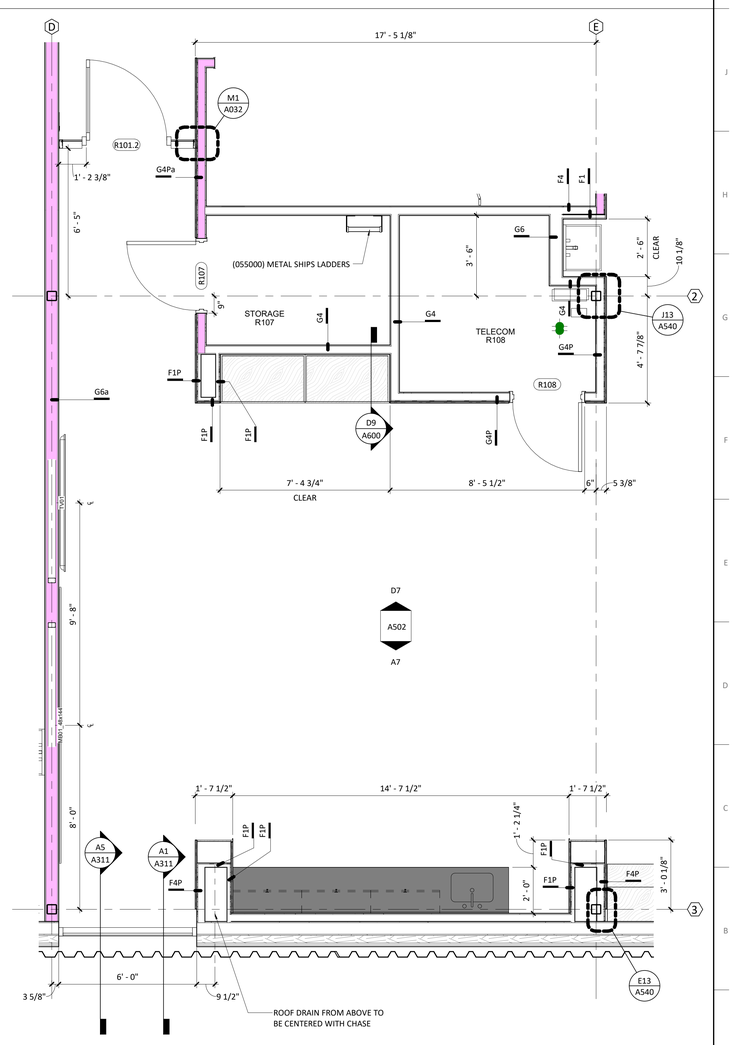
A501



Elevation - Classroom **D7**
1/4" = 1'-0"



Elevation - Classroom - South **A7**
1/4" = 1'-0"



LSN / LSW - Enlarged Classroom Floor Plan **A1**
3/8" = 1'-0"

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LSN: 901 NE Douglas St., Lee's Summit MO 64086
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LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

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Lee's Summit, MO 64086

architect:
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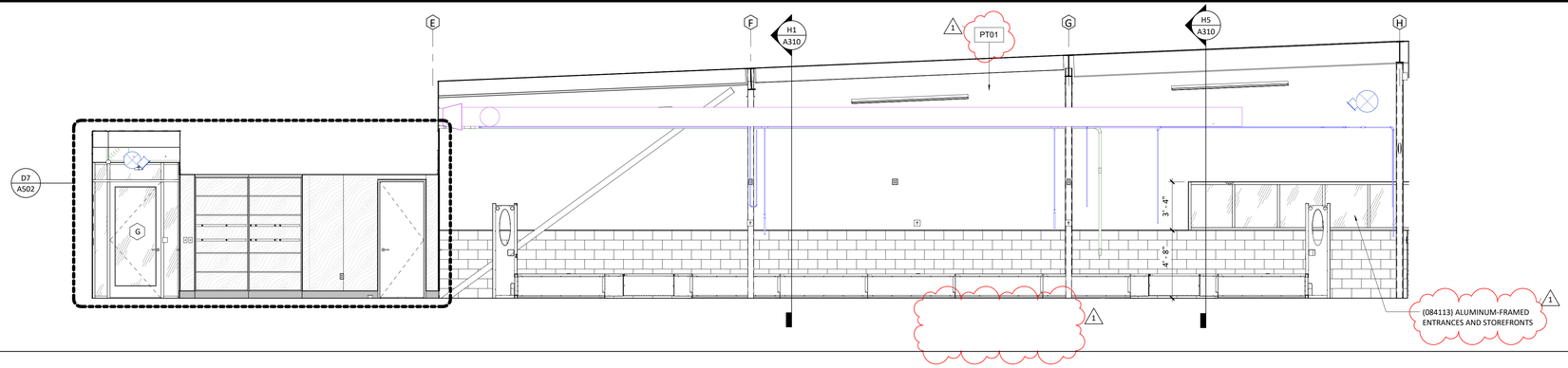
Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

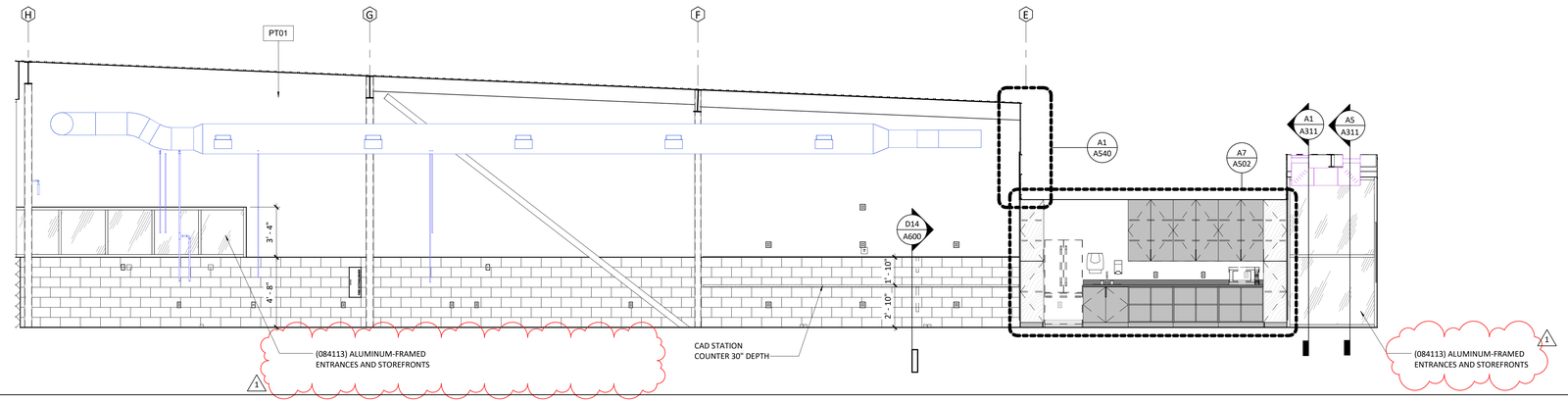
Enlarged Classroom Plans & Elevations

A502



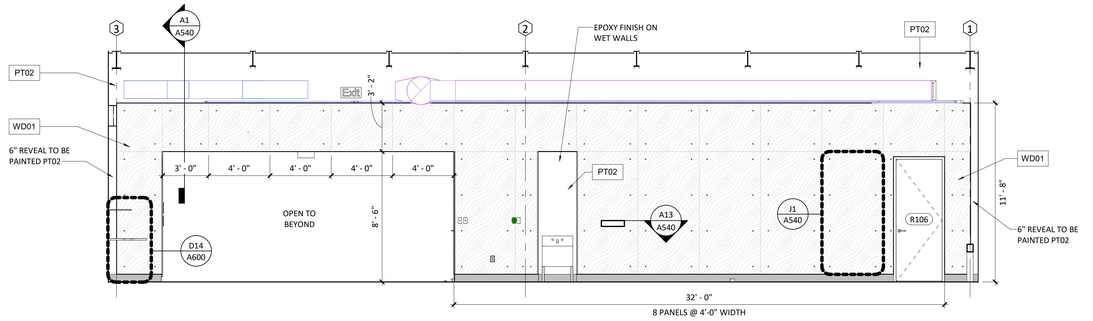
Interior Elevation - LSN / LSW Robotics North L1

1/4" = 1'-0"



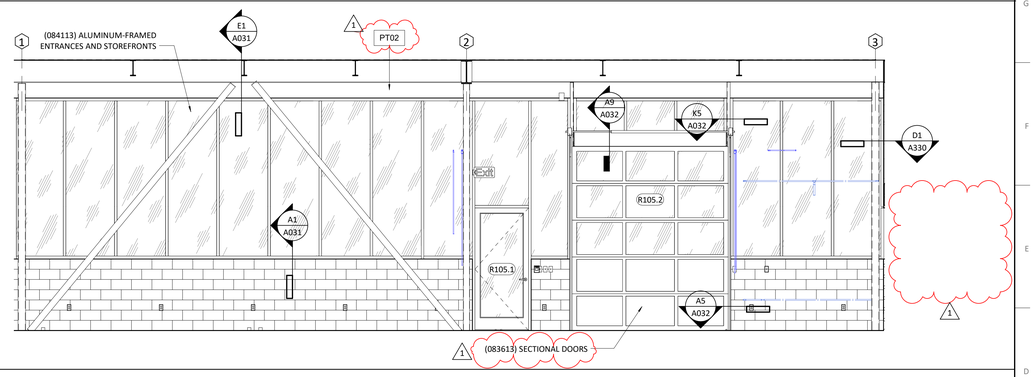
Interior Elevation - LSN / LSW Robotics South G1

1/4" = 1'-0"



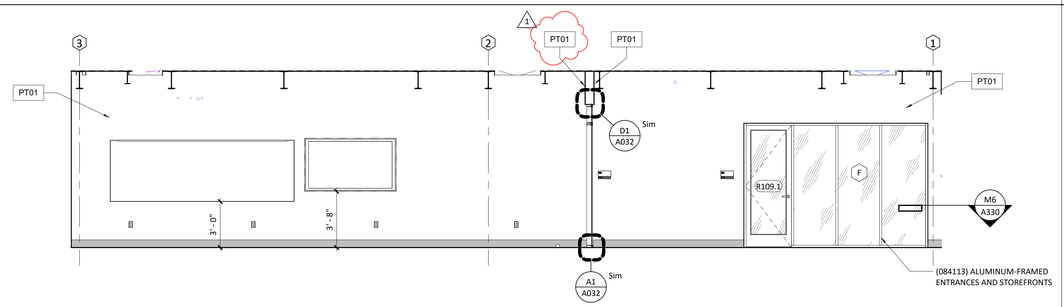
Interior Elevation - LSN / LSW Robotics West D10

1/4" = 1'-0"



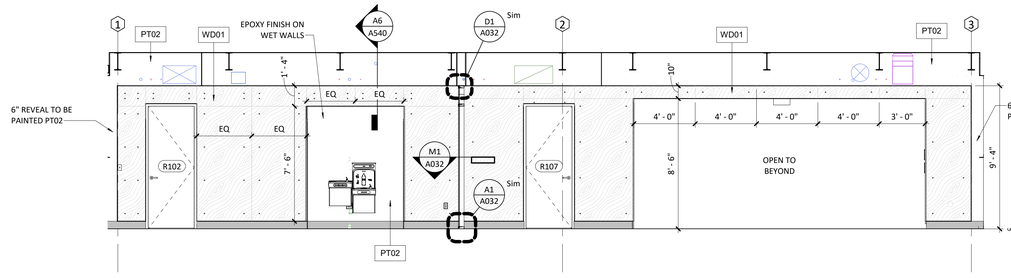
Interior Elevation - LSN / LSW Robotics East D1

1/4" = 1'-0"



Interior Elevation - LSN / LSW Robotics Corridor West A10

1/4" = 1'-0"



Interior Elevation - LSN / LSW Robotics Corridor East A1

1/4" = 1'-0"

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Revisions

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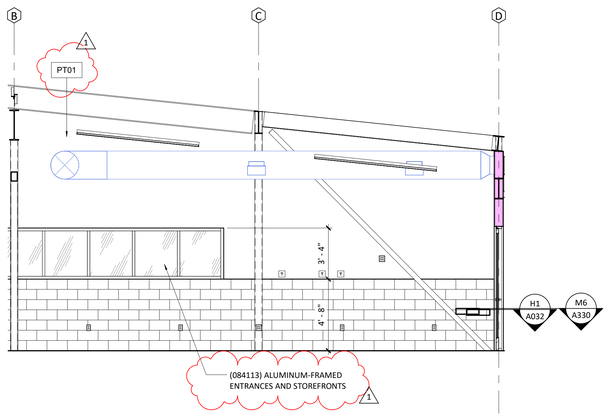
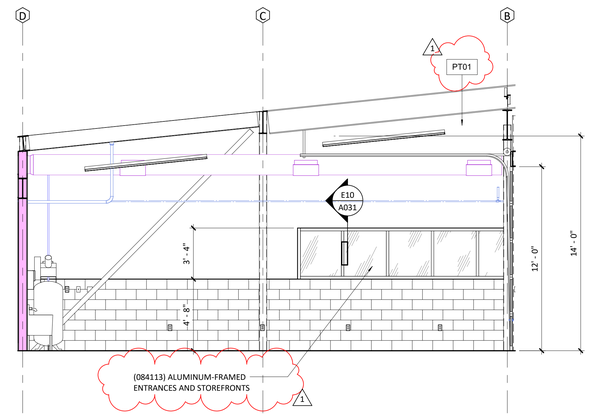
1	Addendum 01	09/19/2022

Interior Elevations

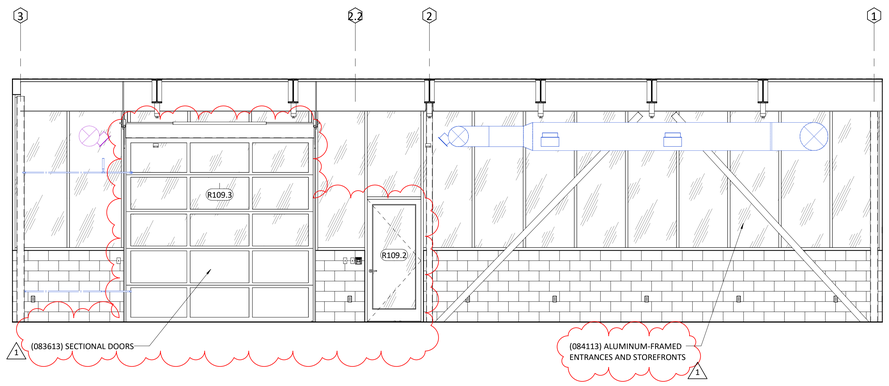
A503



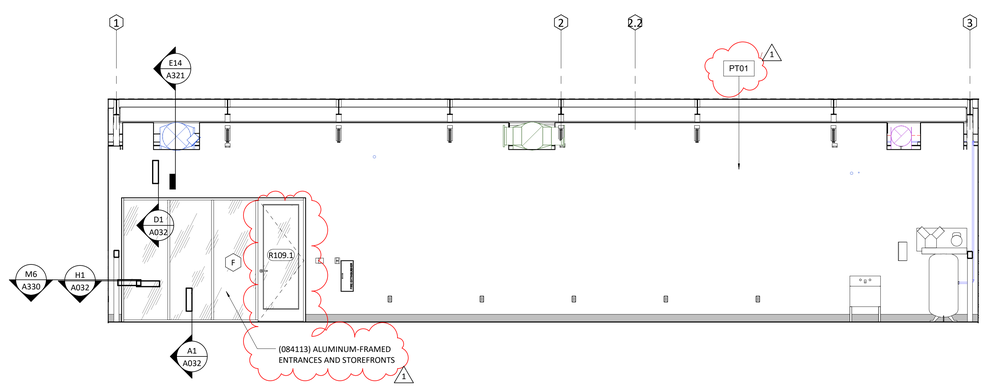
Interior Elevation - LSN / LSW GiC North **E10**
1/4" = 1'-0"



Interior Elevation - LSN / LSW GiC South **E1**
1/4" = 1'-0"



Interior Elevation - LSN / LSW GiC West **A10**
1/4" = 1'-0"



Interior Elevation - LSN / LSW GiC East **A1**
1/4" = 1'-0"

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Revisions

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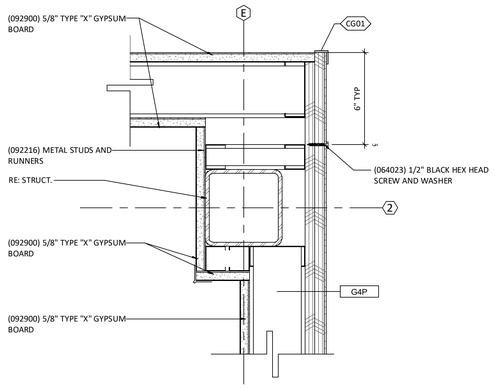
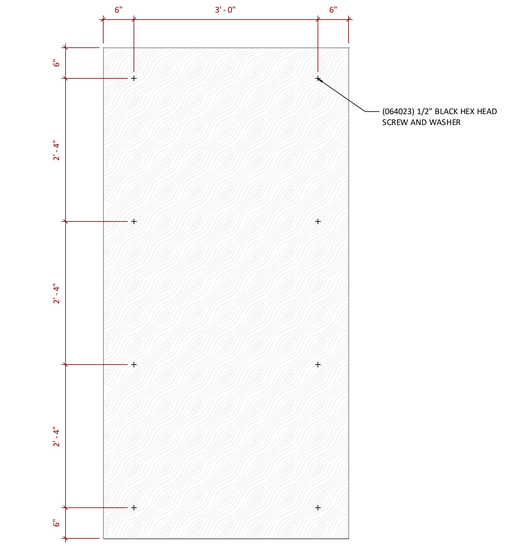
1	Addendum 01	09/19/2022

Interior Elevations

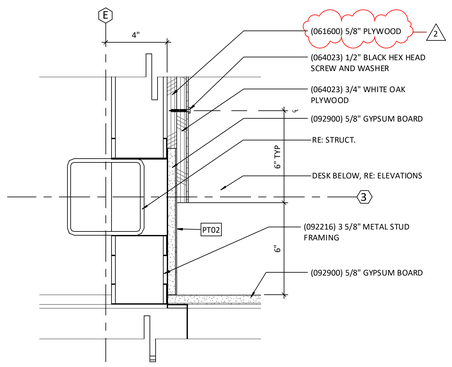
A504



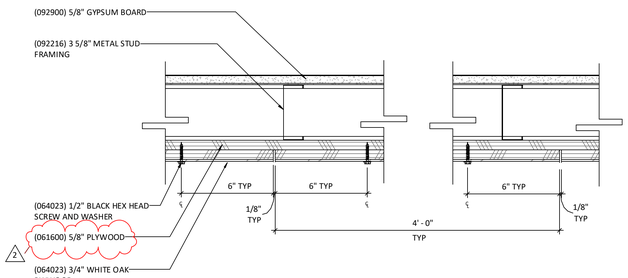
Plan Detail @ 1 Hour Rated Column **J13**
3" = 1'-0"



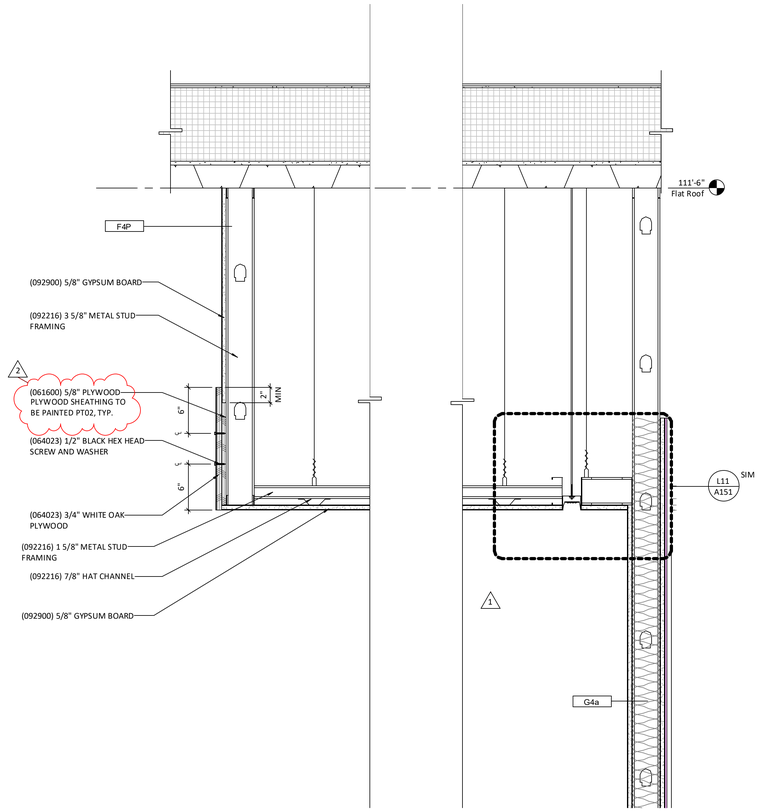
4' x 8' Finished Plywood Panel (TYP) **J1**
1" = 1'-0"



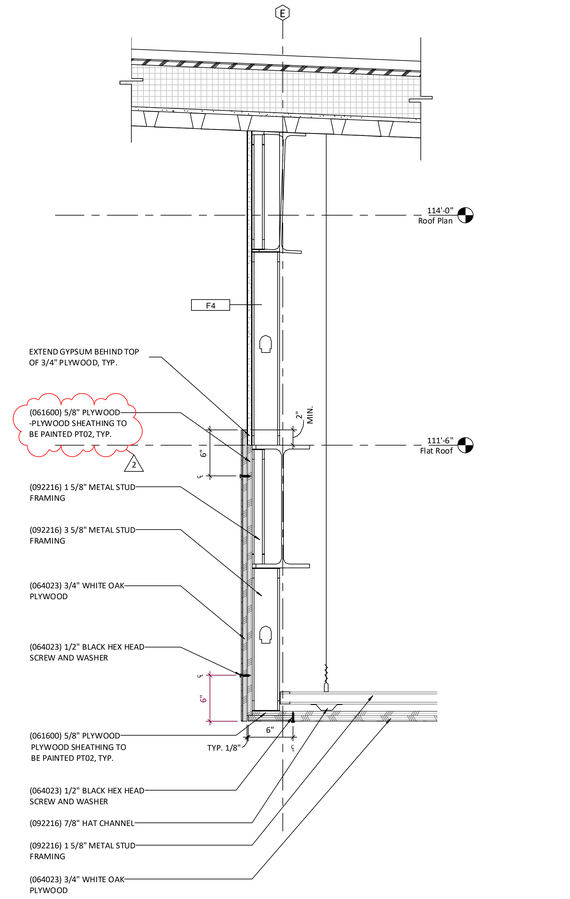
Plan Detail @ Wood Corner Reveal **E13**
3" = 1'-0"



Plan Detail @ Plywood Panel Vertical Joint **A13**
3" = 1'-0"



Section Detail @ Restroom Vestibule **A6**
1 1/2" = 1'-0"



Section Detail @ Classroom Ceiling Edge **A1**
1 1/2" = 1'-0"

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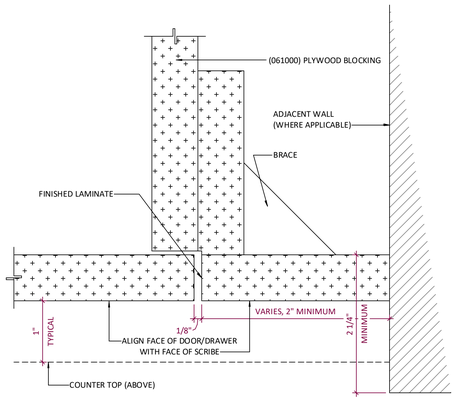
Revisions

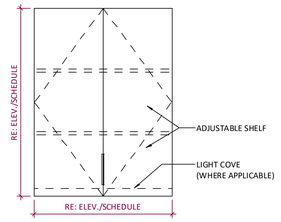
NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/19/2022
2	Addendum 02	09/23/2022

Interior Details

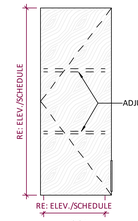
A540



Plan Detail - Typical Scribe K14
12" = 1'-0"



U302
DOUBLE UPPER CABINET



U301
SINGLE UPPER CABINET

Cabinet Types - Upper K3
3/4" = 1'-0"

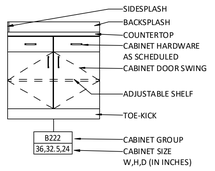
General Notes (Casework Standards):

1. ALL CASEWORK IS TO BE CONSTRUCTED TO MEET OR EXCEED ARCHITECTURAL WOODWORK INSTITUTE (AWI) STANDARDS.
2. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
3. PROVIDE RUBBER BASE AT ALL CABINET BASES, UNLESS NOTED OTHERWISE.
4. REFER TO INTERIOR ELEVATIONS AND FINISH SCHEDULE FOR SPECIFIC MATERIAL LOCATIONS.
5. PROVIDE MOISTURE RESISTANT PLYWOOD AT COUNTERTOPS WITH SINKS.
6. SINKS SHOWN ON THESE DRAWINGS INDICATE LOCATIONS ONLY AND MAY NOTE REFLECT ACTUAL SIZES OR TYPES.
7. COORDINATE LOCATIONS OF ALL EQUIPMENT AND CONFIRM PROPER CLEARANCES. NOTIFY ARCHITECT OF ANY DISCREPANCIES.
8. CENTER ALL SINKS IN THE ASSOCIATED CASEWORK, UNLESS NOTED OTHERWISE.
9. PROVIDE SIDE SPLASH WHERE COUNTERTOP ABUTS WALL, OR AT COUNTERTOPS WITH DIFFERENT HEIGHTS ABUT.
10. SEAL ALL JOINTS BETWEEN WORK SURFACES/CABINETS AND ADJOINING SURFACES.
11. PROVIDE IN WALL BLOCKING AS REQUIRED FOR UPPER CABINETS.
12. CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING FINISHED FLOORING SURFACES FROM DAMAGE DURING ALL CONSTRUCTION PHASES.
13. FIELD COORDINATE LOCATIONS OF GROMMETS IN COUNTERTOPS WITH OWNER/ARCHITECT.
14. PROVIDE FINISHED CLOSURE PANELS AT EXPOSED END CONDITIONS.
15. PROVIDE FILLER PANEL/SCRIBE AT ALL LOCATIONS WHERE CASEWORK MEETS A WALL.
16. PROVIDE LOCKS AT ALL CABINET DOORS. FINAL LOCK COORDINATION WILL BE DONE BY OWNER/ARCHITECT DURING SHOP DRAWING PROCESS.
17. ALL PENETRATIONS THROUGH CASEWORK SHALL BE SEALED OR COVERED WITH AN ESCUTCHEON.

CASEWORK CABINET GROUPS:

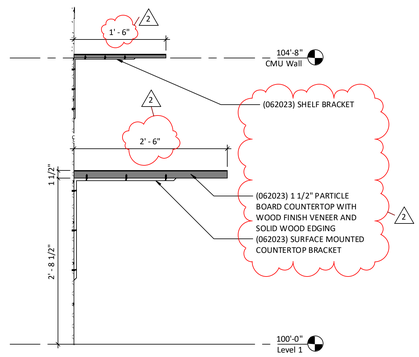
B	BASE CABINET	U	UPPER CABINET
BS	BASE SCRIBE	US	UPPER SCRIBE
T	TALL CABINET		

Casework Legend

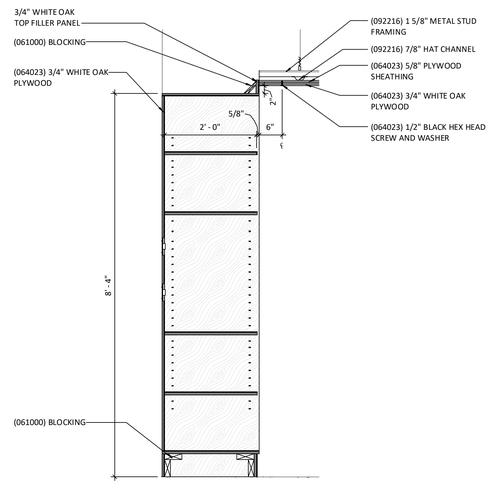


Casework Schedule

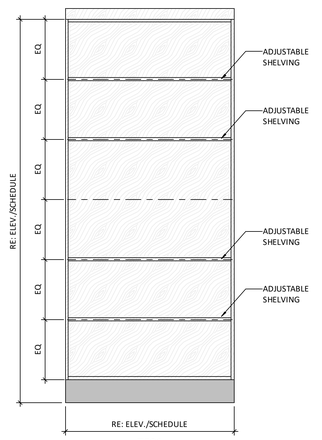
Mark	Width	Height	Depth
Base - 301 - Open Cubby Shelving (34 inch)			
B301	36"	32 1/2"	23"
Base-101-Single-Plywood			
B101	17 1/2"	53"	12"
Base-102-Double			
B154	36"	32 1/2"	24"
Base-154-Double for ADA Sink			
B154	36"	32 1/2"	23"
T525 - Open Sheving Stack (9') 2' Depth			
T501	44"	100"	25 3/8"
Upper-301-Single-Plywood			
U301	17 1/2"	48 3/4"	12"
Upper-302-Double			
U302	36"	49"	12"



Section Detail @ CAD Station D14
1" = 1'-0"

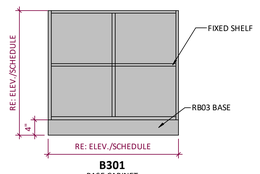


Section Detail @ Classroom Shelving D9
3/4" = 1'-0"

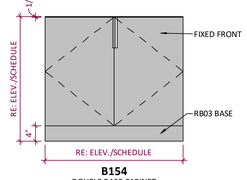


T501
TALL OPEN SHELVING
WITH ADJUSTABLE SHELVES

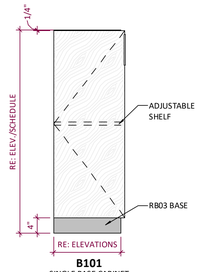
Cabinet Types - Tall D3
3/4" = 1'-0"



B301
BASE CABINET
OPEN CUBBY STACK



B154
DOUBLE BASE CABINET
WITH ADA ROLL IN



B101
SINGLE BASE CABINET
WITH TRASH/RECYLCING

Cabinet Types - Base A3
3/4" = 1'-0"

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Revisions

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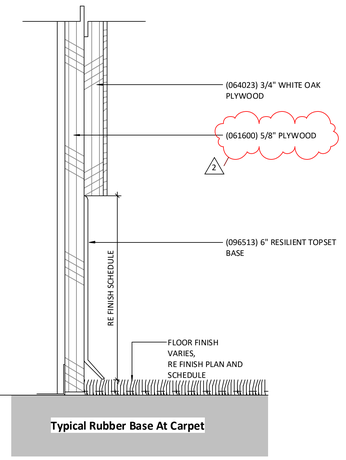
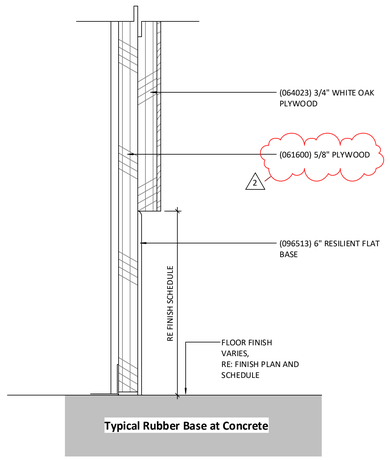
2	Addendum 02	09/23/2022

Casework Standards
A600



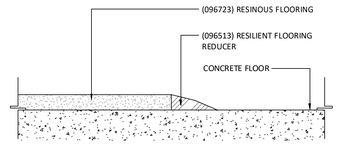
Typical Rubber Base At Carpet



Typical Rubber Base at Concrete

Wall Base Details J12

6" = 1'-0"



Resinous Flooring / Sealed Concrete Transition

Flooring Transitions J9

12" = 1'-0"

Finish Legend - LSN & LSW

Mark	Manufacturer	Model	Material Color	Comments
033000 CAST-IN-PLACE CONCRETE				
SC01	SEALED CONCRETE			CONCRETE WITH SURFACE SEALER
062023 INTERIOR ARCHITECTURAL WOODWORK				
WD01	MURPHY PLYWOOD	3/4" PLYWOOD WALL PANEL WITH TYPE "A" VENEER CORE	WHITE OAK, PLAIN SLICED	REF ELEVATIONS AND RCP FOR LOCATIONS
064116 PLASTIC LAMINATE-CLAD ARCHITECTURAL CABINETS				
PL01	FORMICA	N/A	STORM 912	CLASSROOM CASEWORK, REF ELEVATIONS
081416 FLUSH WOOD DOORS				
WD02	-	N/A	WHITE OAK, PLAIN SLICED	DOOR FINISH
096513 RESILIENT BASE AND ACCESSORIES				
RB01	ROPPE	PINNACLE	123 CHARCOAL	6" COVE WALL BASE
RB02	ROPPE	PINNACLE	123 CHARCOAL	6" FLAT WALL BASE
RB03	ROPPE	PINNACLE	123 CHARCOAL	4" FLAT WALL BASE
096723 EPOXY RESINOUS FLOORING				
EP01	DESCO COATINGS	GRANITE SERIES	GUNMETAL	EPOXY RESINOUS FLOORING IN RESTROOMS, WITH INTEGRAL 6" BASE
096813 TILE CARPET				
CPT01	MATS INC	SUPER NOP S2	GRIJIS/CHARCOAL	WALK OFF CARPET
099123 INTERIOR PAINTING				
PT01	SHERWIN WILLIAMS	N/A	LAZY GRAY SW6254	EPOXY PAINT REQUIRED FOR ALL WET WALL LOCATIONS IN RESTROOMS.
PT02	SHERWIN WILLIAMS	N/A	PEPPERCORN SW7674	ALL STRUCTURE TO BE PAINTED, TYP. EPOXY PAINT REQUIRED FOR ALL WET WALL LOCATIONS: KITCHEN, WATER FOUNTAINS, SHOP SINK ALCOVE.
101100 VISUAL DISPLAY UNITS				
MB01	CLARIDGE	LCS DELUXE PORCELAINE WHITEBOARD	WHITE	60" ROLL MOUNTED HORIZONTALLY. 3'-0" ALUM TRAY AT BASE. J TRIM CONTINUOUS AT TOP. 5'-6" HIGH STARTING 2'-6" AFF
123661 SIMULATED STONE COUNTERTOPS				
SS01	CORIAN SOLID SURFACE	N/A	CARBON AGGREGATE	CLASSROOM COUNTERTOPS

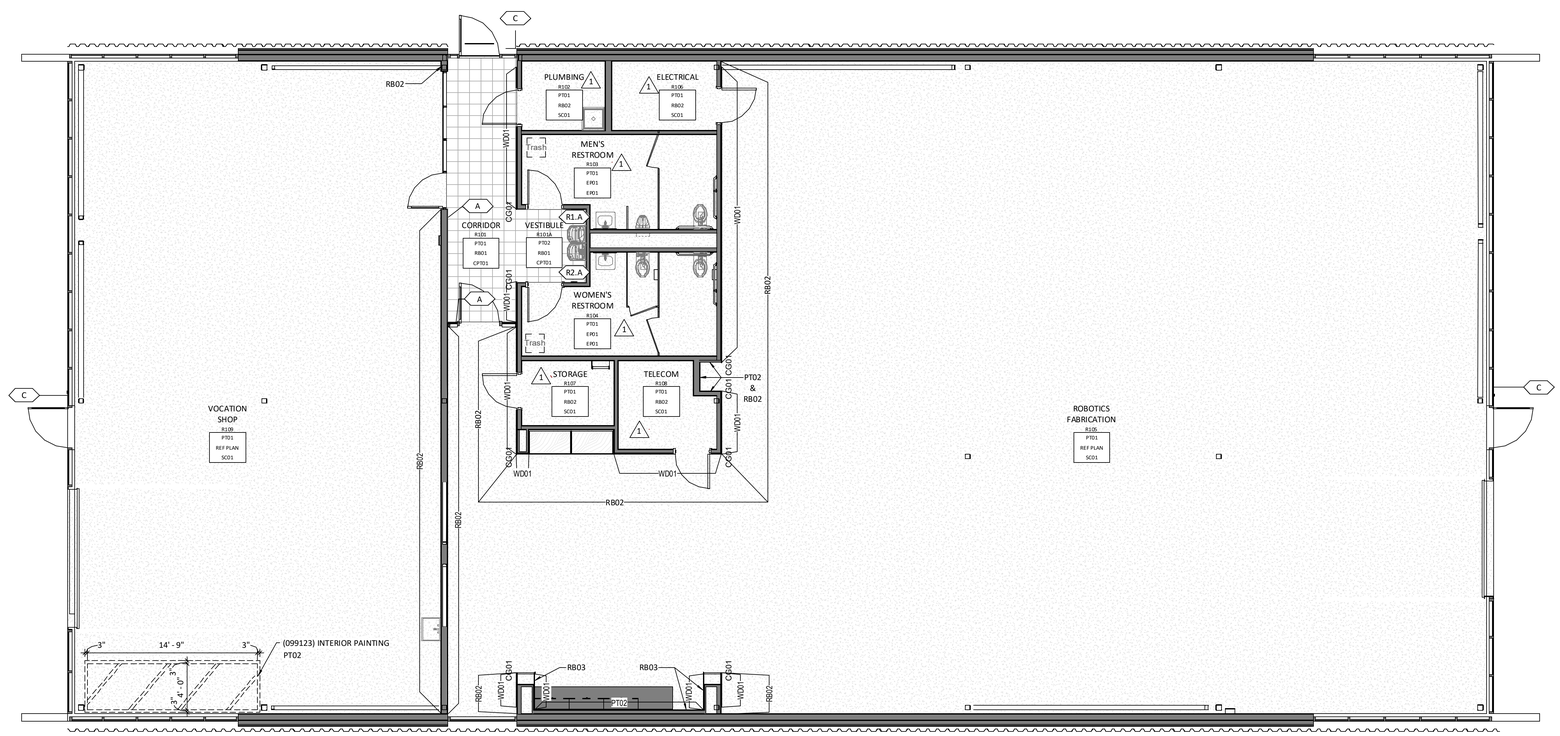
General Finish Notes:

1. ALL FINISH MATERIALS MUST MEET THE FLAME SPREAD RATINGS PER THE BUILDING CODE.
2. REFER TO INTERIOR ELEVATIONS AND PLANS FOR SPECIFIC MATERIAL LOCATIONS.
3. REFERENCED FLOOR/WALL/CEILING TYPES ARE FOR TOP FINISH LAYER DETAILS ONLY. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR FLOOR/WALL CEILING ASSEMBLY DETAILS PER LOCATION.
4. PAINT ALL EXPOSED DUCTWORK, CONDUIT, ELECTRICAL EQUIPMENT, ETC TO MATCH ADJACENT SURFACES.
5. PAINT ALL NON-FACTORY FINISHED EXPOSED METAL TO MATCH ADJACENT WALL COLOR, UNO.
6. REFER TO TYPICAL FLOORING TRANSITION DETAILS FOR ALL FLOORING MATERIALS.
7. FLOORING TRANSITIONS AT DOORS SHOULD BE LOCATED UNDER THE DOOR IN THE CLOSED POSITION, UNLESS NOTED OTHERWISE.
8. CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING FINISHED FLOORING SURFACES FROM DAMAGE DURING ALL CONSTRUCTION PHASES.
9. PROVIDE BULLNOSE TRIM AT TRANSITIONS FROM CERAMIC WALL TILE TO OTHER MATERIAL, UNLESS NOTED OTHERWISE.
10. REFER TO REFLECTED CEILING PLANS FOR CEILING HEIGHTS.
11. ALL ELECTRICAL DEVICE COVERS ARE TO BE WHITE UNLESS NOTED OTHERWISE.
12. ALL HOLLOW METAL DOORS, FRAMES AND LITE KITS TO BE PAINTED TO MATCH ADJACENT WALL COLOR.
13. WALLS AND COLUMNS TO BE PT01 UNO.

Room name
101
Wall Finish
Base Finish
Floor Finish

- Signage Schedule -

Type Mark	Type Comments
A	Room ID (Standard)
R1.A	Restroom - Men
R2.A	Restroom - Women
A	Room ID (Standard)
C	Exterior Door Vinyl Sign
C	Exterior Door Vinyl Sign
C	Exterior Door Vinyl Sign



LSN / LSW - Level 1 Finish Plan A3

3/16" = 1'-0"

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LSR7 Robotics, GiC & Phys Education

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

Project Number: 0121-0100

owner:
Lee's Summit R-7 School
301 NE Tudor Road
Lee's Summit, MO 64086

architect:
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4200 Pennsylvania
Kansas City, MO 64111
816.931.6655
multi.studio

civil engineer:
Kaw Valley Engineering
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913.485.0318
kveng.com

structural engineer:
Bob D. Campbell &
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MEPFT/Code::
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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/19/2022
2	Addendum 02	09/28/2022

Finish Plan

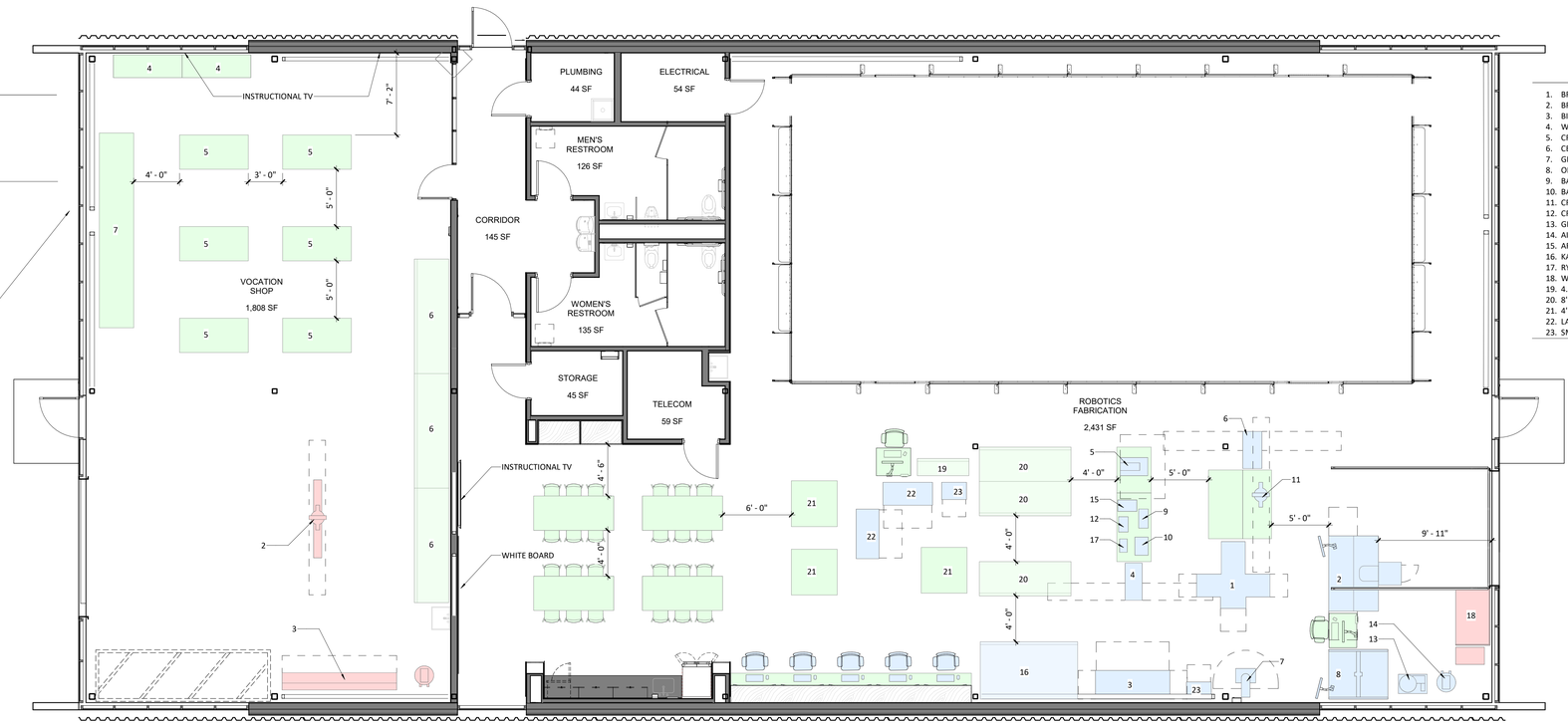
AF101

General Notes (Furniture Plans):

1. FURNITURE SHOWN FOR COORDINATION PURPOSES ONLY. OWNER TO FINALIZE AND PROVIDE UNDER SEPARATE CONTRACT.

GiC Equipment List:

1. AIR COMPRESSOR
2. MITER SAW
3. PANEL SAW
4. 6' X 2' ROLLING TABLES
5. 6' X 3' WORK TABLES
6. 3' X 10' TOOL CRIB
7. BUTCHER BLOCK WORK COUNTER



LSN Equipment List:

1. BRIDGEPORT 3-AXIS CNC
2. BRIDGEPORT TORQ-CUT 22
3. BIRMINGHAM YCL-1340GH LATHE
4. WEN 3975T HORIZONTAL METAL BANDSAW
5. CRAFTSMAN VERTICAL METAL BANDSAW
6. CENTRAL MACHINERY METAL CUTTING BAND SAW
7. GRIZZLY G7947 DRILL PRESS
8. OPEN TABLE CNC ROUTER
9. BALDOR BUFFER
10. BALDOR DISC SANDER
11. CRAFTSMAN MITER SAW
12. CRAFTSMAN BENCHTOP/DISC SANDER
13. GRIZZLY DUST COLLECTOR
14. AIR COMPRESSOR
15. ARBOR PRESS
16. KARDEX STORAGE SYSTEM
17. RYOBI BENCH GRINDER
18. WELDING TABLE & TIG WELDER
19. 4.5' X 1.5' SHELVING
20. 8' X 3' SHELVING
21. 4' X 4' WORK TABLE
22. LARGE CRAFTSMAN TOOL BOX
23. SMALL CRAFTSMAN TOOL BOX

LSN - Level 1 Furniture Plan A3

3/16" = 1'-0"

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Issue Date: September 9, 2022

Revisions

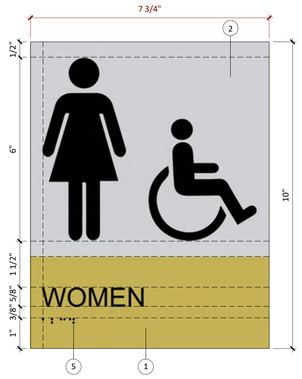
NUMBER	DESCRIPTION	DATE

Furniture Plan - LSN

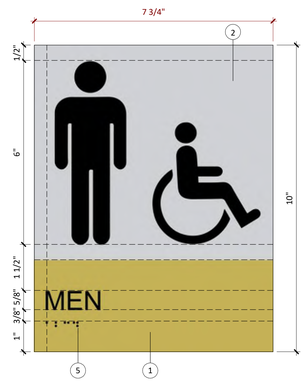
AF102-B

General Notes (Signage):

1. THE ENVIRONMENTAL GRAPHICS PACKAGE CONSISTS OF THE FOLLOWING COMPONENTS: DETAIL DRAWINGS, SIGN LOCATION PLANS, SIGNAGE MESSAGE SCHEDULE, AND SPECIFICATION MANUAL.
2. ALL SIGNS TO BE FABRICATED AND INSTALLED TO COMPLY WITH LOCAL BUILDING CODES, ADAAG, AND ANSI 117.1
3. FABRICATOR TO REVIEW THE STRUCTURAL, MECHANICAL, AND ARCHITECTURAL DRAWINGS AND SITE CONDITIONS TO VERIFY SIZES AND LOCATION OF SIGNAGE RELATED ELEMENTS THAT EXIST. ANY DISCREPANCIES AND/OR CONFLICTS SHALL BE REPORTED TO THE OWNER/ARCHITECT/GENERAL CONTRACTOR IN WRITING BEFORE PROCEEDING WITH FABRICATION OR ORDERING MATERIALS.
4. FABRICATOR SHALL SUBMIT FULLY DETAILED WORKING (SHOP/FABRICATION) DRAWINGS TO ARCHITECT/GENERAL CONTRACTOR FOR ALL SIGNS AND GRAPHICS CONTAINED IN THIS PACKAGE. DRAWINGS SHALL BE REVIEWED AND HAVE SIGNED APPROVAL PRIOR TO FABRICATION OR ORDERING OF MATERIALS.
5. ALL SIGNS ARE TO BE FABRICATED FROM MATERIALS SPECIFIED UNLESS OTHERWISE APPROVED IN WRITING BY THE OWNER/ARCHITECT. NO EXCEPTIONS.
6. DRAWINGS CONTAINED IN THIS PACKAGE ARE FOR AESTHETIC AND FUNCTIONAL DESIGN INTENT ONLY. NO INSTRUCTIONS FOR STRUCTURAL APPROPRIATENESS HAVE BEEN MADE. IT IS THE RESPONSIBILITY OF THE SIGNAGE FABRICATOR TO ENSURE THAT ALL ELEMENTS ARE FABRICATED FOR A STABLE AND DURABLE INSTALLATION WHILE ADHERING TO THE AESTHETIC DETAILS INDICATED.
7. FABRICATOR IS RESPONSIBLE FOR DETERMINING PROPER MOUNTING METHODS FOR SIGNS UNLESS OTHERWISE SPECIFIED. ALL MOUNTING MATERIALS/TECHNIQUES TO BE APPROVED IN WRITING AND HAVE SIGNED APPROVAL PRIOR TO INSTALLATION.
8. ALL FASTENERS ARE TO BE CONCEALED UNLESS NOTED OTHERWISE.
9. FABRICATOR TO COORDINATE THE INSTALLATION OF SITE SIGNAGE AND ASSOCIATED FOOTINGS WITH THE GENERAL CONTRACTOR'S INSTALLATION OF THE SURROUNDING HARDSCAPE.
10. ALL TEXT SHOWN IN DETAIL DRAWINGS IS FOR REFERENCE ONLY. REFER TO SIGNAGE MESSAGE SCHEDULE FOR EXACT TEXT ON EACH SIGN.
11. ALL ROOM IDENTIFICATIONS SIGNS ARE TO BE MOUNTED 9 INCHES FROM THE CENTER OF THE SIGN TO THE LATCH SIDE OF DOOR FRAME.

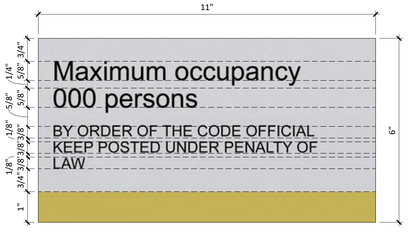


ADA Restroom - Women R2.A
6" = 1'-0"

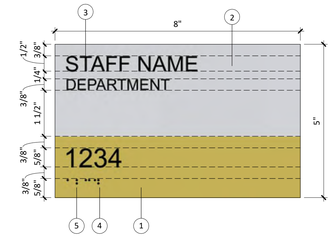


ADA Restroom - Men R1.A
6" = 1'-0"

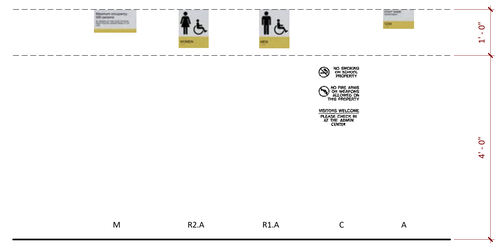
Exterior Door Vinyl Sign C
6" = 1'-0"



Maximum Occupancy M
6" = 1'-0"



Room ID (Standard) A
6" = 1'-0"



Typical Signage Mounting Heights A3
3/4" = 1'-0"

Signage Schedule

Type Mark	Count	Type Comments
A	1	Room ID (Standard)
R1.A	1	Restroom - Men
R2.A	1	Restroom - Women
A	1	Room ID (Standard)
C	1	Exterior Door Vinyl Sign
C	1	Exterior Door Vinyl Sign
C	1	Exterior Door Vinyl Sign

Signage Notes:

1. Solid Color Insert
2. Clear non-glaze lens over paper insert
3. Printed paper text insert
4. Tactile Lettering
5. 3/32" Grade 2 Braille, match color to background

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

Signage Types
SG001

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 OF ANY KIND ABOVE SLAB INSIDE THE BUILDING. 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 SANITARY PIPING 4" AND LARGER. SEE DIVISION 22 SPECIFICATION SECTION "SANITARY DRAINAGE AND VENT AND PIPING SPECIALTIES" FOR MORE INFORMATION.
23. PROVIDE "HEAVY-DUTY" NO-HUB COUPLINGS ON STORM PIPING, INCLUDING CONNECTIONS TO ROOF DRAINS. SEE DIVISION 22 SPECIFICATION SECTION "STORM DRAINAGE PIPING AND SPECIALTIES" 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. PROVIDE TRANSITION ADAPTER COUPLINGS FOR CONNECTION OF PVC DWV TO CAST IRON SANITARY, WASTE AND VENT PIPE AT SLAB ON GRADE. SEE DIVISION 22 SPECIFICATION SECTION "SANITARY DRAINAGE AND VENT PIPING AND SPECIALTIES" FOR MORE INFORMATION.
26. PROVIDE TRANSITION ADAPTER COUPLINGS FOR CONNECTION OF PVC DWV TO CAST IRON STORM PIPE AT SLAB ON GRADE. SEE DIVISION 22 SPECIFICATION SECTION "STORM DRAINAGE PIPING AND SPECIALTIES" FOR MORE INFORMATION.
27. FLOW CONTROL VALVES SHALL BE SIZE 1/2" AND SET AT 0.5 GPM UNLESS NOTED OTHERWISE.
28. WATER HAMMER ARRESTORS SHALL BE SIZE "A" UNLESS NOTED OTHERWISE.
29. PROVIDE VERTICAL LIFT SPRING LOADED CHECK VALVES IN HOT AND COLD WATER SUPPLIES FOR MOP SINK FAUCETS DOWNSTREAM OF SHUTOFF VALVES.
30. PROVIDE WALL PIPES AT PIPING PENETRATIONS OF ELEVATED WATERPROOF FLOOR SLABS, REFER TO SPECIFICATIONS.
31. 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.

PLUMBING SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V2.02

STANDARD MOUNTING HEIGHTS

HOSE BIBB (CENTERLINE)	36"
ICE MAKER OUTLET BOX (CENTER OF BOX)	24"
JANITOR'S SINK FAUCET FITTINGS (CENTERLINE)	42"
NON FREEZE WALL HYDRANT (AFG TO CENTERLINE)	18"
WASHING MACHINE OUTLET BOX (RIM)	42"

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

- PLUMBING PLAN NOTE CALLOUT
- PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES
- EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- 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

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

- DOMESTIC COLD WATER (CW)
- SOFTENED COLD WATER (SCW)
- DOMESTIC HOT WATER (HW)
- DOMESTIC HOT WATER RECIRC. (HWR)
- DOMESTIC HOT WATER (140°)
- TRAP PRIMER LINE (T)
- SOIL PIPING - ABOVE FLOOR (S)
- SOIL PIPING - BELOW FLOOR (S)
- WASTE PIPING - ABOVE FLOOR (W)
- WASTE PIPING - BELOW FLOOR (W)
- GREASE WASTE - ABOVE FLOOR (GW)
- GREASE WASTE - BELOW FLOOR (GW)
- COMBINATION GREASE WASTE AND VENT (CGWV)
- COMBINATION WASTE AND VENT (CWV)
- STORM DRAIN - ABOVE FLOOR (ST)
- STORM DRAIN - BELOW FLOOR (ST)
- OVERFLOW STORM DRAIN - ABOVE FLOOR (OST)
- VENT BELOW GRADE (VBG)
- VENT BELOW FLOOR (VBF)
- INDIRECT DRAIN (ID)
- CONDENSATE DRAIN - HIGH EFFICIENCY RTU (CDH)
- CONDENSATE DRAIN (CD)
- AUXILIARY CONDENSATE DRAIN (ACD)
- SUMP OR SEWAGE PUMP DISCHARGE (SPD)
- NATURAL GAS (G)
- NATURAL GAS ON ROOF (G)
- MEDIUM PRESSURE NATURAL GAS (MPG)
- MEDIUM PRESSURE NATURAL GAS ON ROOF (MPG)
- NON-POTABLE WATER (NPW)
- LIQUEFIED PETROLEUM GAS (LPG)
- WATER SERVICE (WS)
- FIRE PROTECTION SPRINKLER DRY (DFP)
- FIRE PROTECTION SPRINKLER WET (FP)
- FIRE PROTECTION STANDPIPE DRY (DSP)
- FIRE PROTECTION STANDPIPE WET (WSP)
- CONDENSATE PUMP DISCHARGE (PD)
- VENT PIPING (V)
- ACID WASTE - ABOVE FLOOR (AW)
- ACID WASTE - BELOW FLOOR (AW)
- ACID VENT (AV)
- GRAY WATER (GWS)
- COMPRESSED AIR (CA)
- MEDICAL AIR (MA)
- MEDICAL VACUUM (VE)
- HELIUM (HE)
- INSTRUMENT AIR (IA)
- INSTRUMENT VACUUM (IV)
- NITROGEN (N2)
- NITROUS OXIDE (N20)
- OXYGEN (O2)
- EVAC/WAGD (EV)
- CARBON DIOXIDE (CO2)
- MEDICAL AIR INTAKE (AI)
- MEDICAL VACUUM EXHAUST (VE)
- DENTAL AIR (DA)
- DENTAL VACUUM (DV)
- FILTERED WATER (FW1)
- FILTERED WATER W/ SCALE INHIBITOR (FW2)
- REVERSE OSMOSIS (RO)
- 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
DEMOLISH
NEW
FUTURE

CALL OUTS

ENLARGED PLAN CALLOUT

NOT IN SCOPE

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EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

09/09/2022

CARL J. HOLDEN
LICENSE # PE-2020016283

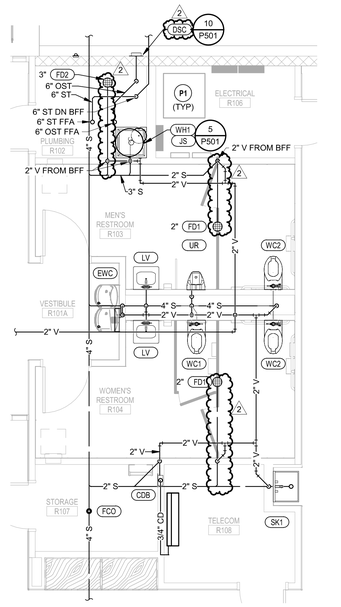
PLUMBING LEGEND AND GENERAL NOTES

P000

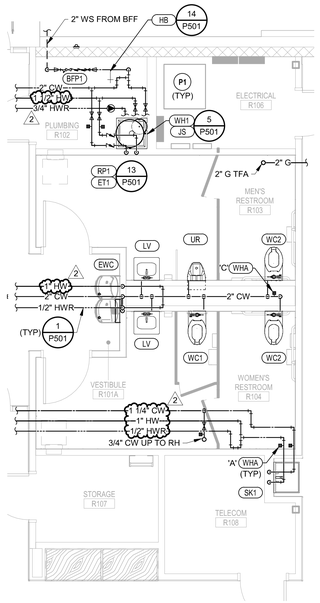
CARL J. HOLDEN

PLUMBING PLAN NOTES:

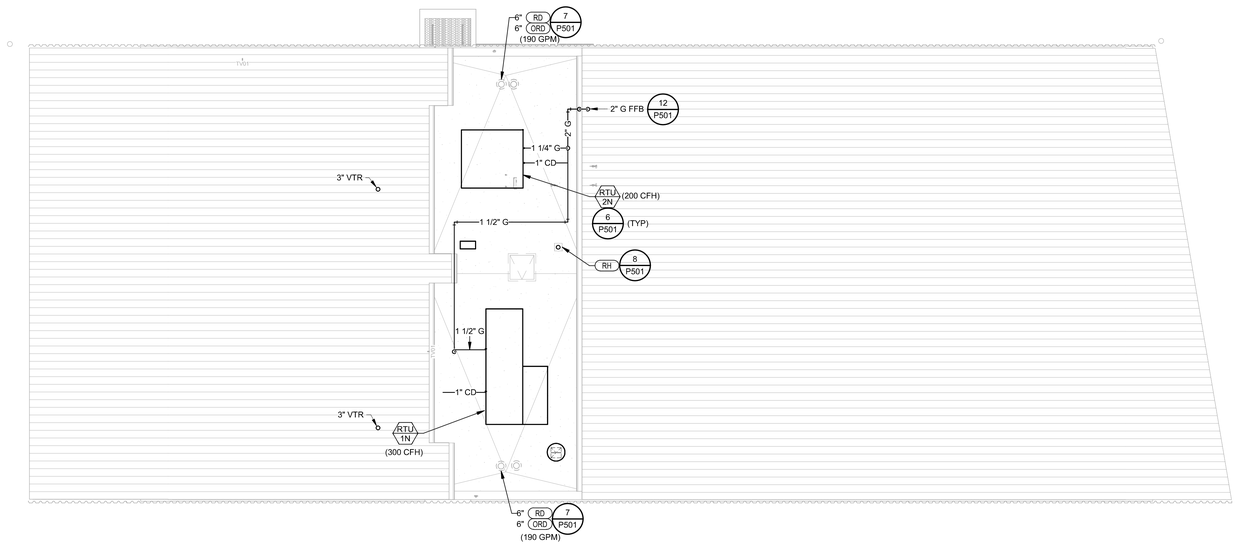
P1 COORDINATE WATER PIPE ROUTING AWAY FROM ELECTRIC PANELS. MAINTAIN CLEARANCES PER NEC.
P2 ROUTE PIPE TIGHT TO WALL.
P4 1/2" CA PROVIDE SHUTOFF VALVE AND CAP FOR FUTURE CONNECTION.
P7 PIPE BELOW WINDOWS TIGHT TO WALL. SLOPE PIPE DOWN TOWARDS THE WALL HYDRANT.
P8 1/2" CA DROP WITH SHUTOFF VALVE. DROP TO 4' AFF



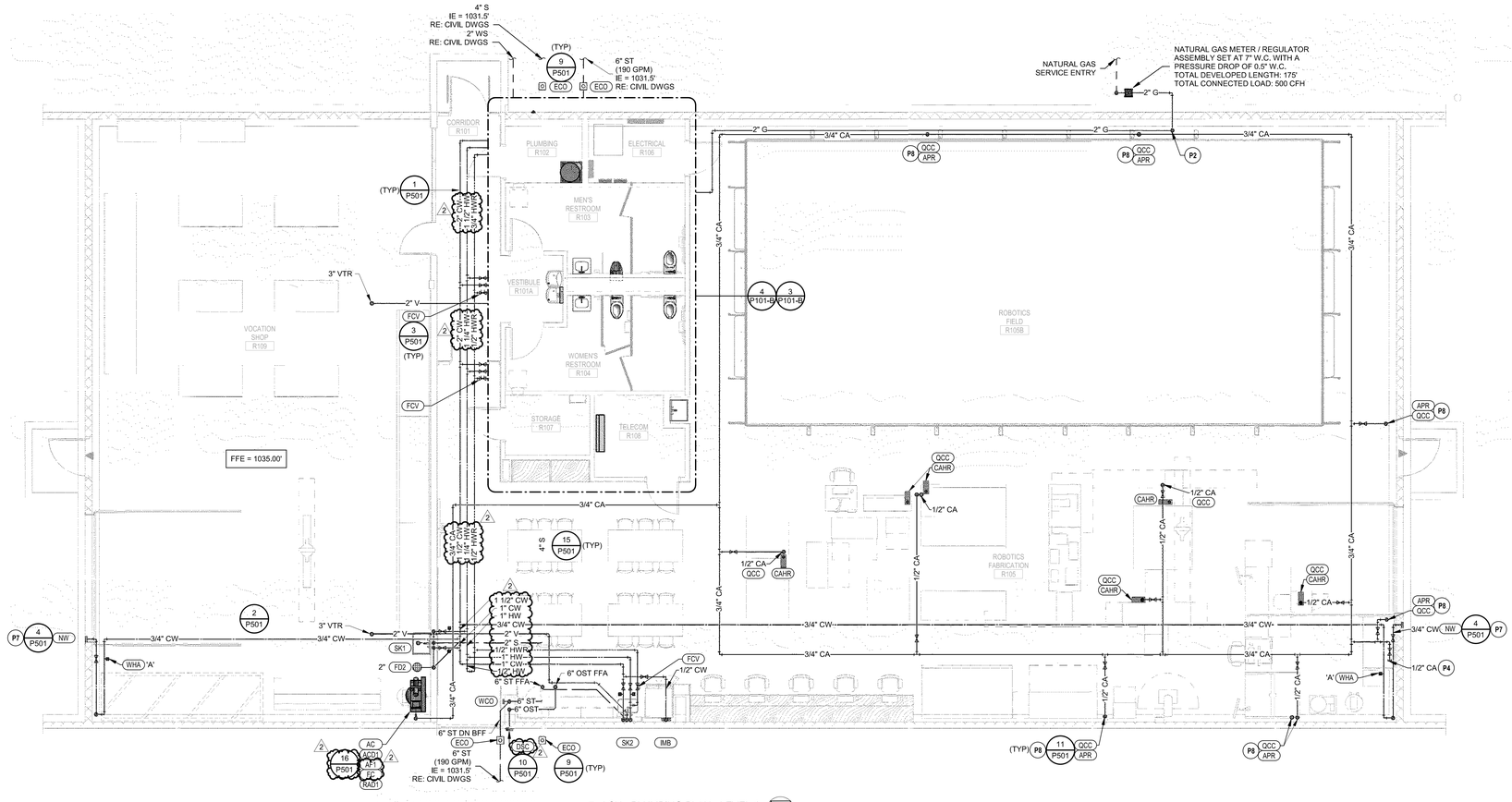
4 LSN - PLUMBING ENLARGED SANITARY & VENT PLAN
1/4" = 1'-0"



3 LSN - PLUMBING ENLARGED WATER & GAS PLAN
1/4" = 1'-0"



2 LSN - PLUMBING ROOF PLAN
1/8" = 1'-0"



1 LSN - PLUMBING PLAN - LEVEL 1
3/16" = 1'-0"

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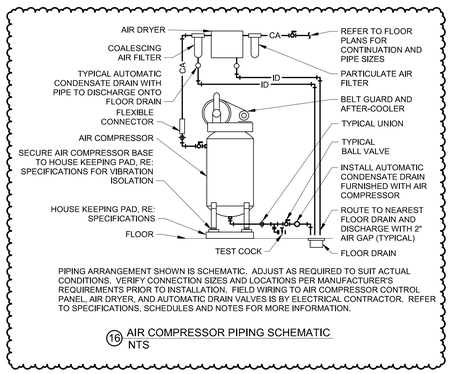
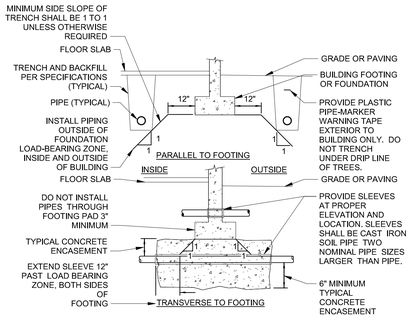
LSN - PLUMBING PLAN - LEVEL 1

P101-B



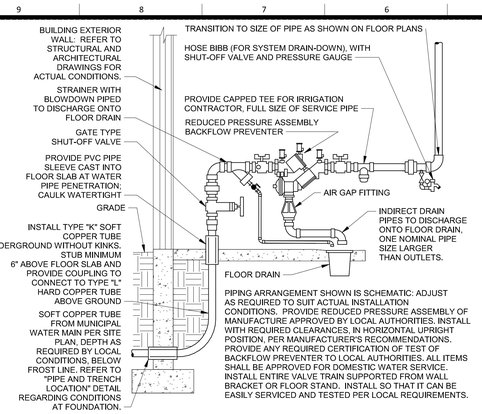
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST AS REQUIRED TO SUIT ACTUAL CONDITIONS. VERIFY CONNECTION SIZES AND LOCATIONS PER MANUFACTURER'S REQUIREMENTS PRIOR TO INSTALLATION. FIELD WIRING TO AIR COMPRESSOR CONTROL PANEL, AIR DRYER, AND AUTOMATIC DRAIN VALVES IS BY ELECTRICAL CONTRACTOR. REFER TO SPECIFICATIONS, SCHEDULES AND NOTES FOR MORE INFORMATION.

16 AIR COMPRESSOR PIPING SCHEMATIC
NTS



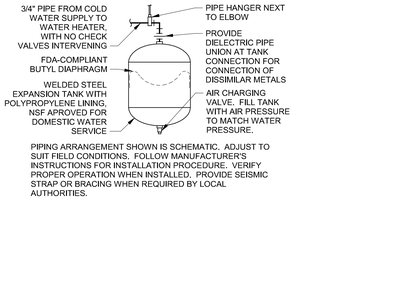
VERIFY EXCAVATION CONDITIONS (SOIL/ROCK) WITH GEOTECHNICAL REPORT AND/OR SITE INVESTIGATIONS. REFER TO SPECIFICATIONS FOR OTHER CONDITIONS. DO NOT INSTALL PIPES UNDER INTERIOR BUILDING SPREAD FOOTINGS OR PILE CAPS. COORDINATE WITH AFFECTED CONTRACTORS PRIOR TO THE START OF WORK.

15 PIPE AND TRENCH LOCATION
NTS



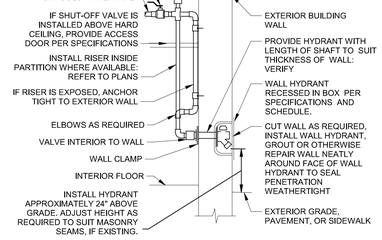
PIPING ARRANGEMENT SHOWN IS SCHEMATIC: ADJUST AS REQUIRED TO SUIT ACTUAL INSTALLATION CONDITIONS. PROVIDE REDUCED PRESSURE ASSEMBLY OF MANUFACTURE APPROVED BY LOCAL AUTHORITIES. INSTALL WITH REQUIRED CLEARANCES, IN HORIZONTAL UPRIGHT POSITION, PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ANY REQUIRED CERTIFICATION OF TEST OF BACKFLOW PREVENTER TO LOCAL AUTHORITIES. ALL ITEMS SHALL BE APPROVED FOR DOMESTIC WATER SERVICE. INSTALL ENTIRE VALVE TRAIN SUPPORTED FROM WALL BRACKET OR FLOOR STAND. INSTALL SO THAT IT CAN BE EASILY SERVICED AND TESTED PER LOCAL REQUIREMENTS.

14 DOMESTIC WATER SERVICE ENTRY
NTS



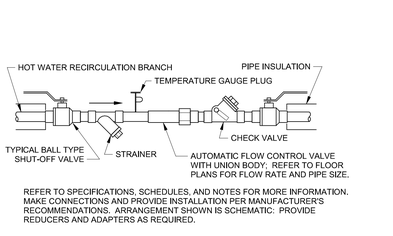
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION PROCEDURE. VERIFY PROPER OPERATION WHEN INSTALLED. PROVIDE SEISMIC STRAP OR BRACING WHEN REQUIRED BY LOCAL AUTHORITIES.

13 SMALL EXPANSION TANK
NTS



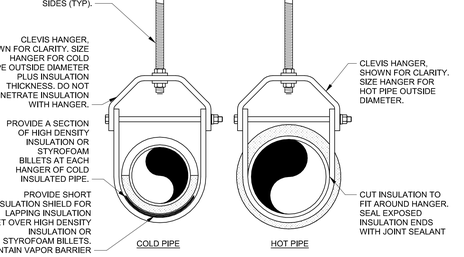
REFER TO PLANS FOR PIPE SIZE(S) AND PENETRATION LOCATION(S). REFER TO SPECIFICATIONS FOR MORE INFORMATION. LOCATE PENETRATION MINIMUM 18" FROM ADJACENT WALLS, VENTS THRU ROOF, EQUIPMENT CURBS, PARAPETS, ROOF DRAINS, EXPANSION JOINTS, AND OTHER ROOF FEATURES.

12 GAS PIPE ROOF PENETRATION
NTS



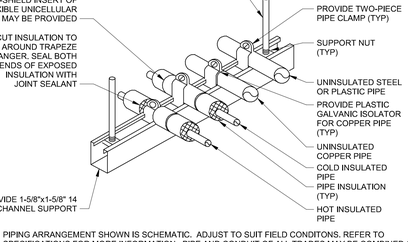
REFER TO SPECIFICATIONS FOR FURTHER INFORMATION ABOUT PIPE, FITTINGS, AND DEVICES. PIPING ARRANGEMENT SHOWN IS SCHEMATIC: ADJUST TO SUIT CONDITIONS. REFER TO FLOOR PLANS FOR LOCATION OF OUTLETS, DRIP LEGS, AND AIR MAIN PIPE SIZES.

11 COMPRESSED AIR OUTLET - WITH REGULATOR
NTS



ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. RE: SPECIFICATIONS FOR DOWNSPOUT COVER, AND
TYPE OF PIPE, FITTINGS, AND CONNECTORS.

10 DOWNSPOUT COVER
NTS



LOCATE EXTERIOR CLEANOUTS AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT MINIMUM 75 FOOT INTERVALS ON STRAIGHT RUNS, AND WHERE SHOWN ON PLANS. PROVIDE EARTH BACKFILL AND COMPACTION PER ARCHITECTURAL SPECIFICATIONS. REFER TO SPECIFICATIONS AND SCHEDULES FOR MORE INFORMATION.

9 EXTERIOR CLEANOUT
NTS

PIPING ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS, RE: FLOOR PLANS FOR LOCATION.

8 ROOF HYDRANT DETAIL
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.

7 ROOF DRAIN INSTALLATION
NTS

ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. VERIFY CONNECTION LOCATIONS BEFORE INSTALLING PIPE RUNS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS AND INSTALLATION. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. FOR PIPE SIZE(S) REFER TO FLOOR PLANS, OR CODE REQUIREMENTS FOR HVAC UNIT TONNAGE. PROVIDE GAS COCK, UNION AND DIRT LEG SAME SIZE AS BRANCH PIPE. SLOPE CONDENSATE PIPE AS MUCH AS POSSIBLE TOWARD DISCHARGE, 2% MINIMUM. PROVIDE CLEANOUTS IN ENDS AND TURNS OF PIPE PER LOCAL CODE REQUIREMENTS; ADAPTER WITH THREADED CLEANOUT PLUG. PROVIDE MINIMUM 6" CLEARANCE TO ROOF UNDER PIPES.

6 CONNECTIONS TO ROOF-TOP UNIT
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 WITH WATER HEATER FURNISHED. REFER TO FLOOR PLANS FOR PIPE SIZES. PROVIDE SEISMIC BRACE WHERE REQUIRED. PROVIDE WATER HEATER PLATFORM ATTACHED TO WALL AND/OR SUSPENDED FROM STRUCTURE ABOVE. INSTALL BOTTOM OF PLATFORM AT MINIMUM 6'-6" ABOVE FLOOR IF ABOVE JANITOR'S SINK; OTHERWISE HIGH AS POSSIBLE. POWER WIRING AND DISCONNECT ARE SPECIFIED BY ELECTRICAL. INTERLOCK OF AQUASTAT WITH RECIRCULATION PUMP IS SPECIFIED BY ELECTRICAL.

5 ELECTRIC WATER HEATER OVERHEAD WITH RECIRCULATION PUMP SYSTEM
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.

4 WALL HYDRANT INSTALLATION
NTS

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.

3 AUTOMATIC FLOW CONTROL VALVE TRAIN
NTS

REFER TO SPECIFICATIONS FOR INSULATION TYPES, INSULATION THICKNESSES, HANGER TYPES, HANGER ROD CONNECTIONS TO STRUCTURE AND HANGER SPACING.

2 PIPE HANGER DETAIL
NTS

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.

1 TRAPEZE PIPE HANGER
NTS

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PLUMBING DETAILS

P501

PLUMBING FIXTURE CONNECTION SCHEDULE

FIXTURE	COLD WATER	HOT WATER	WASTE	VENT
WATER CLOSET (FV)	1-1/4" (NOTE 1)	--	4"	2"
URINAL	3/4" (NOTE 2)	--	2"	2"
LAVATORY	1/2"	1/2"	2"	2"
ELECTRIC WATER COOLER	1/2"	--	2"	2"
JANITOR'S SINK	1/2"	1/2"	3"	2"
FLOOR DRAIN	--	--	2"	2"
SINK	1/2"	1/2"	2"	2"

NOTES:

PIPE SIZES SHOWN ARE MINIMUM. AND ARE FOR INDIVIDUAL SERVICE PIPE SIZES UNLESS NOTED OTHERWISE ON DRAWINGS.

(NOTE 1) PROVIDE 1-1/4" CW TO FLUSH VALVE, REDUCE TO 1" PRIOR TO CONNECTING TO FLUSH VALVE INLET AT INSIDE OF WALL
(NOTE 2) PROVIDE 1" CW TO FLUSH VALVE, REDUCE TO 3/4" PRIOR TO CONNECTING TO FLUSH VALVE INLET AT INSIDE OF WALL

ELECTRIC STORAGE WATER HEATER SCHEDULE

MARK	MANUFACTURER/ MODEL#	AREA SERVED	TANK SIZE (GALLONS)	ELECTRICAL DATA VOLTS	PHASE	KW	RECOVERY (GPH)	WEIGHT (LBS)	NOTES
WH1	A.O. SMITH DEL-20	R102	20	277	1	6.0	26	73	A,B,C

NOTES:

A. 100° TEMPERATURE RISE WITH 140°F OPERATING TEMPERATURE.
B. SINGLE ELEMENT
C. "LOW BOY" DESIGN

EXPANSION TANK SCHEDULE

MARK	MANUFACTURER / MODEL #	TANK SIZE (GALLONS)	MIN. ACCEPTANCE VOLUME (GALLONS)	AIR PRESSURE SETTING (PSI)	SERVICE	WEIGHT (LBS)	NOTES
ET1	AMTROL ST-5	2.1	0.882	150	R102	21	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	IMPELLER SIZE (IN.)	ELECTRICAL DATA VOLTS	PHASE	HP	NOTES
RP1	BELL & GOSSETT # NBF-12U/LW	R102	1.5	10.4	3/4"	3.69	115	1	7/95	A, B, C, D, E

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 10F BELOW SET POINT
E. INTERLOCK PUMP "ON" - "OFF" CONTROL WITH BUILDING AUTOMATION SYSTEM, RE: MECH DRAWINGS

AIR COMPRESSOR SCHEDULE

MARK	MANUFACTURER/ MODEL#	LOCATION	TYPE NOTE A	ACCUMULATOR CAPACITY (GAL)	COMPRESSOR CAPACITY NOTE B	ELECTRICAL DATA VOLTS	PHASE	HP	WEIGHT (LBS)	NOTES
AC	CHAMPION #VR10-8	R109	D	80	34.7 SCFM @ 125 PSIG	208	3	10	723	C & D

NOTES:

A. S = SIMPLEX, TANK MOUNTED, D = DUPLEX, TANK MOUNTED
B. FOR ONE COMPRESSOR ONLY
C. SET OUTLET PRESSURE TO 125 PSIG
D. SEE SPECIFICATIONS FOR MORE INFORMATION

LOW PRESSURE GAS PIPE SIZING CHART

PIPE SIZE	LOAD (CFH)
1/2"	37
3/4"	77
1"	145
1-1/4"	299
1-1/2"	448
2"	862
2-1/2"	1,374
3"	2,428
4"	4,953
5"	8,961
6"	14,510
8"	29,812
10"	54,146
12"	85,720

FOR SCHEDULE 40 STEEL PIPE
OPERATING PRESSURE OF 7"WC WITH A
PRESSURE DROP OF 0.5"WC
TOTAL DEVELOPED LENGTH (FEET) = 175
BASED ON NFPA 54 EQUATION 4-1

TOTAL CONNECTED NATURAL GAS LOAD - LSW

MECHANICAL EQUIPMENT

EQUIPMENT DESIGNATION	DESCRIPTION	CFH (EACH)
RTU 1W	ROOFTOP UNIT	300
RTU 2W	ROOFTOP UNIT	200
	TOTAL CONNECTED LOAD =	500

NATURAL GAS SYSTEM OPERATING PRESSURE: 7" WC
NATURAL GAS SYSTEM SIZED WITH TOTAL DEVELOPED LENGTH FROM
GAS METER TO MOST REMOTE PIECE OF EQUIPMENT: 175 FEET
SYSTEM DESIGN PRESSURE DROP: 0.5" WC

TOTAL CONNECTED NATURAL GAS LOAD - LSN

MECHANICAL EQUIPMENT

EQUIPMENT DESIGNATION	DESCRIPTION	CFH (EACH)
RTU 1N	REMOTE TERMINAL UNIT	300
RTU 2N	REMOTE TERMINAL UNIT	200
	TOTAL CONNECTED LOAD =	500

NATURAL GAS SYSTEM OPERATING PRESSURE: 7" WC
NATURAL GAS SYSTEM SIZED WITH TOTAL DEVELOPED LENGTH FROM
GAS METER TO MOST REMOTE PIECE OF EQUIPMENT: 175 FEET
SYSTEM DESIGN PRESSURE DROP: 0.5" WC

WATER PIPE SIZING CHART (IPC) BRANCHES

FIXTURE UNITS VS. PRESSURE LOSS
IN PSI / 100 FEET FOR TYPE "L" COPPER TUBE

COLD WATER @ 2.50 PSI / 100'						HOT WATER @ 2.5 PSI / 100'		
PIPE SIZE	INTERNAL DIAMETER	FLUSH TANK SFU	FLUSH VALVE SFU	VELOCITY FEET / SEC	FLOW GPM	FLUSH TANK SFU	VELOCITY FEET / SEC	FLOW GPM
1/2"	0.545	0.5	N/A	2.3	1.6	*	*	*
3/4"	0.785	1.6	N/A	2.9	4.3	*	*	*
1"	1.025	4.4	N/A	3.4	8.6	*	*	*
1-1/4"	1.265	10.6	5.0	3.9	15.0	*	*	*
1-1/2"	1.505	31.6	8.6	4.3	23.8	*	*	*
2"	1.985	126.0	48.3	5.1	49.3	120.9	5	48.2
2-1/2"	2.465	311.2	187.7	5.9	87.2	246.8	5	74.3
3"	2.945	583.1	476.8	6.6	139.3	406	5	106.1
4"	3.905	1710.4	1710.4	7.8	292.5	859.4	5	186.6
6"	5.845	5269.9	5269.9	8.0	669.0	2859.7	5	418.1
8"	7.725	10143.1	10143.1	8.0	1168.6	5653.3	5	730.3
SIZED WITH HAZEN WILLIAMS CONSTANT "C" =					135	*UTILIZE COLD WATER SIZING CHART		

PLUMBING FIXTURE SCHEDULE - LSW & LSN

PLUMBING PLAN MARK	DESCRIPTION
ACD1	AUTOMATIC CONDENSATE DRAIN: ARROW # 5702S TIMER CONTROLLED SOLENOID DRAIN VALVE WITH MOUNTING KIT. PROVIDE WITH ARROW Y STRAINER # S202. ELECTRICAL REQUIREMENTS: 120-VOLT SINGLE PHASE.
AF1	AIR FILTER: HANKISON # HF-9-16-4-X-G COALESCING CARTRIDGE TYPE WITH METAL HOUSING AND DIFFERENTIAL PRESSURE INDICATOR AND EXTERNAL DRAIN ADAPTER. FILTER SHALL BE CAPABLE OF REMOVING PARTICLES TO 3 MICRON AND AEROSOLS TO 5 PPM AT 60 SCFM AT 100PSI.
APR	AIR PRESSURE REGULATOR: WILKERSON #R-8, ALUMINUM BODY, BRASSVALVE STEM, NITRILE DIAPHRAGM AND SEALS, OUTLET PRESSURE GAGE, 3/8" FNPT CONNECTIONS AND MAXIMUM FLOW OF 68 SCFM WITH PRESSURE ADJUSTMENT RANGE OF 0 -125 PSIG.
2 BFP1	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # LF909QT-S, MEETING ASSE 1013, LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, QUARTER TURN BALL VALVES, BRONZE STRAINER, AND # 909AG AIR GAP FITTING.
CAHR	COMPRESSED AIR HOSE REEL: COXREELS EZ-P-LP430 RETRACTABLE HOSE REEL , WITH SPRING LOADED "EZ-COIL REWIND SAFETY SYSTEM" WITH LOW RETRACTION SPEED, BRASS BEARING AND 30 FEET OF 1/2" LOW PRESSURE AIR HOSE WITH A MAXIMUM PRESSURE RATING OF 180 PSIG. PROVIDE WITH 4-WAY ROLLER BRACKET #4RB, PROVIDE WITH MOUNTING BRACKET KIT FOR MOUNTING SINGLE HOSE REEL # 15723 EZ-UP BRACKET, PROVIDE WITH # 5155-1.5 3/4" X 24" INCH LOW PRESSURE HOSE FOR CONNECTION FROM THE COMPRESSED AIR LINE TO THE HOSE REEL INLET. PROVIDE WITH QUICK DISCONNECT (QCC) DESCRIBED ELSE WHERE IN THIS PLUMBING FIXTURE SCHEDULE.
CDB	CONDENSATE DRAIN BOX: SIOUX CHIEF "OXBOX" MODEL # 696-3 OUTLET BOX, MODEL #696-CF SECONDARY DRAINAGE FUNNEL AND #696-SC SOLID COVER PLATE MOUNT AT 48" AFF.
2 DSC	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.
2 ECO	EXTERIOR CLEANOUT: EXTERIOR CLEANOUT: JAY R. SMITH # 4261L SERIES DUCO CAST IRON DOUBLE FLANGED HOUSING WITH HEAVY DUTY SECURED SCORIATED CAST IRON COVER WITH LIFTING DEVICE AND CLEANOUT BODY WITH ABS PLASTIC PLUG WITH GASKET SEAL AND PUSH-ON JOINT. REFER TO SPECIFICATIONS FOR INSTALLATION.CLEANOUT COVERS SHALL HAVE EITHER "SANITARY" OR "STORM" CAST INTO THE COVER TO IDENTIFY SYSTEM SERVED.
2 EWC	ELECTRIC WATER COOLER (ADA ACCESSIBLE): ELKAY # VRCGRN8WSK VANDAL-RESISTANT, WALL-MOUNTED, LEAD FREE, WATER COOLER WITH BOTTLE FILLING STATION, MECHANICAL FRONT PUSH BUTTON, STAINLESS STEEL FINISH, VANDAL-RESISTANT BUBBLER, CHILLER WITH 8.0 GALLONS PER HOUR CAPACITY, 50°F DRINKING WATER AT 80°F INLET TEMPERATURES 90°F ROOM TEMPERATURE BOTTLE FILLING STATION: ELECTRONIC SENSOR FOR TOUCHLESS ACTIVATION WITH AUTO 20-SECOND SHUT-OFF TIMER, UNIT PROVIDES 1.1-1.5 GPM WITH LAMINAR FLOW TO MINIMIZE SPLASHING. TRIM: McGUIRE # LF2165CCSS12 LEAD FREE BRASS COMPRESSION ANGLE STOP VALVE WITH STAINLESS STEEL BRAIDED RISER AND ESCUTCHEON, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, AND SUITABLE CARRIER WITH STANCHIONS TO FLOOR. INSTALL "WCO" UNDERNEATH WASTE CONNECTION. ELECTRICAL REQUIREMENTS: 115-VOLT, 4.5 FULL LOAD AMPS.
2 FC	FLEXIBLE CONNECTOR: UNITED FLEXIBLE #AFBX1, 3/4" X 12"LONG CORRUGATED 316L STAINLESS STEEL BELLOWS AND 304 STAINLESS STEEL SINGLE BRAID WITH MALE NPT THREADED CONNECTIONS WITH INTREGRAL HEX AND WITH A MAXIMUM OPERATING PRESSURE OF 875 PSI.
2 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. CLEANOUT COVERS SHALL HAVE EITHER "SANITARY" OR "STORM" CAST INTO THE COVER TO IDENTIFY SYSTEM SERVED.
FCV	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.
FD1	FLOOR DRAIN: JAY R .SMITH # 2005L (-A), CAST IRON BODY AND CLAMPING COLLAR, ADJUSTABLE 6" ROUND NICKEL BRONZE STRAINER. PROVIDE TRAP PRIMER PORT IF TRAP PRIMER IS PROVIDED ON THE DRAWINGS. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS.
FD2	FLOOR DRAIN: JAY R .SMITH # 2005L (-A), CAST IRON BODY AND CLAMPING COLLAR, ADJUSTABLE 8" ROUND NICKEL BRONZE STRAINER. PROVIDE TRAP PRIMER PORT IF TRAP PRIMER IS PROVIDED ON THE DRAWINGS. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS.
HB	HOSE BIBB: PRIER PRODUCTS # C-258NCP.75, POLISHED NICKEL PLATED BRASS 3/4" MALE INLET, 3/4" THREADED HOSE CONNECTION, LOOSE KEY HANDLE, AND ASSE 1011 INTEGRAL VACUUM BREAKER.
IMB	FIRE RATED ICE MAKER BOX: GUY GRAY MODEL # FRMIB12ABDS, ASTM E814 LISTED, WHITE POWDER COAT ON COLD ROLLED STEEL BOX WITH TWO INTUMESCENT PADS ATTACHED, BOTTOM INLET WATER SUPPLY WITH 1/2" x 1/4" LEAD FREE COMPRESSION ANGLE STOP VALVE.
JS	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.
LV	WALL-MOUNTED LAVATORY (ADA ACCESSIBLE): AMERICAN STANDARD # 0356.421 "LUCERNE" 20-1/2" X 18-1/4" RECTANGULAR WALL MOUNTED WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. FAUCET: TOTO # TEL105-D10E #CP DECK-MOUNT, HYDRO-POWERED, LEAD-FREE, SENSOR OPERATED FAUCET, BATTERY BACK-UP, 0.5 GPM (0.09 GALLONS PER CYCLE), AND VANDAL RESISTANT AERATOR. TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED 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, PLUMBEREX "PRO-EXTREME" # X-4222 INSULATION KIT FOR WATER AND WASTE PIPES. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD-FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 100F. PROVIDE WITH MOUNTING BRACKET. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S). TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS, McGUIRE # 151 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.
NW	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.

PLUMBING FIXTURE SCHEDULE - LSW & LSN

PLUMBING PLAN MARK	DESCRIPTION
2 ORD	OVERFLOW ROOF DRAIN: JAY R. SMITH # 1080Y (-E0X-C-R-LESS DOME), 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. CAST IRON ROOF DRAIN DOME: MIFB # RG2016DDC ROOF GUARD CAST IRON 19" DIAMETER REPLACEMENT ROOF DOME.
QCC	QUICK CONNECT COUPLER: GRACO #110198 COUPLER WITH 3/8" FNPT END. GRACO #110199 COUPLER WITH 1/2" FNPT END. VERIFY WITH OWNER THE TYPE OF COUPLER NECESSARY TO MATCH TOOL AND EQUIPMENT CONNECTION NEEDS FOR NEW AND RELOCATED EQUIPMENT.
RAD1	REFRIGERATED AIR DRYER: HANKISON # HPR-35 AIR COOLED NON-CYCLING TYPE WITH 200 PSI MAXIMUM WORKING PRESSURE, AIR DRYING MODULE, ON-OFF SWITCH, POWER ON LIGHT, AUTOMATIC DRAIN VALVE, THERMAL OVERLOAD PROTECTION, CYCLING FAN CONTROL AND HIGH TEMPERATURE LIGHT. AIR DRYER SHALL BE CAPABLE OF PROVIDING 35 SCFM AT A 35F PRESSURE DEWPOINT AT 100 PSI WITH A 1/3 HP 120V 1 PHASE MOTOR.
2 RD	ROOF DRAIN: JAY R. SMITH # 1010Y (-E0X-C-R-LESS DOME), 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. CAST IRON ROOF DRAIN DOME: MIFB # RG2016DDC ROOF GUARD CAST IRON 19" DIAMETER REPLACEMENT ROOF DOME.
RH	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.
2 SK1	SINK: ELKAY # WNSF-8124, ONE 24" x 24" x 14" DEEP COMPARTMENT, 8" HIGH BACKSPLASH, 14 GAUGE TYPE 304 STAINLESS STEEL, AND 16 GAUGE STAINLESS STEEL ADJUSTABLE LEGS. FAUCET: CHICAGO FAUCET #445-206578AB 3 3/8" BACK MOUNT FAUCET WITH 3" – 3 3/8" ADJUSTABLE "R" ARMS WITH INTEGRAL SHUT OFF, VANDAL RESISTANT # 369 LEVER HANDLES, L9 SWING SPOUT, # E1 FULL FLOW OUTLET, QUARTER TURN CERAMIC CARTRIDGES TRIM: ELKAY # LK24RT GRID STRAINER WITH LEVER HANDLE AND 1-1/2" TAILPIECE, AND 1-1/2" HARD COPPER TYPE "DWV" FABRICATED INDIRECT WASTE LINE ROUTED TO FLOOR SINK.
SK2	UNDERMOUNT SINK (ADA ACCESSIBLE): ELKAY # ELUHAD361855, 35-3/4" x 18-1/2" x 5-3/8" DEEP, DOUBLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 304 STAINLESS STEEL. PROVIDE A BEAD OF SILICONE CAULK BETWEEN THE SINK AND COUNTERTOP PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. FAUCET: CHICAGO FAUCET # 895-317GN2AE29ABCP 4" SPREAD LEAD FREE FAUCET WITH 4" WRISTBLADE HANDLES, 5-1/4" GOOSENECK SPOUT, 2.2 GPM LAMINAR FLOW OUTLET, AND QUARTER TURN CERAMIC CARTRIDGES. TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS, McGUIRE # 151 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. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD-FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 120F. PROVIDE WITH MOUNTING BRACKET. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
2 UR	URINAL (ADA ACCESSIBLE): AMERICAN STANDARD # 6561.017 "TRIMBROOK" WHITE VITREOUS CHINA FIXTURE WITH FLUSHING RIM, 3/4" TOP SPUD, AND SIPHON FLUSH ACTION. VALVE: TOTO #TEU1UA12#CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 1.0 GALLON PER FLUSH, EXPOSED, CHROME PLATED, SENSOR OPERATED FLOW REGULATOR TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH POM FLOW REGULATOR WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, 3/4" FLUSH TUBE AND SWEAT ADAPTER KIT. TRIM: SUITABLE CARRIER WITH STANCHIONS TO FLOOR.
WC1	WALL-MOUNTED WATER CLOSET: AMERICAN STANDARD # 2257.001 "AFWALL" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. VALVE: TOTO TET1LAR #CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 1.28 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, SENSOR OPERATED PISTON TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH PISTON WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, AND SWEAT ADAPTER KIT. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS-STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WC2	WALL-MOUNTED WATER CLOSET (ADA ACCESSIBLE): AMERICAN STANDARD # 2257.001 "AFWALL" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. VALVE: TOTO TET1LAR #CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 1.28 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, SENSOR OPERATED PISTON TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH PISTON WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, AND SWEAT ADAPTER KIT. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS-STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WCO	WALL CLEANOUT: JAY R. SMITH # 4530S, CAST IRON CLEANOUT TEE, COUNTER SUNK PLUG, STAINLESS STEEL ROUND COVER AND SCREW, AND IRON PLUG WITH GASKET SEAL. REFER TO SPECIFICATIONS FOR INSTALLATION.
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.

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the evolution of gould evans

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Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

STATE OF MISSOURI
CARL J. HOLDEN
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PROFESSIONAL ENGINEER

09/22/2022

CARL J. HOLDEN
LICENSE # PE-2020016283

PLUMBING SCHEDULES

P601

CARL J. HOLDEN

MECHANICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V3.0

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
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

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
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
BB	BACKBONE
BD	BACKDRAFT DAMPER
BD	BLOWDOWN
BFC	BELOW FINISHED CEILING
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
BFP	BOILER FEED PUMP
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
CH	CHILLER
CLG	COOLING
CP	CONDENSATE PUMP
CPT	CONTROL POWER TRANSFORMER
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRU	COMPUTER ROOM UNIT
CT	COOLING TOWER
CV	CONTROL VALVE
CWP	CONDENSER WATER PUMP
CU	CONDENSING UNIT
CHWP	CHILLED WATER PUMP
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
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
HTG	HEATING
HWP	HEATING WATER PUMP
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
SCP	STEAM CONDENSATE PUMP
SD	SMOKE DUCT DETECTOR
SD	SUPPLY DUCT
SF	SUPPLY FAN
SH	SENSIBLE HEAT CAPACITY
SOW	SCOPE OF WORK
SP	STATIC PRESSURE
ST	STEAM TRAP
STM	STEAM
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
UNO	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
XP	EXPLOSION PROOF

HVAC DUCTWORK AND ACCESSORIES

- DUCTWORK/EQUIPMENT TO BE REMOVED OR RELOCATED
- EXISTING DUCTWORK/EQUIPMENT TO REMAIN
- 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 — 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
- (#) — 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.

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

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 BLOWOFF
- 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)

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

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. EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS AND SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING FINAL BIDS. COORDINATE NEW WORK AND DEMOLITION WITH OTHER DISCIPLINES AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
3. 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.
4. DURING INSTALLATION OF NEW WORK, AVOID DAMAGING EXISTING SURFACES AND EQUIPMENT TO REMAIN. REPAIR DAMAGE CAUSED DURING CONSTRUCTION AT NO EXTRA COST TO THE OWNER.
5. PROVIDE TEMPORARY BARRIERS TO CONTAIN DUST AND DEBRIS RESULTING FROM THE PERFORMANCE OF THE WORK TO THE AREA WHERE WORK IS BEING PERFORMED.
6. ALL MECHANICAL EQUIPMENT SHOWN ON THE MECHANICAL PLANS SHALL BE PROVIDED BY DIVISION 23 UNLESS OTHERWISE NOTED.
7. 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.
8. 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.
9. COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
10. 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. 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.
11. INSTALL DUCTWORK AND PIPING PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
12. 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.
13. COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
14. SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
15. DRAIN, FLUSH, AND REFILL ALL PIPING SYSTEMS NECESSARY TO PERFORM THE WORK. REFERENCE SPECIFICATIONS FOR FLUSHING PERFORMANCE REQUIREMENTS AND SUBMIT FLUSHING PLAN TO ENGINEER FOR REVIEW. PROVIDE CHEMICAL TREATMENT FOR ALL PIPING SYSTEMS AFTER FLUSHING AND REFILLING THE SYSTEM.
16. 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.
17. ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
18. 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.
19. DUCTWORK CROSSING FIRE RATED WALLS OR OTHER FIRE RATED ASSEMBLIES SHALL BE MINIMUM 26 GAUGE SHEET METAL.
20. PROVIDE FIRE OR FIRE/SMOKE DAMPERS, AS APPLICABLE, IN DUCTWORK AT CEILINGS AND WALLS AT LOCATIONS SHOWN ON THE PLANS. FIRE AND FIRE/SMOKE DAMPERS SHALL CONFORM TO NFPA AS APPLICABLE. COORDINATE SLEEVE LENGTH WITH REQUIREMENTS OF INSTALLED LOCATION.
21. PROVIDE WALL OR DUCT ACCESS PANELS OR DOORS FOR ACCESS TO FIRE AND FIRE/SMOKE DAMPERS. ACCESS PANEL OR DOOR SHALL BE MINIMUM SIZE OF 10" BY 10" AND SHALL BE INSTALLED WITHIN 12" OF DAMPER. PROVIDE A REMOVABLE DUCT SECTION WHERE DUCT SIZE IS TOO SMALL FOR A 10" BY 10" ACCESS DOOR.
22. 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.
23. 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.
24. PROVIDE A MANUAL BALANCING DAMPER IN EACH DUCT TAKEOFF FROM SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
25. 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.
26. BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
27. 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.
28. 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.
29. PROVIDE EQUIPMENT VENTS AND FLUES PER EQUIPMENT MANUFACTURERS RECOMMENDATIONS AND EQUIPMENT SPECIFICATIONS. KEEP PENETRATIONS THROUGH ROOF A MINIMUM OF 10'-0" FROM HVAC EQUIPMENT FRESH AIR INLETS AND 2'-0" FROM ROOF PARAPETS.
30. PROVIDE WALL MOUNTED LOUVERS AND DAMPERS WITH SUITABLE MOUNTING FRAME TO MATCH WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL DRAWINGS.
31. PROVIDE A NEW SET OF AIR FILTERS IN UNITS PRIOR TO TESTING, ADJUSTING AND BALANCING AND BEFORE TURNING SYSTEM(S) OVER TO OWNER.

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Revisions

NUMBER	DESCRIPTION	DATE

STATE OF MISSOURI — CARL J. HOLDEN — 09/09/2022 — PE-2020016283 — PROFESSIONAL ENGINEER

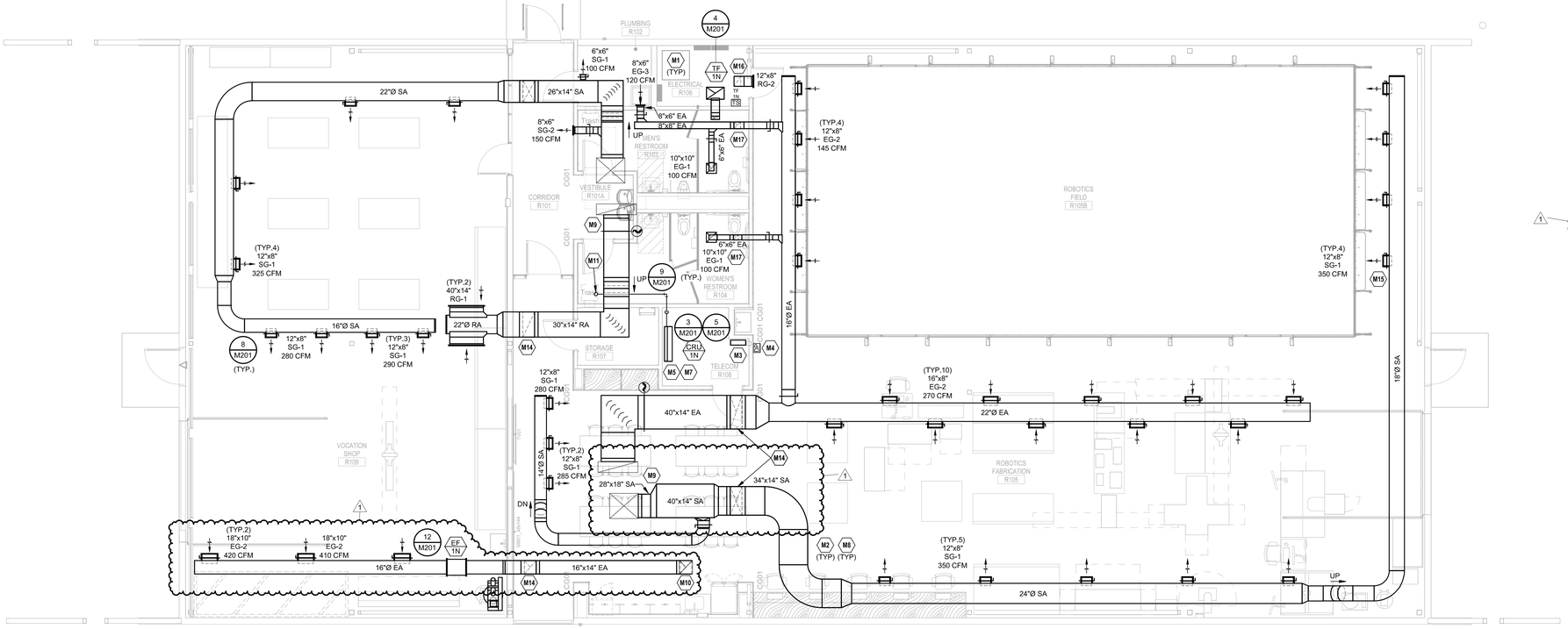
09/09/2022

CARL J. HOLDEN
LICENSE # PE-2020016283

MECHANICAL GENERAL NOTES AND LEGEND

M000

CARL J. HOLDEN



1 HVAC LEVEL 1 PLAN - LSN
3/16" = 1'-0"

MECHANICAL PLAN NOTES:

M1 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL PANELS AND EQUIPMENT.

M2 ALL FULLY AND PARTIALLY EXPOSED SUPPLY SPIRAL AND RECTANGULAR DUCT SHALL BE INTERNALLY LINED AND FIELD PAINTED, COLOR BY ARCHITECT.

M3 PROVIDE BUILDING BAS PANEL(S). QUANTITY OF PANELS TO BE DETERMINED BY CONTROLS CONTRACTOR. COORDINATE LOCATIONS WITH ARCHITECT AND OTHER TRADES.

M4 INSTALL BUILDING DIFFERENTIAL PRESSURE SENSOR. EXTEND LOW PORT TUBING UP THRU ROOF TO MATCH MANUFACTURER RECOMMENDATIONS/REQUIREMENTS.

M5 REFRIGERANT PIPING IS SCHEMATIC. ACTUAL ROUTING AND SIZING OF REFRIGERANT LINES SHALL BE DETERMINED PER MANUFACTURER'S RECOMMENDATIONS.

M7 ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE TO ALLOW MAXIMUM CLEARANCES BELOW.

M8 COORDINATE PIPING, CONDUIT, AND DUCT ROUTING THROUGH EXPOSED AREAS TO CLEANLY ROUTE/GROUP TOGETHER. COORDINATE WITH ALL OTHER TRADES.

M9 ROUTE SUPPLY/RETURN DUCT UP THROUGH ROOF. TRANSITION TO DUCT/RTU CONNECTION SIZE IN CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M10 ROUTE EXHAUST DUCT UP THROUGH ROOF. TRANSITION TO DUCT/HOOD CONNECTION SIZE IN CURB.

M11 ROUTE REFRIGERANT PIPE UP THROUGH ROOF. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M14 ROUTE DUCT UP INTO SOFFIT AND ELBOW OUT INTO SHOP SPACE.

M15 DO NOT INSTALL ANY DUCTWORK OR PIPING BELOW 12'-6" AFF IN ROBOTICS FIELD.

M16 INSTALL BOTTOM OF TRANSFER DUCT 12'-0" AFF. DUCT INTO SOFFIT AND INTO ELECTRICAL ROOM FOR TRANSFER AIR CIRCULATION.

M17 ROUTE DUCT DOWN THROUGH SOFFIT TO CONCEAL IN CEILING ABOVE RESTROOMS.

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STATE OF MISSOURI
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PROFESSIONAL ENGINEER

CARL J. HOLDEN 09/15/2022
LICENSE # PE-2020016283

LSN - HVAC PLAN - LEVEL 1

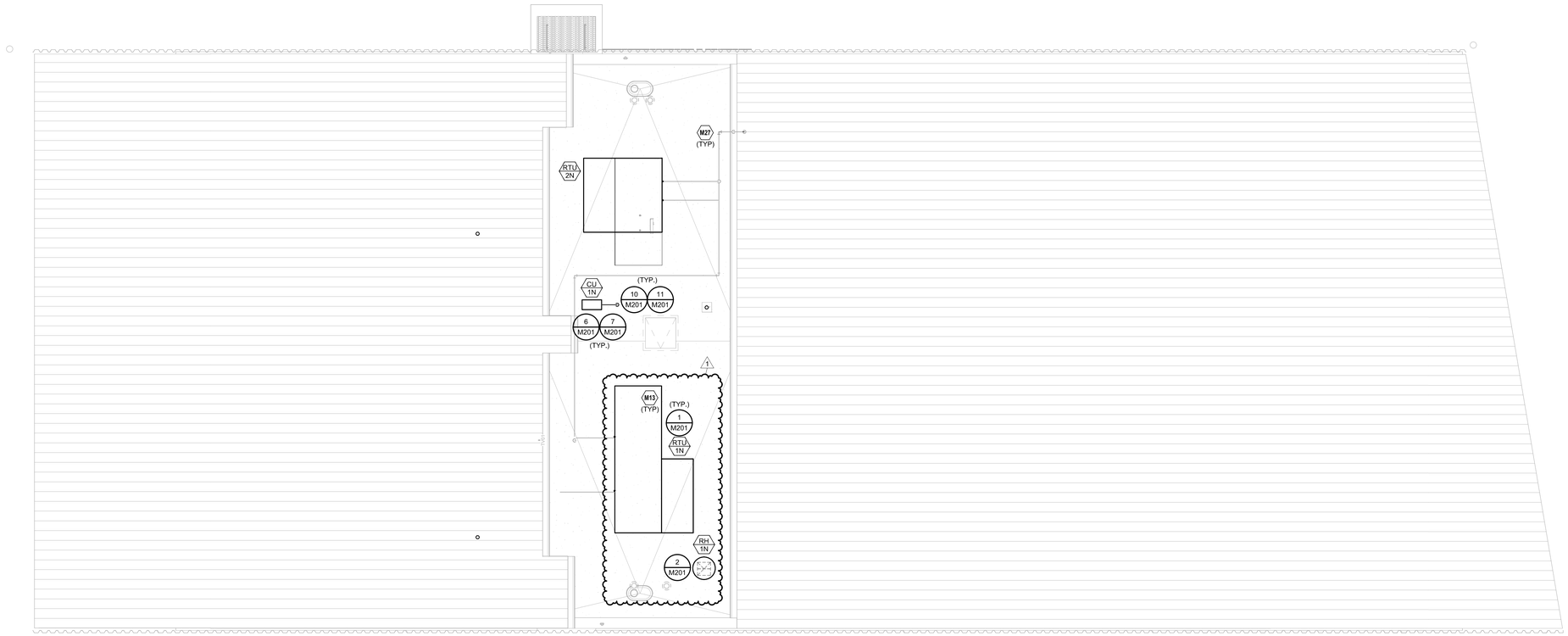
M101-B

CARL J. HOLDEN

MECHANICAL PLAN NOTES:

M13 INSTALL ALL SERVICEABLE ROOF MOUNTED EQUIPMENT AT A MINIMUM 15-0" AWAY FROM ROOF EDGE UNLESS SPECIFIED OTHERWISE.

M27 REFER TO PLUMBING PLANS FOR GAS AND CONDENSATE PIPE SIZING.



1 MECHANICAL ROOF PLAN - LSN
3/16" = 1'-0"

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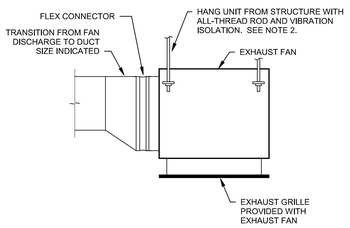
LSN - MECHANICAL PLAN - ROOF

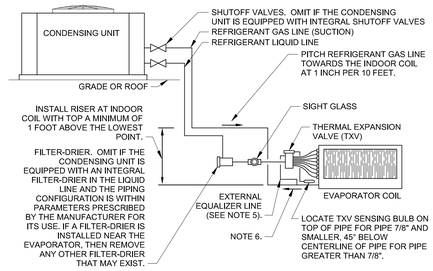
M102-B

CARL J. HOLDEN



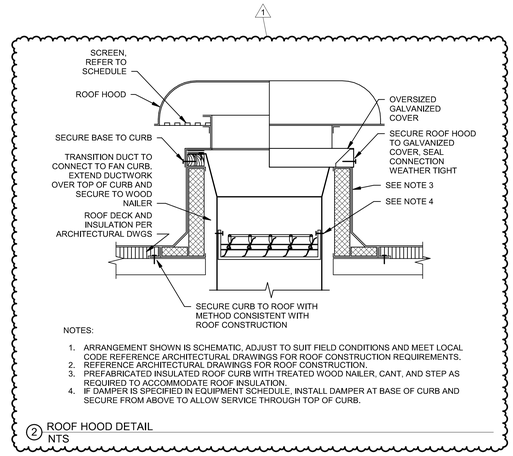
NOTES:
1. ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.
2. FOR FANS 1 HP AND LESS, PROVIDE NEOPRENE RUBBER MOUNT HANGER (NR). FOR FANS LARGER THAN 1 HP, PROVIDE SPRING VIBRATION ISOLATION HANGER (SPNH).

④ SUSPENDED EXHAUST FAN DETAIL
NTS



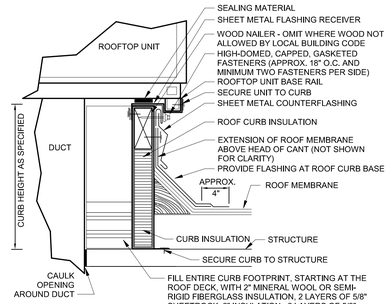
NOTES:
1. INSTALL REFRIGERANT PIPING AND COMPONENTS IN STRICT CONFORMANCE WITH ALL MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS, WHICH SHALL TAKE PRECEDENT OVER INFORMATION PRESENTED IN THIS DETAIL.
2. ALL COMPONENTS INSTALLED SHALL BE THE EXACT MODEL RECOMMENDED BY THE MANUFACTURER.
3. CONSULT THE MANUFACTURER REGARDING THE NEED TO INSTALL A SOLENOID VALVE IN THE LIQUID LINE BETWEEN THE FILTER-ORIER AND SITE GLASS.
4. INSTALL REFRIGERATION PIPE SIZES RECOMMENDED BY THE MANUFACTURER AND CONSULT THE MANUFACTURER REGARDING THE NEED FOR INTERMEDIATE TRAPS BASED ON THE RECOMMENDED PIPE SIZES AND PIPING CONFIGURATION.
5. INSTALL THERMAL EXPANSION VALVE WITH BALANCED PORT CONSTRUCTION AND EXTERNAL EQUALIZER LINES FOR ALL EVAPORATOR COILS EQUIPPED WITH A REFRIGERANT DISTRIBUTOR.
6. PITCH REFRIGERANT GAS LINE AWAY FROM INDOOR COIL AT 1 INCH PER 10 FEET.
7. FILTER- DRIER MAY BE OMITTED IF NOT REQUIRED BY MANUFACTURER.
8. SIGHT GLASS MAY BE OMITTED IF NOT REQUIRED BY MANUFACTURER AND SYSTEM IS LESS THAN 5 TONS.

③ SPLIT SYSTEM PIPING DETAIL
NTS



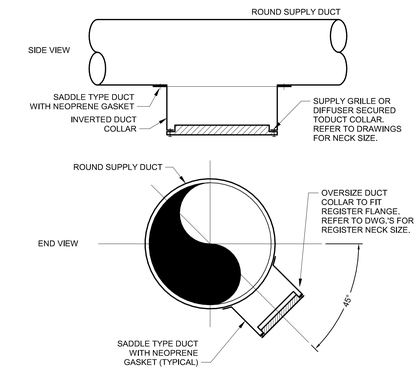
NOTES:
1. ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REFERENCE ARCHITECTURAL DRAWINGS FOR ROOF CONSTRUCTION REQUIREMENTS.
2. REFERENCE ARCHITECTURAL DRAWINGS FOR ROOF CONSTRUCTION.
3. PREFABRICATED INSULATED ROOF CURB WITH TREATED WOOD NAILER, CANT, AND STEP AS REQUIRED TO ACCOMMODATE ROOF INSULATION.
4. IF DAMPER IS SPECIFIED IN EQUIPMENT SCHEDULE, INSTALL DAMPER AT BASE OF CURB AND SECURE FROM ABOVE TO ALLOW SERVICE THROUGH TOP OF CURB.

② ROOF HOOD DETAIL
NTS

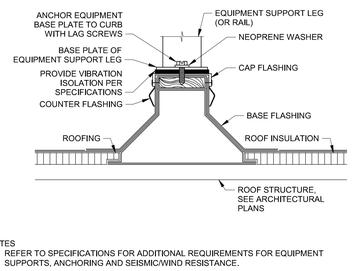


NOTES:
1. CUT METAL DECKING TO ALLOW CURB INSTALLATION ON STEEL FRAMING. AFTER CURB IS SET IN PLACE, TRIM REMAINING METAL DECKING AND INSTALL WITHIN CURB. TACK WELD DECKING TO SUPPORT STEEL. DO NOT WELD INTERIOR DECKING TO ROOF CURB. PROVIDE ADDITIONAL CROSS FRAMING TO SUPPORT INTERIOR DECKING AND FILL MATERIAL AS REQUIRED.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.

① ROOF CURB DETAIL
NTS

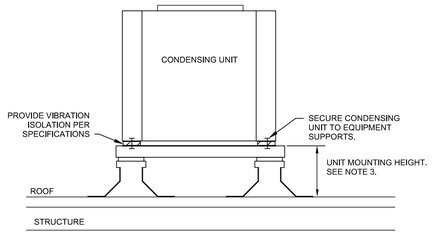


⑧ REGISTER MOUNTING TO ROUND DUCT DETAIL
NTS



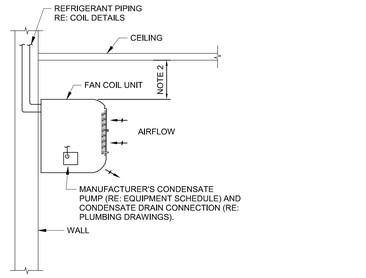
NOTES
1. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR EQUIPMENT SUPPORTS, ANCHORING AND SEISMIC/WIND RESISTANCE.

⑦ ROOF EQUIPMENT SUPPORT RAIL DETAIL
NTS



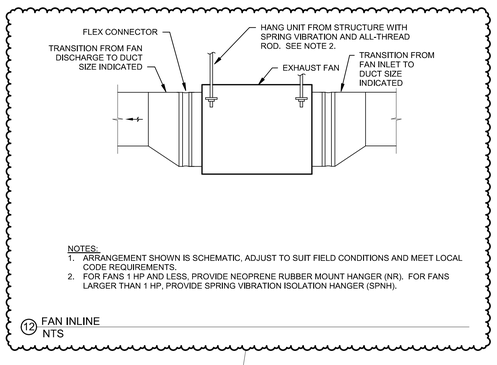
NOTES:
1. SUPPORT AND ANCHOR OUTDOOR UNITS IN COMPLIANCE WITH LOCAL SEISMIC AND WIND RESTRAINT REQUIREMENTS.
2. SEE MECHANICAL EQUIPMENT ANCHORS AND SUPPORT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. REFER TO THE EQUIPMENT SCHEDULE AND MANUFACTURER'S REQUIREMENTS FOR UNIT MOUNTING HEIGHT.

⑥ CONDENSING UNIT SUPPORT DETAIL
NTS



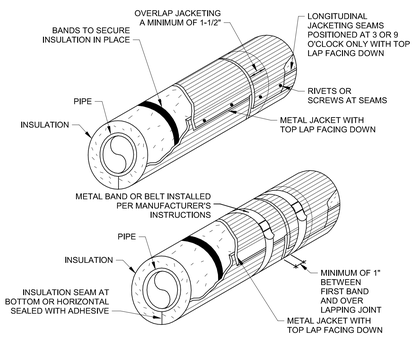
NOTES:
1. ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.
2. PROVIDE MINIMUM 3.5" OF CLEARANCE AT THE TOP OF THE UNIT.
3. ATTACH FAN COIL UNIT TO MANUFACTURER'S PROVIDED INSTALLATION PLATE. MOUNT INSTALLATION PLATE TO WALL PER MANUFACTURER'S RECOMMENDATIONS.

⑤ VRF WALL-MOUNTED UNIT DETAIL
NTS

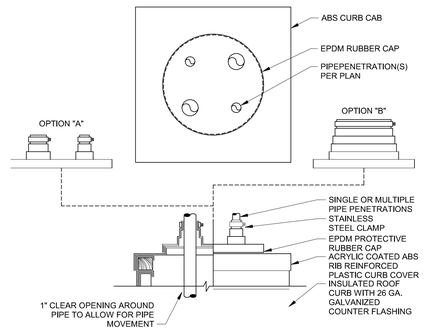


NOTES:
1. ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.
2. FOR FANS 1 HP AND LESS, PROVIDE NEOPRENE RUBBER MOUNT HANGER (NR). FOR FANS LARGER THAN 1 HP, PROVIDE SPRING VIBRATION ISOLATION HANGER (SPNH).

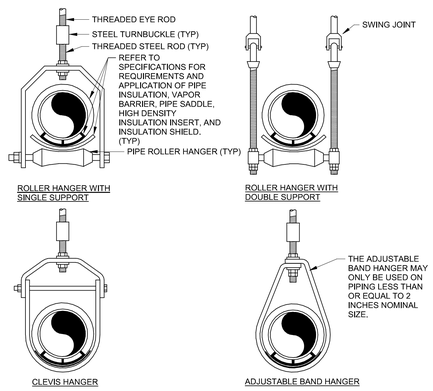
⑫ FAN INLINE
NTS



⑪ EXTERIOR PIPING WITH FIELD APPLIED METAL JACKET OVER INSULATION DETAIL
NTS



⑩ PIPE PORTAL ROOF PENETRATION DETAILS
NTS



⑨ PIPE HANGERS DETAILS
NTS

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EXPIRES 12/31/2022

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Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/16/2022

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

CARL J. HOLDEN 09/15/2022
LICENSE # PE-2020016283

MECHANICAL DETAILS

M201

CARL J. HOLDEN

ROOFTOP UNIT W/ STATIC CORE ENERGY RECOVERY SCHEDULE (DX COOLING, NATURAL GAS HEAT) - LSW/LSN

					SUPPLY FAN						EXHAUST FAN					MAX PLATE PRESSURE DROP (IN)	SUMMER HEAT RECOVERY						DX COOLING COIL							HOT GAS REHEAT			WINTER HEAT RECOVERY				NATURAL GAS HEAT EXCHANGER						MIN. O/A CFM	ABS. MIN. O/A	ELECTRICAL						
																	OAT		EXAUST EAT		WHEEL SA LAT				EAT		LAT								EXHAUST LAT		WHEEL SA LAT													
MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	FAN TYPE	CFM	ESP (IN)	TSP (IN)	BHP	NOM HP	ECM (Y/N)	CFM	ESP (IN)	BHP	NOM HP	ECM (Y/N)		TH (MBH)	SH (MBH)	(°F DB)	(°F WB)	(°F DB)	(°F WB)	(°F WB)	TH (MBH)	SH (MBH)	(°F DB)	(°F WB)	(°F DB)	(°F WB)	REFR TYPE	MIN EFF (EER)	MIN NO STAGES	MAX VEL (FPM)	CAP. (MBH)	EAT (°F DB)	LAT (°F DB)	OAT (°F DB)	(°F WB)	(°F DB)	(°F WB)	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES	MAX VEL (FPM)			V/PH	MCA	MOCP	DISC TYPE	WEIGHT (LBS)	NOTES
RTU 1N	DAIKIN	DPS015A	15	100% OA SZ-VAV	SWSI	4000	1.10	3.20	3.1	4.00	Yes	3600	0.50	1.8	3.00	Yes	1.20	95.5	75.3	75.0	62.5	84.4	69.4	182.8	123.4	82.4	68.6	54.5	54.5	R-410A	10.7	MOD.	325	88.6	54.5	75.0	0.0	70.0	50.0	38.7	30.3	199.1	300.0	80	39	85	MOD.	325	4000	1240	460/3	40	50	NF	4500	A, C-U, V, W
RTU 1W	DAIKIN	DPS015A	15	100% OA SZ-VAV	SWSI	4000	1.10	3.20	3.1	4.00	Yes	3600	0.50	1.8	4.00	Yes	1.20	95.5	75.3	75.0	62.5	84.4	69.4	182.7	123.3	82.4	68.6	54.5	54.5	R-410A	10.7	MOD.	325	88.6	54.5	75.0	0.0	70.0	50.0	38.7	30.3	198.9	300.0	80	39	85	MOD.	325	4000	1240	460/3	40	50	NF	4500	A,C-U,V,W

ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT) - LSW/LSN

					SUPPLY FAN						POWERED EXHAUST				DX COOLING COIL								HOT GAS REHEAT			NATURAL GAS HEAT EXCHANGER								ELECTRICAL						
																	EAT		LAT			MIN EFF																			
MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	FAN TYPE	CFM	ESP (IN)	BHP	NOM HP	ECM (Y/N)	CFM	ESP (IN)	NOM HP	ECM (Y/N)	TH (MBH)	SH (MBH)	(°F DB)	(°F WB)	(°F DB)	(°F WB)	REFR TYPE	(EER)	(IEER)	MIN NO STAGES	MAX VEL (FPM)	CAP. (MBH)	EAT (°F DB)	LAT (°F DB)	MIN OUT. (MBH.)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES	MAX VEL (FPM)	MIN O/A CFM	ABS MIN O/A	V/PH	MCA	MOCP	DISC TYPE	WEIGHT (LBS)	NOTES
RTU 2N	DAIKIN	DPS015A	15	SZ-VAV	SWSI	2700	0.90	1.36	2.00	Yes	2450	0.5	1.5	Yes	130.4	91.2	85.3	69.4	54.7	54.2	R-410A	10.7	16.4	MOD.	325	59.2	54.7	75.0	148.7	200	80	34.0	85.0	MOD.	325	1350	585	460/3	28	35	NF	2800	B-U,X
RTU 2W	DAIKIN	DPS015A	15	SZ-VAV	SWSI	2700	0.90	1.36	2.00	Yes	2450	0.5	1.5	Yes	130.3	91.1	85.3	69.4	54.7	54.2	R-410A	10.7	16.4	MOD.	325	59.2	54.7	75.0	148.7	200	80	34.0	85.0	MOD.	325	1350	585	460/3	28	35	NF	2800	B-U,X

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 SHEET M402 FOR CUSTOM ROOFTOP UNIT CONTROL DRAWING, POINTS LIST, AND SEQUENCE.
B. REFER TO SHEET M403 FOR CUSTOM ROOFTOP UNIT CONTROL DRAWING, POINTS LIST, AND SEQUENCE.
C. EQUIPMENT SIZED FOR 100°F AMBIENT TEMPERATURE.
D. PROVIDE 2" MERV 13, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
E. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
F. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
G. PROVIDE SINGLE POINT POWER CONNECTION.
H. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
J. 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.
K. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
L. SPECIFIED FAN TSP INCLUDES EXTERNAL DUCT AND INTERNAL FILTER, COIL, AND CASING LOSSES. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
M. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
N. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 16 INCHES ABOVE FINISHED ROOF SURFACE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
O. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT AND CURB.
P. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
Q. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
R. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
S. SELECT EQUIPMENT FOR ELEVATION OF 1000 FEET ABOVE SEA LEVEL.
T. PROVIDE UNIT WITH FULLY MODULATING HOT GAS REHEAT.
U. PROVIDE UNIT WITH INTERNAL VIBRATION ISOLATION.
V. PROVIDE UNIT WITH STATIC CORE ENERGY RECOVERY DEVICE.
W. DAIKIN IS BASIS OF DESIGN. ACCEPTABLE MANUFACTURERS ARE VALENT AND AAON. REFER TO UNIT MAX DIMENSIONS IN SCHEDULE.
X. DAIKIN IS BASIS OF DESIGN. ACCEPTABLE MANUFACTURERS ARE YORK/JCI, CARRIER, AND LENNOX. REFER TO UNIT MAX DIMENSIONS IN SCHEDULE.

ROOFTOP UNIT SIZE - LSW/LSN

PLAN MARK	UNIT LENGTH (FT-IN)	UNIT WIDTH (FT-IN)	UNIT HEIGHT (FT-IN)	NOTES
RTU 1W	29'-0"	16'-3"	7'-0"	A,B
RTU 2W	18'-6"	16'-3"	7'-0"	A,B
RTU 1N	29'-0"	16'-3"	7'-0"	A,B
RTU 2N	18'-6"	16'-3"	7'-0"	A,B

NOTES:

A. UNIT WIDTH AND LENGTH INCLUDE CLEARANCE REQUIREMENTS.
B. HEIGHT INCLUDES CURB HEIGHT.

FAN SCHEDULE - LSW/LSN

											ELECTRICAL				
MARK	SERVICE DESCRIPTION	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	ECM (Y/N)	V/PH	DISC TYPE	STARTER TYPE	WEIGHT (LBS)	NOTES
EF 1N	GIC EXHAUST	GREENHECK	INLINE	SQ-120-VG	1250	0.55	0.50	1422	DIRECT	Yes	120/1	NF	EC	75	A-D
EF 1W	GIC EXHAUST	GREENHECK	INLINE	SQ-120-VG	1250	0.55	0.50	1422	DIRECT	Yes	120/1	NF	EC	75	A-D
TF 1N	ELEC ROOM TRANSFER	GREENHECK	SUSPENDED	SP-A510	475	0.30	0.25	1202	DIRECT	No	120/1	NF	COMBI	30	A,C-E
TF 1W	ELEC ROOM TRANSFER	GREENHECK	SUSPENDED	SP-A510	475	0.30	0.25	1202	DIRECT	No	120/1	NF	COMBI	30	A,C-E

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 FACTORY MOUNTED DISCONNECT SWITCH.
B. PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.
C. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE BHP.
D. PROVIDE RUBBER IN SHEAR ISOLATION AND ALL-THREAD HANGING RODS.
E. PROVIDE WITH MANUFACTURERS SPEED CONTROLLER FOR BALANCING PURPOSES.

GRILLE, REGISTER AND DIFFUSER SCHEDULE - LSW/LSN

MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION TYPE	FACE TYPE	MOUNTING LOCATION	BORDER TYPE	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
EG-1	PRICE	EXHAUST	80	ALUMINUM	EGG CRATE	CEILING	LAY-IN	12"x12"	20	0.08	C,F,H
EG-2	PRICE	EXHUAST	600	ALUMINUM	LOUVERED	DUCT	FLANGED	REFER TO PLANS	20	0.00	B,D,E,G,J
EG-3	PRICE	EXHAUST	600	ALUMINUM	LOUVERED	SIDEWALL	FLANGED	REFER TO PLANS	20	0.08	B,D,E,F,G,J
RG-1	PRICE	RETURN	600	ALUMINUM	LOUVERED	DUCT	FLANGED	REFER TO PLANS	20	0.05	B,D,E,G,J
RG-2	PRICE	RETURN	600	ALUMINUM	LOUVERED	SIDEWALL	FLANGED	REFER TO PLANS	20	0.08	B,D,E,F,G,J
SG-1	PRICE	SUPPLY	500	STEEL	LOUVERED	DUCT	FLANGED	REFER TO PLANS	20	0.08	B,D,E,G,J
SG-2	PRICE	SUPPLY	500	STEEL	LOUVERED	SIDEWALL	FLANGED	REFER TO PLANS	20	0.08	B,D,E,F,G,J

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. [PROVIDE ONE SPARE LOOSE BLANK-OFF DEFLECTOR PER DIFFUSER FOR USE DURING BALANCING AS REQUIRED.]
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. PAINT ALL INTERIOR SURFACES SLOTS, GRILLES AND PLENUMS FLAT BLACK.
H. PROVIDE WITH RAPID MOUNT FRAMING OPTION FOR LAY-IN TYPE DIFFUSERS INSTALLED IN A HARD CEILING.
J. PROVIDE GRILLE PRIMED FOR FIELD PAINTING.

MINI SPLIT UNIT SCHEDULE (DUCTLESS) - LSW/LSN

						EVAPORATOR SECTION				CONDENSING SECTION				
EVAPORATOR PLAN MARK	CONDENSING PLAN MARK	MANUFACTURER	INDOOR MODEL	OUTDOOR MODEL	REF TYPE	CFM	TC (MBH)	V/PH	FLA	AMB (°F DB)	V/PH	MCA	MOCP	NOTES
CRU 1N	CU 1W	DAIKIN	FTK18NMVJU	RK18NMVJU	R-410A	605	18.0	208/1	0.5	100	208/1	16 A	20 A	A-E
CRU 1W	CU 1W	DAIKIN	FTK18NMVJU	RK18NMVJU	R-410A	605	18.0	208/1	0.5	100	208/1	16 A	20 A	A-E

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 EQUIOPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
B. DIVISION 26 CONTRACTOR TO PROVIDE DISCONNECT SWITCH FOR EVAPORATOR SECTION AND CONDENSING SECTION.
C. PROVIDE WITH WALL MOUNTED THERMOSTAT BY UNIT MANUFACTURER.
D. PROVIDE WITH INTEGRAL CONDENSATE PUMP. ENSURE PUMP IS PROVIDED WITH VOLTAGE TO MATCH UNIT VOLTAGE.
E. PROVIDE CONDENSER COIL HAIL GUARDS.

ROOF HOOD SCHEDULE - LSW/N

MARK	SERVICE (INTAKE, EXHAUST)	MANUFACTURER	MODEL	CFM	MAX THROAT VEL (FPM)	MAX APD (IN)	THROAT (DIA, ")	CURB (L" x W")	WEIGHT (LBS)	NOTES
RH 1N	RELIEF	GREENHECK	GRSR	1250	725	0.1	16"	26"x26"	50	A-C
RH 1W	RELIEF	GREENHECK	GRSR	1250	725	0.1	16"	26"x26"	50	A-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. PROVIDE WITH INTEGRAL BIRDSCREEN ALUMINUM BIRDSCREEN.
B. 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.
C. PROVIDE INTEGRAL BACKDRAFT DAMPER.

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EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/16/2022

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

CARL J. HOLDEN 09/15/2022
LICENSE # PE-2020016283

MECHANICAL SCHEDULES

M301

CARL J. HOLDEN

MECHANICAL SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ABBREVIATIONS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

CONTROLS SYMBOLS AND NOMENCLATURE

- FLUE DAMPER (BOILERS)
- BOILER (CONTROL PANEL)
- COOLING TOWER
- CONDENSING UNIT
- FLUID COOLER
- WATER-COOLED CHILLER (CONDENSER, EVAPORATOR, CONTROL PANEL)
- AIR-COOLED CHILLER (AIR-COOLED)
- GENERIC HEAT EXCHANGER (HX)
- SHELL AND TUBE HEAT EXCHANGER (HEAT EXCHANGER)
- BASIN HEATER (BHTR)
- GROUND HEAT EXCHANGER
- HEAT RECOVERY WHEEL
- HOT GAS REHEAT COIL (H/G)
- COOLING COIL (C/C)
- FURNACE
- HEATING COIL (H/C)
- DAMPER - GENERIC BLADE TYPE
- DAMPER - OPPOSED BLADE TYPE
- DAMPER - PARALLEL BLADE TYPE
- FLEXIBLE SENSING ELEMENT
- AIRFLOW STATION
- PUMP
- FAN
- HUMIDIFIER
- AIR FILTER
- 3-WAY CONTROL VALVE
- 2-WAY CONTROL VALVE
- AIR BYPASS DAMPER
- AFS — AIRFLOW MEASURING STATION
- DX — DIRECT EXPANSION COOLING UNIT CONTROLLER
- GAS — FURNACE BURNER CONTROLLER
- SCR — SILICON-CONTROLLED RECTIFIER ELECTRIC HEATER CONTROL (MODULATING)
- ELEC — ELECTRIC HEATER CONTROLLER (ON/OFF)
- ECM — ELECTRONIC COMMUTATED MOTOR
- VFD — VARIABLE FREQUENCY DRIVE
- STARTER — MOTOR STARTER
- LTC — LOW LIMIT TEMPERATURE CONTROLLER (FREEZESTAT)
- EMERGENCY PUSH BUTTON

- (#) RISER DESIGNATION
- (FD) FIRE DAMPER
- (FSD) FIRE SMOKE DAMPER
- (SD) SMOKE DAMPER
- SMOKE DETECTOR SD (SD=SUPPLY / RD=RETURN)
- (MD) MOTORIZED DAMPER
- (BD) BACKDRAFT DAMPER
- (VD) VOLUME DAMPER
- (H) HUMIDISTAT
- (T) THERMOSTAT

- BTU — BTU METER
- CO — CARBON MONOXIDE SENSOR
- CO2 — CARBON DIOXIDE SENSOR
- CP — CONTROL PANEL
- CT — CURRENT CIRCUIT RELAY
- DP — DIFFERENTIAL PRESSURE SENSOR
- EM — ELECTRIC METER
- FM — FLOW METER; FUEL METER
- FS — FLOW SWITCH
- HS — HUMIDITY SENSOR
- P — PRESSURE SENSOR
- PA — POLLUTANT ALARM
- PS — PULL STATION
- R — REFRIGERANT LEAK SENSOR
- S — SENSOR - GENERIC
- SP — STATIC PRESSURE PORT
- SW — SWITCH
- TS — TEMPERATURE SENSOR
- WM — WATER METER

-X	GENERIC INDICATOR OF PLAN MARK NUMBER OR QTY
<>	NOT EQUAL TO
AI	ANALOG INPUT (MODULATING)
AO	ANALOG OUTPUT (MODULATING)
AV	ANALOG VIRTUAL (VALUE)
BI	BINARY INPUT (ON/OFF, OPEN/CLOSED, ETC)
BO	BINARY OUTPUT (ON/OFF, OPEN/CLOSED, ETC)
BV	BINARY VIRTUAL (VALUE)
BAS	BUILDING AUTOMATION SYSTEM
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CMD	COMMAND
COM	COMMUNICATION LINK
CP	CONTROL PANEL
CV	CONTROL VALVE
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
DCW	DOMESTIC COLD WATER
DDC	DIRECT DIGITAL CONTROL
E/C	ELECTRICAL CONTRACTOR
EOA	ECONOMIZER OUTSIDE AIR
EQ	EQUALIZER
E/M	EQUIPMENT MANUFACTURER
FA/C	FIRE ALARM CONTRACTOR
FIP	FAIL IN POSITION
G	NATURAL GAS
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
HPWS	HEAT PUMP WATER SUPPLY
HPWR	HEAT PUMP WATER RETURN
LPS	LOW PRESSURE STEAM SUPPLY
LPC	LOW PRESSURE STEAM CONDENSATE
M/C	MECHANICAL CONTRACTOR
MIN	MINIMUM; MINUTES
MOA	MINIMUM OUTSIDE AIR
NC	NORMALLY CLOSED
NIA	NOT IN AUTO (IN HAND)
NO	NORMALLY OPEN
PID	PROPORTIONAL INTEGRAL DERIVATIVE
RA	RETURN AIR
REA	RELIEF/EXHAUST AIR
RH	RELATIVE HUMIDITY
SA	SUPPLY AIR
SCHE	AS SCHEDULED ON DRAWINGS
SPEC	SPECIFIED
SPT	SETPOINT
TBD	TO BE DETERMINED
TC/C	TEMPERATURE CONTROLS CONTRACTOR
	POWER WIRING
	CONTROL WIRING
	ETHERNET LAN WIRING
	BAS COMMUNICATION WIRING

PROJECT DESIGN CONDITIONS - LSW/LSN

CLIMATE CONDITONS

WEATHER STATION:		LEE'S SUMMIT MUNICIPAL, MO					
CLIMATE ZONE:		4A					
HEATING (DB):	99.6%	4.7	°F				
DESIGN HEATING CONDITIONS (DB):		0	°F				
HUMIDIFICATION (DP/ HR/ MCDB):	99.6%		°F/		gr/lb	°F	
COOLING (DB/MCWB):	0.4%	96.4	°F/	74.7	°F/		
DESIGN COOLING CONDITIONS (DB/ MCWB):		96.4	°F/	74.7	°F/		
DEHUMIDIFICATION (DP/ HR/ MCDB):	0.4%	79.9	°F/	135.8	gr/lb	85.9 °F	

BUILDING OPERATING HOURS:

MONDAY - FRIDAY	TBD BY OWNER
SATURDAY	TBD BY OWNER
SUNDAY	TBD BY OWNER
HOLIDAY	TBD BY OWNER

SPACE / UNIT DESCRIPTION	SET POINTS										SPACE OPERATING HOURS OCCUPIED / UNOCCUPIED			NOTES
	COOLING / DE-HUMIDIFICATION				HEATING		HUMIDIFICATION		ZONE VENTILATION RESET					
	OCC °F	UNOCC °F	MAX RH %	MIN RH %	OCC °F	UNOCC °F	MIN RH %	MAX RH %	CONTROL METHOD	BASE PPM	MAXIMUM PPM	M-F	SAT	SUN	
GIC	75	80	60%	NA	70	60	NA	NA	CO2	400	900	TBD	TBD	TBD	A-C
ROBOTICS	75	80	60%	NA	70	60	NA	NA	OCC	400	900	TBD	TBD	TBD	A-C

NOTES:
A. ZONE LEVEL VENTILATION RESET / DEMAND CONTROL VENTILATION (DCV) CONTROL METHOD: CARBON DIOXIDE SENSOR (CO2).
B. ZONE LEVEL SET POINT CONDITIONS SHALL BE AS SCHEDULED UNLESS OTHERWISE SCHEDULED OR NOTED ON THE DRAWINGS FOR ROOM SPECIFIC SPACE CONDITIONS.
C ZONE LEVEL OCCUPANCY HOUR SCHEDULE SHALL BE PER BUILDING OPERATING HOURS UNLESS OTHERWISE SCHEDULED.

POINTS LIST - GLOBAL BUILDING MONITORING - LSW/LSN

POINT ID	DESCRIPTION	POINT TYPE	UNITS	ACCURACY	TRENDING INTERVAL	ENERGY DASHBOARD DISPLAY	STATUS ALARM	ALARM RANGE	NOTES
BUILDING SENSORS									
BDP	BUILDING DIFFERENTIAL PRESSURE	AI	IN. W.G.	SPEC	15 MIN.	X	X	-0.15 > BDP > +0.20	A, B
OAC02	OUTSIDE AIR CARBON DIOXIDE LEVEL	AI	PPM	SPEC	15 MIN.				
OAT	OUTSIDE AIR DRY BULB TEMPERATURE	AI	°F	SPEC	15 MIN.	X			
OAH	OUTSIDE AIR RELATIVE HUMIDITY	AI	%	SPEC	15 MIN.	X			

NOTES:
A. INITIAL SETPOINT SHALL BE 0.05 IN. W.G. COORDINATE FINAL SETPOINT AT BUILDING STARTUP.
B. APPLY A MOVING TIME AVERAGE TO BUILDING DIFFERENTIAL PRESSURE USING A SLIDING 5-MINUTE WINDOW TO REDUCE DAMPER AND FAN CONTROL FLUCTUATIONS.

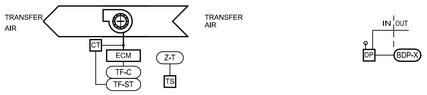
MISCELLANEOUS CONTROL POINTS - LSW/LSN

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
EXHAUST FANS (EF-XX)							
EF-C	EXHAUST FAN COMMAND (START/STOP)	BO					A
EF-ST	EXHAUST FAN STATUS (CT)	BI			X	EF-C=ON, EF-ST=OFF	A
EA-AF	EXHAUST AIR AIRFLOW QUANTITY	AI	CALC.				A,E
EF-BD	EXHAUST FAN BUILDING DIFFERENTIAL OFFSET	AV	100 CFM				A,B,E
SPLIT SYSTEM ROOM AC UNITS (CRU-XX)							
Z-T	ZONE TEMPERATURE	AI					A
Z-FLT	ZONE TEMPERATURE ALARM	AI			X	Z-T < STPT-15 DEG F	A, D
TRANSFER FAN (TF-XX)							
Z-T	ZONE TEMPERATURE	AI	80 F		X	Z-T > 90 DEG F	A
TF-C	TRANSFER FAN COMMAND (START/STOP)	BO					A
TF-ST	TRANSFER FAN COMMAND (START/STOP)	BI			X	TF-C-X=ON, TF-ST-X=OFF	A
DOMESTIC HOT WATER RECIRCULATING PUMP							
DHWR-T	DOMESTIC HOT WATER RETURN TEMPERATURE	AI					
DHW-T	DOMESTIC HOT WATER SUPPLY TEMPERATURE	AI	110 DEG F		X	DHW-T > 115 DEG F	A, D
HWCP-C	HOT WATER RECIRCULATING PUMP COMMAND (START/STOP)	BO					
HWCP-ST	HOT WATER RECIRCULATING PUMP STATUS (CT)	BI			X	HWCP-C=ON, HWCP-ST=OFF	A, C
WATER HEATER MONITORING							
DHW-T	DOMESTIC HOT WATER SUPPLY TEMPERATURE	AI	110 DEG F		X	DHW-T-X > 115 DEG F	A,D

NOTES:
A. POINTS APPLY TO MULTIPLE UNITS. SEE CONTROL DIAGRAMS FOR NUMBER OF UNITS.
B. DETERMINE SETPOINT DURING TESTING AND BALANCING. COORDINATE WITH THE TEST AND BALANCE CONTRACTOR.
C. ALARM TO SIGNAL AFTER 30 SECOND TIME DELAY (ADJ.)
D. ALARM TO SIGNAL AFTER 10 MINUTE TIME DELAY (ADJ.)
E. POINT SHALL BE ADJUSTABLE.

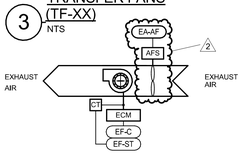
GENERAL

1 BUILDING GLOBAL WEATHER MONITORING STATION
NONE

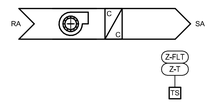


2 BUILDING DIFFERENTIAL PRESSURE SENSOR
NONE

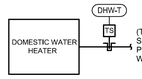
3 TRANSFER FANS (TF-XX)
NTS



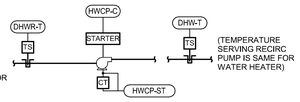
4 EXHAUST FANS (EF-XX)
NTS



5 SPLIT SYSTEM ROOM AC UNITS (CRU-XX)
NTS



6 DOMESTIC WATER HEATER
NTS



7 DOMESTIC HOT WATER RECIRCULATING PUMP
NTS

SEQUENCE OF OPERATIONS MISCELLANEOUS EQUIPMENT

This sequence of operations is organized into the following main categories:
safeties, overrides and interlocks, and component control loops
either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties and interlocks section outlines the hardwired interlocks that will be required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram.

TRANSFER FANS (TF-XX)

OPERATING MODES

OCCUPIED MODE:

The units shall be in occupied mode per the project design conditions schedule shown on the control drawings.

UNOCCUPIED MODE:

The units shall be in unoccupied mode for all periods not included in the occupied hours of operation.

COMPONENT CONTROL LOOPS

FAN CONTROL - CONSTANT VOLUME BMS SCHEDULED

When in Occupied Mode:
The fan shall start upon an increase in room temperature above setpoint as measured by Z-T. When space temperature drops below setpoint, the fan shall stop.
If space temperature rises 10 degrees F above setpoint, an alarm shall be generated.

When in Unoccupied Mode:
The fan shall operate as it does in occupied mode.

EXHAUST FANS (EF-XX)

OPERATING MODES

OCCUPIED MODE:

The units shall be in occupied mode per the project design conditions schedule shown on the control drawings.

UNOCCUPIED MODE:

The units shall be in unoccupied mode for all periods not included in the occupied hours of operation.

COMPONENT CONTROL LOOPS

FAN CONTROL - VARIABLE VOLUME FLOW OFFSET

When in Occupied Mode:
The fan shall energize and slowly ramp to the initial minimum fan speed determined during system startup. The fan VFD shall vary to maintain the exhaust airflow setpoint as measured by the exhaust airflow sensor (EA-AF). The exhaust airflow setpoint shall be calculated as the RTU measured outdoor airflow minus the exhaust fan building differential offset (EF-BD).
Exhaust Airflow Setpoint = RTU (OA-AF) - (EF-BD).

When in Unoccupied Mode:
The fan shall be OFF.

SPLIT SYSTEM ROOM AC UNITS (CRU-XX)

COMPONENT CONTROL LOOPS

The space temperature sensor shall cycle the indoor unit and condensing unit as required to maintain the space temperature as indicated by the space temperature sensor (Z-T).

If space temperature rises 5 degrees F above setpoint, an alarm shall be generated.

DOMESTIC HOT WATER HEATERS

The BAS shall monitor the domestic hot water leaving water temperature. Should the water temperature increase above 115F, an alarm shall be generated.

DOMESTIC HOT WATER RECIRCULATION SYSTEM

The BAS shall monitor the domestic hot water recirculation system. Should the domestic hot water pump error or malfunction, an alarm shall be generated. The pump shall be continuously operated between the hours of of 5am and 7pm (adj.).

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Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

09/22/2022
CARL J. HOLDEN
LICENSE # PE-2020016283

MECHANICAL CONTROLS

M401

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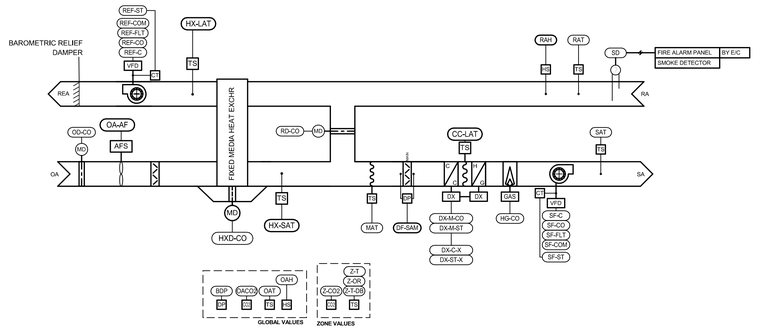

1 ROBOTICS - 100% OA SZ-VAV RTU (RTU-1W/N - LSW/N)
NTS

POINTS LIST - ROBOTICS - LSW/LSN

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SET POINT	SET POINT RESET RANGE	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
GLOBAL VALUES								
BDP	BUILDING DIFFERENTIAL PRESSURE	AV						A
OAT	OUTSIDE AIR TEMPERATURE	AV						A
OAH	OUTSIDE AIR HUMIDITY	AV						A
OACO2	OUTSIDE AIR CO2 LEVEL	AV						A
AIR SENSING								
SAT	SUPPLY AIR TEMPERATURE	AI	55 F CLG; 90 F HTG	52 - 65 F CLG		X	50 F > SAT > 100 F	D
RAT	RETURN AIR TEMPERATURE	AI						
RAH	RETURN AIR HUMIDITY	AI	50 PCT	30-55 PCT		X	15RH > RAH >65RH	D
MAT	MIXED AIR TEMPERATURE	AI	55 F	52 - 65 F CLG				D
CC-LAT	COOLING COIL LEAVING AIR TEMPERATURE	AI	SCHED			X	50 F > CC-LAT > 100 F	D
OA-AF	OUTSIDE AIR AIRFLOW QUANTITY ABSOL. MIN./ MIN.(CFM)	AI	SCHED			X	MOA-AF < SCHED - 15%	D
ZONE LEVEL SENSORS								
Z-T	ZONE TEMPERATURE	AI	SCHED					C, D
Z-OR	MANUAL OCCUPANCY OVERRIDE	BI	2 HOURS					D
Z-T-DB	ZONE TEMPERATURE	BV	5 F	-2.5 F < Z-T < +2.5 F				D
Z-CO2	ZONE CO2	AI	SCHED				Z-CO2 > SPT	C, D
SUPPLY FAN								
SF-COM	SUPPLY FAN VFD COMMUNICATION	COM						
SF-C	SUPPLY FAN COMMAND (START/STOP)	BO						
SF-CO	SUPPLY FAN CONTROL OUTPUT - SPEED (PERCENT)	AO		SCHED				
SF-ST	SUPPLY FAN STATUS	BI				X	SF-ST <> SF-C	
SF-FLT	SUPPLY FAN VFD FAULT	BI				X	COMMON ALARM	
RELIEF-EXHAUST FAN								
REF-COM	RELIEF-EXHAUSTFAN VFD COMMUNICATION	COM						
REF-C	RELIEF-EXHAUST FAN COMMAND (START/STOP)	BO						
REF-CO	RELIEF-EXHAUST FAN CONTROL OUTPUT - SPEED (PERCENT)	AO		SCHED.				
REF-ST	RELIEF-EXHAUST FAN STATUS	BI				X	REF-ST <> REF-C	
REF-FLT	RELIEF-EXHAUST FAN VFD FAULT	BI				X	COMMON ALARM	
RETURN AIR DAMPER (MODULATING)								
RD-CO	RETURN AIR DAMPER CONTROL OUTPUT	AO			NO			
OUTSIDE AIR DAMPER (MODULATING)								
OD-CO	OUTSIDE AIR DAMPER CONTROL OUTPUT	AO			NC			
FILTERS								
DF-SAM	DIRTY FILTER INDICATION (SA MAIN FILTER)	BI	SCHED.			X	ON ACTIVATION	D
COOLING COIL - DX MODULATING AND BINARY STAGES								
DX-M-CO	DX MODULATING COMPRESSOR CONTROL OUTPUT	AO						J
DX-M-ST	DX MODULATING COMPRESSOR STATUS	AI				X	DX-M-ST <> DX-M-CO	J
DX-C-X	DX COMPRESSOR STAGE "X" COMMAND	BO						J
DX-ST-X	DX COMPRESSOR STAGE "X" STATUS	BI				X	DX-ST-X <> DX-C-X	J
HEATING COIL - GAS FURNACE MODULATING								
HG-CO	GAS FURNACE HEAT MODULATION CONTROL OUTPUT	AO						
HEAT EXCHANGER - TEMPERATURE SENSING								
HX-LAT	LEAVING AIR TEMPERATURE	AI						
HX-SAT	SUPPLY AIR TEMPERATURE	AI				X	HX-SAT< 35 F	
HEAT EXCHANGER - FIXED MEDIA								
	(NO ADDITIONAL CONTROL)							
HEAT EXCHANGER - BYPASS DAMPERS								
HXD-CO	BYPASS DAMPER CONTROL OUTPUT	AO			NC			
FIRE ALARM/SMOKE DETECTORS								
SD	SMOKE DETECTOR STATUS	BI				X	ON ACTIVATION	K

ALL POINTS SHOWN SHALL BE PROVIDED BY BAS CONTRACTOR UNLESS NOTED OTHERWISE.

NOTES:
A. DISPLAY VALUE WITH AHU GRAPHIC AT BAS FRONT-END. REFERENCE GLOBAL BUILDING MONITORING SCHEDULE FOR CONTROL POINT.
C. REFERENCE PROJECT DESIGN CONDITIONS SCHEDULE FOR SETPOINT.
D. POINT SHALL BE ADJUSTABLE.
J. COORDINATE NUMBER OF STAGES FOR CONTROL WITH EQUIPMENT FURNISHED.
K. DEVICE AND RELAY FROM FIRE ALARM SYSTEM PROVIDED BY DIVISION 28. DISPLAY DETECTOR RELAY STATUS (NORMAL/ALARM) AT BAS FRONT END.

SEQUENCE OF OPERATIONS
SINGLE ZONE VARIABLE AIR VOLUME
ROOFTOP UNIT (RTU-1W/N)

This sequence of operations is organized into the following main categories: operating modes; control setpoint resets; safeties, overrides and interlocks; and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that are required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections. Setpoints shall be adjustable (adj.) as noted.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION

The rooftop unit described by this sequence of operations consist of a 100% OA DX/Gas RTU with modulating supply fan, modulating powered exhaust, and static core energy recovery device. The RTU shall be provided with refrigeration only and control to its own internal safeties and time delays. Controls shown in the diagram, points list, and described in the sequence are intended to be performed by controllers, sensors, and programming to achieve the specified sequence of operations indicated.

OPERATING MODES

OCCUPIED MODE:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on the control drawings.

UNOCCUPIED MODE:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation. Overrides of unoccupied schedule are defined at the zone level control.

OCCUPIED STANDBY MODE:
The unit shall be in occupied standby mode when the associated zone is scheduled to be occupied and an occupant sensor indicates zero population within the zone subject to a 5-minute (adj.) delay. The unit shall exit occupied standby mode when occupancy is detected.

COOLING MODE:
The unit shall be in cooling mode when the outside air temperature (OAT) rises above the outside air cooling enable setpoint (OAT-C)

HEATING MODE:
The unit shall be in heating mode when the outside air temperature (OAT) falls below the outside air heating enable setpoint (OAT-H)

VENTILATION ONLY MODE:
The unit shall be in ventilation only mode when the outdoor air temperature is between the outdoor air cooling enable (OAT-C) and outdoor air heating enable (OAT-H) setpoints.

DEHUMIDIFICATION MODE:
The unit shall be in dehumidification mode when the outside air dewpoint (OADP) is greater than the setpoint. The unit shall exit dehumidification mode when the outside air dewpoint (OADP) is less than its setpoint minus the outside air dewpoint deadband (OADP-DB).
Dehumidification mode shall take priority over other modes.

ENERGY RECOVERY COOLING MODE- TEMPERATURE ENABLED:
The unit shall be in energy recovery cooling mode when the outside air temperature (OAT) is greater than the return air temperature (RAT).

ENERGY RECOVERY HEATING MODE- TEMPERATURE ENABLED:
The unit shall be in energy recovery heating mode when:
The outside air temperature (OAT) is lower than the return air temperature (RAT) and the outside air temperature (OAT) is colder than the supply air temperature (SAT) setpoint).

ENERGY RECOVERY FROST PREVENTION MODE- TEMPERATURE ENABLED:
The unit shall be in energy recovery frost prevention mode when the heat exchanger exhaust leaving air temperature (HX-LAT) falls below setpoint.
The unit shall be in energy recovery frost prevention mode when the outside air temperature (OAT) is below 30 degrees F (adj).

CONTROL SETPOINT RESETS

SUPPLY AIR TEMPERATURE RESET - DIRECT OUTSIDE AIR RESET:
The supply air temperature (SAT) setpoint shall linearly reset within the range as listed in the "setpoint reset range" column of the points list based on the outside air temperature (OAT) according to the following schedule:

(OAT)	(SAT)
OAT-C setpoint	minimum value of the SAT setpoint range
OAT-H setpoint	maximum value of the SAT setpoint range

VENTILATION RESET (CO2):
The outside airflow CFM (OA-AF) setpoint shall be reset between the minimum and maximum values subject to the associated zone level CO2 value as scheduled in the Project Design Conditions Schedule.
The airflow setpoint shall be at its maximum value when the associated zone CO2 sensor detects levels at or above the maximum CO2 range.
The airflow setpoint shall be at its minimum value when the associated zone CO2 sensor detects levels at or below the minimum CO2 range.
The airflow setpoint shall vary between its minimum and maximum setpoint range linearly as the associated zone CO2 sensor varies between is minimum and maximum value.

SAFETIES, OVERRIDES AND INTERLOCKS

SMOKE DETECTOR INTERLOCK:
The unit shall be disabled via hard wired interlock on activation of a system smoke detector. Display smoke detector relay status (normal or alarm) at the BAS front end.

COMPONENT CONTROL LOOPS

SUPPLY FAN CONTROL- SINGLE ZONE VARIABLE VOLUME:
When the HOA switch is in hand position, the variable speed supply fan shall operate at a speed set manually by the operator at the user interface of the drive.
When the HOA switch is in off position, the fan shall be off.
When the HOA switch is in auto position, the variable speed supply fan shall operate subject to the unit enable signal, and unit operating modes.
When in Occupied Mode:
The fan shall energize and slowly ramp to the initial minimum fan speed determined during system startup. Minimum fan speed shall be established during balancing.
The fan VFD shall modulate to maintain the design outside airflow CFM (OA-AF) as measured by the outside airflow sensor.
When in Occupied Standby Mode:
The fan shall be OFF.
When in Unoccupied Mode:
The fan shall be OFF. On an override signal from the zone level, the fan shall operate as in occupied mode until the override is removed.
When in Pre-Occupancy Purge Mode:
The fan shall operate as in occupied mode.

RELIEF - EXHAUST FAN (REF) - BUILDING PRESSURE SENSOR CONTROL
When in Occupied Mode:
The fan shall be ON. When the building differential pressure (BDP) exceeds setpoint, the fan shall energize and slowly ramp to the initial minimum fan speed determined during system startup. The fan VFD speed shall vary to maintain the building differential pressure (BDP) setpoint.
When in Unoccupied Mode:
The fan shall be OFF.
When in Pre-Occupancy Purge Mode:
The fan shall operate as in occupied mode.

OUTSIDE AIR DAMPER (OA)
When in Occupied Mode:
The damper shall be open.
When in Unoccupied Mode:
The damper shall close after the supply fan is off and a time delay.
When in Pre-Occupancy Purge Mode:
The damper shall be open.

FILTER MONITORING
When in All Modes:
The controller shall monitor the differential pressure across each filter bank and shall provide a signal when the setpoint is exceeded.

ENERGY RECOVERY BYPASS DAMPERS
The supply and exhaust bypass dampers shall be linked together on a common actuator.
When in Occupied Mode:
The dampers shall be open unless unit is in one of the following modes.
When in Ventilation Mode
The dampers shall be open. This takes priority over other energy recovery modes listed below.
When in Energy Recovery Cooling Mode:
The dampers shall be closed.
When in Energy Recovery Heating Mode:
The dampers shall be closed.
The dampers shall modulate to maintain the heat exchanger leaving air temperature (HX-SAT) setpoint.
When in Energy Recovery Frost Prevention Mode:
Capacity modulation: The energy recovery bypass dampers shall modulate to maintain the heat exchanger exhaust leaving air temperature (HX-LAT) setpoint.
When in Unoccupied Mode:
The dampers shall be open.
On an override signal from the zone level the dampers shall operate as in occupied mode until the override is removed.

HEATING COIL- GAS MODULATED
When in Occupied Mode:
When in Ventilation Only Mode:
The coil shall be OFF.
When in Cooling Mode:
The coil shall be OFF.
When in Heating Mode:
The controller shall modulate the heating to maintain the supply air temperature setpoint (SAT).
When in Dehumidification Mode:
The coil shall be OFF.
When in Unoccupied Mode:
The coil shall be OFF.
On an override signal from the zone level the coil shall operate as in occupied mode until the override is removed.

COOLING COIL DX STAGED + VARIABLE CONTROL (MULTIPLE COMPRESSORS)
When in Occupied Mode:
When in Ventilation Only Mode:
The compressors shall be OFF.
When in Cooling Mode:
The variable compressor shall modulate in coordination with the constant speed compressors (subject to the manufacturer's standard safeties) to maintain the supply air temperature setpoint (SAT).
When in Heating Mode:
The compressors shall be OFF.
When in Dehumidification Mode:
The variable compressor shall modulate in coordination with the constant speed compressors (subject to the manufacturer's standard safeties) to maintain the cooling coil leaving air temperature (CC-LAT).
The variable compressor represents the primary stage of cooling and shall vary continuously between minimum capacity and 100% capacity to maintain the supply air set point temperature. When the supply air temperature setpoint cannot be maintained and the variable compressor is at 100%, then the constant speed compressor shall be energized and the variable compressor shall return to minimum speed and modulate to maintain the supply air setpoint. Units with subsequent stages of cooling shall follow a similar loading and unloading logic.
When in Unoccupied Mode:
The compressors shall be OFF.
On an override signal from the zone level the compressors shall operate as in occupied mode until override is removed.

REHEAT COIL- DX HOT GAS REHEAT
When in Occupied Mode:
When in Ventilation Only Mode:
The coil shall be OFF.
When in Cooling Mode:
The coil shall be OFF.
When in Heating Mode:
The coil shall be OFF.
When in Dehumidification Mode:
The manufacturer onboard controller shall control the hot gas reheat coil valve to maintain the supply air temperature setpoint (SAT).
When in Unoccupied Mode:
The coil shall be OFF.
On an override signal from the zone level the coil shall operate as in occupied mode until the override is removed.

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CARL J HOLDEN
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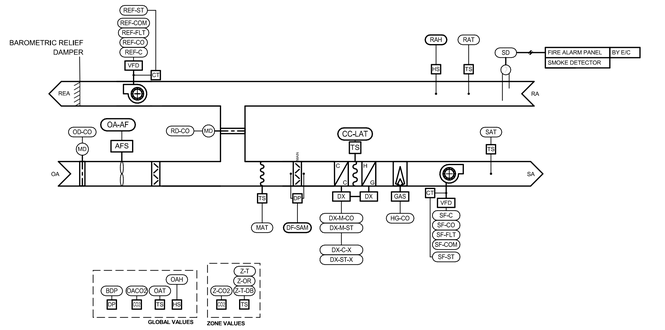
09/09/2022
CARL J. HOLDEN
LICENSE # PE-2020016283

MECHANICAL CONTROLS
M402

CARL J. HOLDEN



1 GIC - SZ-VAV RTU (RTU-2W/N - LSW/LSN)
NTS

POINTS LIST - GIC - LSW/LSN

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SET POINT	SET POINT RESET RANGE	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
GLOBAL VALUES								
BDP	BUILDING DIFFERENTIAL PRESSURE	AV						A
OAT	OUTSIDE AIR TEMPERATURE	AV						A
OAH	OUTSIDE AIR HUMIDITY	AV						A
OACO2	OUTSIDE AIR CO2 LEVEL	AV						A
AIR SENSING								
SAT	SUPPLY AIR TEMPERATURE	AI	55 F CLG; 90 F HTG	52 - 65 F CLG		X	50 F > SAT > 100 F	D
RAT	RETURN AIR TEMPERATURE	AI						
RAH	RETURN AIR HUMIDITY	AI	50 PCT	30-55 PCT		X	15RH > RAH >65RH	D
MAT	MIXED AIR TEMPERATURE	AI	55 F	52 - 65 F CLG				D
CC-LAT	COOLING COIL LEAVING AIR TEMPERATURE	AI	SCHED			X	50 F > CC-LAT > 100 F	D
OA-AF	OUTSIDE AIR AIRFLOW QUANTITY ABSOL. MIN./ MIN.(CFM)	AI	SCHED			X	MOA-AF < SCHED - 15%	D
ZONE LEVEL SENSORS								
Z-T	ZONE TEMPERATURE	AI	SCHED					C, D
Z-OR	MANUAL OCCUPANCY OVERRIDE	BI	2 HOURS					D
Z-T-DB	ZONE TEMPERATURE	BV	5 F	+2.5 F < Z-T < +2.5 F				D
Z-CO2	ZONE CO2	AI	SCHED				Z-CO2 > SPT	C, D
SUPPLY FAN								
SF-COM	SUPPLY FAN VFD COMMUNICATION	COM						
SF-C	SUPPLY FAN COMMAND (START/STOP)	BO						
SF-CO	SUPPLY FAN CONTROL OUTPUT - SPEED (PERCENT)	AO		SCHED				
SF-ST	SUPPLY FAN STATUS	BI				X	SF-ST <> SF-C	
SF-FLT	SUPPLY FAN VFD FAULT	BI				X	COMMON ALARM	
RELIEF-EXHAUST FAN								
REF-COM	RELIEF-EXHAUSTFAN VFD COMMUNICATION	COM						
REF-C	RELIEF-EXHAUST FAN COMMAND (START/STOP)	BO						
REF-CO	RELIEF-EXHAUST FAN CONTROL OUTPUT - SPEED (PERCENT)	AO		SCHED.				
REF-ST	RELIEF-EXHAUST FAN STATUS	BI				X	REF-ST <> REF-C	
REF-FLT	RELIEF-EXHAUST FAN VFD FAULT	BI				X	COMMON ALARM	
RETURN AIR DAMPER (MODULATING)								
RD-CO	RETURN AIR DAMPER CONTROL OUTPUT	AO			NO			
MINIMUM OUTSIDE AIR DAMPER (MODULATING)								
OD-CO	OUTSIDE AIR DAMPER CONTROL OUTPUT	AO			NC			
FILTERS								
DF-SAM	DIRTY FILTER INDICATION (SA MAIN FILTER)	BI	SCHED.			X	ON ACTIVATION	D
COOLING COIL - DX MODULATING AND BINARY STAGES								
DX-M-CO	DX MODULATING COMPRESSOR CONTROL OUTPUT	AO						J
DX-M-ST	DX MODULATING COMPRESSOR STATUS	AI				X	DX-M-ST <> DX-M-CO	J
DX-C-X	DX COMPRESSOR STAGE "X" COMMAND	BO						J
DX-ST-X	DX COMPRESSOR STAGE "X" STATUS	BI				X	DX-ST-X <> DX-C-X	J
HEATING COIL - GAS FURNACE MODULATING								
HG-CO	GAS FURNACE HEAT MODULATION CONTROL OUTPUT	AO						
FIRE ALARM/SMOKE DETECTORS								
SD	SMOKE DETECTOR STATUS	BI				X	ON ACTIVATION	K

ALL POINTS SHOWN SHALL BE PROVIDED BY BAS CONTRACTOR UNLESS NOTED OTHERWISE.

NOTES:
A. DISPLAY VALUE WITH AHU GRAPHIC AT BAS FRONT-END. REFERENCE GLOBAL BUILDING MONITORING SCHEDULE FOR CONTROL POINT.
C. REFERENCE PROJECT DESIGN CONDITIONS SCHEDULE FOR SETPOINT.
D. POINT SHALL BE ADJUSTABLE.
J. COORDINATE NUMBER OF STAGES FOR CONTROL WITH EQUIPMENT FURNISHED.
K. DEVICE AND RELAY FROM FIRE ALARM SYSTEM PROVIDED BY DIVISION 28. DISPLAY DETECTOR RELAY STATUS (NORMAL/ALARM) AT BAS FRONT END.

SEQUENCE OF OPERATIONS
SINGLE ZONE VARIABLE AIR VOLUME
ROOFTOP UNIT (RTU-2W/N)

This sequence of operations is organized into the following main categories: operating modes; control setpoint resets; safeties, overrides and interlocks; and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that are required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections. Setpoints shall be adjustable (adj.) as noted.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION

The rooftop unit described by this sequence of operations consist of a DX/Gas RTU with modulating supply fan and modulating powered exhaust. The RTU shall be provided with refrigeration only and control to its own internal safeties and time delays. Controls shown in the diagram, points list, and described in the sequence are intended to be performed by controllers, sensors, and programming to achieve the specified sequence of operations indicated.

OPERATING MODES

OCCUPIED MODE:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on the control drawings.

COOLING MODE:
The unit shall be in cooling mode when the zone temperature (Z-T) rises above the dead band (Z-T-DB).

MINIMUM COOLING MODE:
The unit shall be in minimum cooling mode when:
The unit is in cooling mode;
And- The supply fan reaches its minimum speed setting for 2 minutes (adj.).
The unit shall return to cooling mode when:
The cooling coil leaving air temperature (CC-LAT) is at or below its setpoint for 2 minutes (adj.);

HEATING MODE:
The unit shall be in heating mode when the zone temperature (Z-T) falls below the dead band (Z-T-DB).

MINIMUM HEATING MODE:
The unit shall be in minimum heating mode when:
The unit is in heating mode;
And- The supply fan reaches its minimum speed setting for 2 minutes (adj.).
The unit shall return to heating mode when:
The supply air temperature (SAT) is at or above its setpoint for 2 minutes (adj.);

UNOCCUPIED MODE:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation. Overrides of unoccupied schedule are defined at the zone level control.

DEHUMIDIFICATION MODE:
The unit shall be in dehumidification mode when the return air humidity sensor (RAH) senses humidity above 60% RH (adj.). The unit shall exit dehumidification mode when the humidity reaches or falls below 50% RH (adj.). The dehumidification mode shall be enabled to operate in occupied and unoccupied mode.

ECONOMIZER MODE – FIXED ENTHALPY WITH FIXED DRY-BULB TEMPERATURE ENABLED:
The unit shall be in economizer mode when:
The supply fan status is on;
And- the unit is in cooling mode;
And- the AHU is not in freeze protection mode;
And- the outside air enthalpy is less than 28 Btu/lb (adj.);
And- the outside air temperature is less than 75 F (adj.);

MORNING WARM-UP/COOL-DOWN MODE:
The unit shall be in morning warm-up/cool-down mode according to an optimum start sequence to allow the temperature control zones to reach their scheduled occupied setpoints before the scheduled occupancy time.

CONTROL SETPOINT RESETS

SUPPLY AIR TEMPERATURE RESET - TRIM AND RESPOND - COOLING ONLY:
The supply air temperature (SAT) setpoint shall be reset using trim and respond logic within the range as listed in the "Setpoint Reset Range" column of the points list. The control system shall monitor the cooling loop output to determine the direction of reset (i.e., up or down). The control system shall be capable of excluding zones from the analysis.
Trim and respond logic:
When fan is off, reset setpoint to the default value.
While fan is proven on:
If the cooling loop output is less than 90% of cooling loop output (adj.), every 2 minutes (adj.), increase the setpoint by 0.5º F (adj.). Repeat trim and respond logic until the cooling loop output is greater than than 90% open (adj.).
If the cooling loop output is greater than 95% open (adj.), every 2 minutes (adj.), decrease setpoint by 0.5º F. Repeat trim and respond logic until cooling loop output is less than 95% open(adj.).
When in economizer mode, reset the mixed air temperature setpoint (MAT) to be equal to the supply air temperature (SAT) setpoint.

COOLING COIL LEAVING AIR TEMPERATURE RESET - TRIM AND RESPOND – DEHUMIDIFICATION MODE:
While in dehumidification mode, the cooling coil leaving air temperature (CC-LAT) setpoint shall be reset using trim and respond logic within the range as listed in the "Setpoint Reset Range" column of the points list.
Trim and respond logic:
Every 2 minutes (adj.), decrease the setpoint by 1.0º F (adj.). Repeat trim and respond logic until humidity setpoint is satisfied.
After humidity is satisfied, return to supply air temperature reset-cooling only trim and respond sequence.

VENTILATION RESET:
System Level Ventilation Reset - shall modify the minimum outside airflow setpoint value between the absolute minimum and the minimum outside airflow values shown on the air-handling unit schedule subject to the maximum zone level CO2 setpoint as scheduled in the Project Design Conditions Schedule. Upon detection of sensor failure, the system shall provide a signal that resets the ventilation system to supply the design minimum outside air value.

SAFETIES, OVERRIDES AND INTERLOCKS

SMOKE DETECTOR INTERLOCK:
The unit shall be disabled via hard wired interlock on activation of a system smoke detector. Display smoke detector relay status (normal or alarm) at the BAS front end.

COMPONENT CONTROL LOOPS

SUPPLY FAN CONTROL- VFD:
When the HOA switch is in hand position, the variable speed supply fan shall operate at a speed set manually by the operator at the user interface of the drive.
When the HOA switch is in off position, the fan shall be off.
When the HOA switch is in auto position, the variable speed supply fan shall operate subject to the unit enable signal, and unit operating modes.
When in Occupied Mode:
The fan shall energize and slowly ramp to the initial minimum fan speed determined during system startup. Minimum fan speed shall be established during balancing.
When in Cooling Mode:
The fan VFD shall modulate to control zone temperature (Z-T) at setpoint. An increase in zone temperature causes an increase in airflow.
When in Heating Mode:
The fan VFD shall modulate to control zone temperature at setpoint. A decrease in zone temperature causes an increase in airflow.
When in Minimum Cooling, or Minimum Heating Mode:
The fan VFD shall maintain minimum speed.
When in Dehumidification Mode:
The fan VFD shall be locked at its current speed until the minimum supply air temperature setpoint is reached. If the humidity is still not satisfied after 5 minutes (adj), increase fan speed by 5% (adj). Repeat fan speed trim and respond sequence until setpoint is satisfied. Return to previous mode of operation upon exiting dehumidification mode.
When in Unoccupied Mode:
The fan shall be OFF. On a call for cooling/heating or override signal from the zone level, the fan shall operate as in occupied mode until the call is cleared or the override is removed.
When in Dehumidification Mode:
The fan shall operate as in occupied mode.
When in Morning Warm-Up/Cool-Down Mode:
The fan shall operate as in occupied mode.

RELIEF - EXHAUST FAN (REF) - BUILDING PRESSURE SENSOR CONTROL
When in Occupied Mode:
The fan shall be OFF. When the building differential pressure (BDP) exceeds setpoint, the fan shall energize and slowly ramp to the initial minimum fan speed determined during system startup.
The fan VFD speed shall vary to maintain the building differential pressure (BDP) setpoint.
The fan shall de-energize when the building pressure is satisfied.
When in Unoccupied Mode:
The fan shall be OFF.
When in Morning Warm-Up/Cool-Down Mode:
The fan shall be OFF.

MIXED AIR DAMPER WITH ECONOMIZER
The mixed air damper assembly consists of a outside air (OD) damper and return air (RD) damper.
When in Occupied Mode:
OA Active Control- The OA and RA dampers shall vary together to satisfy the minimum outside airflow setpoint as indicated by the OA airflow measuring station (OA-AF).
When in Unoccupied Mode:
The OA damper shall be fully closed and RA damper shall be fully open. On a call for cooling/heating or override signal, the OA damper shall remain closed unless beneficial for cooling.
When in Economizer Mode:
The OA and RA dampers shall modulate in opposing directions to maintain the supply air temperature (SAT) setpoint.
When in Morning Warm-Up/Cool-Down Mode:
The OA dampers shall be fully closed and the RA damper shall be fully open. The OA dampers shall be allowed to open if beneficial for cooling or heating

FILTER MONITORING
When in All Modes:
The controller shall monitor the differential pressure across each filter bank and shall provide a signal when the setpoint is exceeded.

HEATING COIL- GAS MODULATED
When in Occupied Mode:
The controller shall modulate the heating to maintain the heating coil leaving air temperature setpoint (SAT).
When in Cooling Mode:
The coil shall be OFF.
When in Minimum Heating Mode:
The controller shall modulate the heating to maintain the zone temperature setpoint (Z-T).
When in Heating Mode:
The controller shall modulate the heating to maintain the supply air temperature setpoint (SAT).
When in Unoccupied Mode:
The coil shall be OFF.
On a call for heating or override signal from the zone level the coil shall operate as in occupied mode until the call is cleared or the override is removed.
When in Economizer Mode:
The coil shall be OFF.
When in Morning Warm-Up Mode:
The coil shall operate as in occupied mode.

COOLING COIL DX STAGED + VARIABLE CONTROL (MULTIPLE COMPRESSORS)
When in Occupied Mode:
When in Minimum Cooling Mode:
The variable compressor shall modulate in coordination with the constant speed compressor(s) (subject to the unit manufacturer's standard safeties) to maintain the zone temperature setpoint (Z-T).
When in Cooling Mode:
The variable compressor shall modulate in coordination with the constant speed compressor(s) (subject to the unit manufacturer's standard safeties) to maintain the supply air temperature setpoint (SAT).
When in Heating Mode:
The coil shall be OFF.
When in Dehumidification Mode:
The variable compressor shall modulate in coordination with the constant speed compressors(s) (subject to the unit manufacturer's standard safeties) to maintain the cooling coil leaving air temperature (CC-LAT).
The variable compressor represents the primary stage of cooling and shall vary continuously between minimum capacity and 100% capacity to maintain the supply air set point temperature. When the supply air temperature setpoint cannot be maintained and the variable compressor is at 100%, then the constant speed compressor shall be energized and the variable compressor shall return to minimum speed and modulate to maintain the supply air setpoint. Units with subsequent stages of cooling shall follow a similar loading and unloading logic.
When in Unoccupied Mode:
The compressor(s) shall be OFF.
On a call for cooling or override signal from the zone level the compressor(s) shall operate as in occupied mode until the call is cleared or the override is removed.
On a call for dehumidification the compressor(s) shall operate as in occupied mode until the call is cleared or the override is removed.
When in Morning Cool-Down Mode:
The compressor(s) shall operate as in occupied mode.

REHEAT COIL- DX HOT GAS REHEAT
When in Dehumidification Mode:
The manufacturer onboard controller shall control the hot gas reheat coil valve to maintain the zone temperature setpoint (Z-T).
When in all other modes:
The coil shall be OFF.

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STATE OF MISSOURI
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NUMBER PE-2020016283
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CARL J. HOLDEN
LICENSE # PE-2020016283

MECHANICAL CONTROLS
M403

CARL J. HOLDEN

ELECTRICAL SYMBOLS

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

V3.00

STANDARD MOUNTING HEIGHTS

AUDIBLE APPLIANCE (CENTERLINE)	84"
ALARM (TOP OF DEVICE)	46"
ANNUNCIATOR PANEL (DISPLAY)	60"
CONTROLS (TOP OF DEVICE)	46"
DATA WALL OUTLET	SAME AS ADJACENT DEVICE, UNO
EXIT SIGNS (WALL MOUNTED)	92"
FIRE ALARM ANNUNCIATOR PANEL (TOP OF DISPLAY)	60"
FIRE ALARM BELL (EXTERIOR) (CENTERLINE)	120"
FIRE ALARM CONTROL PANEL/UNIT (TOP OF DISPLAY)	60"
INTERCOM (TOP OF DEVICE)	46"
PULL STATION (TOP OF DEVICE)	46"
RECEPTACLE	16"
RECEPTACLE (ABOVE COUNTER)	+6" ABOVE BACKSPLASH/COUNTER, 40"MAX
RECEPTACLE (CLOCK)(CENTERLINE)	84"
RECEPTACLE (EQUIPMENT ROOMS)(TOP OF DEVICE)	46"
RECEPTACLE (EXTERIOR)	24"
RECEPTACLE (GARAGES)	24"
REMOTE INDICATING LIGHT (EQUIPMENT ROOMS)(TOP OF DEVICE)	46"
REMOTE INDICATING LIGHT (FINISHED AREAS)	CEILING
SAFETY SWITCH (TOP OF DEVICE)	46"
STARTER (TOP OF DEVICE)	46"
SWITCH (TOP OF DEVICE)	46"
TELEPHONE WALL OUTLET (TOP OF DEVICE)	46"
TELECOMMUNICATIONS BACKBOARD	6"
TELEVISION OUTLET	REFER TO ARCH
VISIBLE APPLIANCE (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
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AS	AMPERE SWITCH SIZE
AT	AMPERE TRIP SETTING
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
BAS	BUILDING AUTOMATION SYSTEM
BKR	BREAKER
C	CONDUIT
CAT	CATEGORY
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CD	CANDELA
CKT	CIRCUIT
CODE	APPLICABLE CODE ADOPTED BY JURISDICTION
CT	CURRENT TRANSFORMER
CTR	CENTER
CVD	CUMULATIVE VOLTAGE DROP
D/DEMO	DEMOLITION
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, SINGLE-THROW
E/ETR/EX	EXISTING TO REMAIN
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
ELV	ELECTRONIC LOW-VOLTAGE
EWC	ELECTRIC WATER COOLER
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FCA	FAULT CURRENT AMPS AVAILABLE
FCU	FAN COIL UNIT
FF	FINISHED FLOOR
FLA	FULL LOAD AMPS
FLR	FLOOR
GC	GENERAL CONTRACTOR
GEC	GROUNDING ELECTRODE CONDUCTOR
GES	GROUNDING ELECTRODE SYSTEM
GFR	GROUND FAULT RELAY
G	GROUND
IG	ISOLATED GROUND
ISC	SHORT CIRCUIT CURRENT
JB/J-BOX	JUNCTION BOX
LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LTG/LTS	LIGHTING/LIGHTS
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MLV	MAGNETIC LOW-VOLTAGE
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
N/A	NOT APPLICABLE
NF	NON-FUSED
NL	NIGHT LIGHT (24HR ON)
NRTL	NATIONALLY RECOGNIZED TESTING LABORATORY (CSA, ETL, NSF, UL)
NTS	NOT TO SCALE
OS	OCCUPANCY SENSOR
P	POLE
PART	PARTIAL CIRCUIT
PH/Ø	PHASE
PNL	PANEL
PNLBD	PANELBOARD
PROVIDE	FURNISH AND INSTALL
PT	POTENTIAL TRANSFORMER
QTY	QUANTITY
R/REL	RELOCATE
RCPT	RECEPTACLE
RLA	RUNNING LOAD AMPS
RTU	ROOFTOP UNIT
SCCR	SHORT-CIRCUIT CURRENT RATING
SD	SMOKE DUCT DETECTOR
SF	SQUARE FEET
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SSBJ	SUPPLY-SIDE BONDING JUMPER
ST	SHUNT TRIP
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TBD	TO BE DETERMINED
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TL	TWISTLOCK
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TX/XFMR	TRANSFORMER
TYP	TYPICAL
U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
VD	VOLTAGE DROP
VFD	VARIABLE FREQUENCY DRIVE
VS	VACANCY SENSOR
W	WIRE
W/	WITH
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION PROOF

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	———	ARTICLE 702 OR OPTIONAL	———
FUTURE	- - - - - - - - - -		

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 [R#] P1 P1-3,5,7	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

CONDUCTOR TICK MARK LEGEND

WHERE TICK MARKS ARE SHOWN, THE FOLLOWING SHALL GOVERN:

- SWITCHED HOT (PHASE) CONDUCTORS (SHOWN TRAILING NEUTRAL)
- NEUTRAL (GROUNDED) CONDUCTOR
- UNSWITCHED HOT (PHASE) CONDUCTORS (SHOWN LEADING NEUTRAL)
- NOTE: HASH MARKS INDICATE QUANTITY OF CONDUCTORS
- EQUIPMENT GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION OR BARE)
- ISOLATED GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION WITH YELLOW TRACER)

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

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

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)
D#	DAYLIGHT SENSOR (# INDICATES TYPE PER SCHEDULE)
LC	LIGHTING CONTROLS PROCESSOR AND/OR EQUIPMENT
P#	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	BLANK FACE GFCI FEED THROUGH DEVICE
OR GFCI	GFCI TYPE RECEPTACLE*
OR IG	ISOLATED GROUND TYPE RECEPTACLE*
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
	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
T	THERMOSTAT
J J	CEILING/FLOOR MOUNT JUNCTION/OUTLET BOX
J J	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##	SHIELDED TRANSFORMER (TYPE AND RATINGS AS INDICATED)
ATS# ###A ATS# (W/BYPASS)	AUTOMATIC TRANSFER SWITCH (RATINGS AS INDICATED)
ATS# (W/BYPASS) ###A	AUTOMATIC TRANSFER SWITCH WITH BYPASS (RATINGS AS INDICATED)
##KW GENERATOR 480Y/277V, 3Ø, 4W ###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

CALL OUTS

ENLARGED PLAN CALLOUT	▨
NOT IN SCOPE	▨

ELECTRICAL SUPPLEMENTAL SPECIFICATIONS:

1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS. AS APPLICABLE, REVIEW THE OWNER 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. 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.
8. ALL APPLICABLE SWITCHES, RECEPTACLES, OUTLETS, AND CONTROLS SHALL BE PLACED AT HEIGHTS THAT ARE IN ACCORDANCE WITH ADA ACCESSIBILITY GUIDELINES.
9. COORDINATE FLOOR MOUNTED BOX, RECEPTACLE, AND COVER PLATE TYPES WITH ARCHITECT AND OWNER PRIOR TO ORDER.
10. WIRING DEVICES ADJACENT TO EACH OTHER SHALL BE INSTALLED UNDER A SINGLE COVER PLATE, UNO.
11. 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.
12. 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.
13. 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.
14. PROVIDE TAMPER-RESISTANT (TR) TYPE RECEPTACLES AT ALL CODE REQUIRED LOCATIONS AND AT LOCATIONS WHERE RECEPTACLES ARE MOUNTED LESS THAN 5'-6" AFF AND ARE EASILY ACCESSIBLE BY CHILDREN, UNLESS NOTED OTHERWISE.
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/PIPE 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.
23. 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 MAX/MIN RATIO ALONG THE EMERGENCY EGRESS PATHS.
24. 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 ENCLOSURE IF REQUIRED. COORDINATE LOCATION AND ENCLOSURE TYPE WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
25. 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.
26. 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.
27. 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.
28. 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".
29. 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.
30. 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.

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: N/A

SPECIAL SYSTEMS SUPPLEMENTAL SPECIFICATIONS:

1. PROVIDE NECESSARY BOXES, CONDUIT AND MAKE FINAL CONNECTIONS TO TEMPERATURE CONTROL DEVICES PER MANUFACTURER'S RECOMMENDATIONS. THIS INCLUDES BUT IS NOT LIMITED TO: MAIN CONTROL PANELS, THERMOSTATS, HUMIDISTATS, AC SOLENOIDS, HEAT RECLAIM WIRING, AHU CONTROL WIRING, DUCT FURNACE CONTROL WIRING, TIMERS, AND SIMILAR CONTROLS. PROVIDE CONDUIT FOR ALL WIRING WITHIN WALLS. PROVIDE CONTROL AND INTERLOCK WIRING WHEN NOT PROVIDED BY OTHER TRADES. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIERS AND OTHER TRADES PRIOR TO ROUGH-IN.
2. PROVIDE LINE VOLTAGE WIRING AND MAKE FINAL CONNECTIONS TO ALL DUCT-MOUNTED SMOKE DETECTORS, FIRE/SMOKE AND SMOKE DAMPERS WHERE APPLICABLE. COORDINATE REQUIREMENTS WITH OTHER TRADES PRIOR TO INSTALLATION.
3. DEVICES MOUNTED ON ACOUSTICAL TILE CEILINGS SHALL BE CENTERED ON THE TILE, UNO.
4. PROVIDE BOX AND 3/4" CONDUIT FROM EACH THERMOSTAT LOCATION TO MECHANICAL EQUIPMENT, (FLUSH MOUNT BOX WHEREVER PRACTICABLE). COORDINATE LOCATION OF ALL THERMOSTAT BOXES WITH MECHANICAL/CONTROLS CONTRACTOR AND OWNER PRIOR TO ROUGH-IN.
5. PROVIDE BOXES AND CONDUITS FOR THE FIRE PROTECTION SYSTEM LOW VOLTAGE WIRING AS REQUIRED. THIS INCLUDES EXPOSED WIRING LESS THAN 96" AFF. AT A MINIMUM, PROVIDE 3/4" CONDUIT, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS AND LOCATIONS WITH SYSTEM INSTALLER AND FIRE ALARM SPECIFICATIONS.
6. AT A MINIMUM, PROVIDE EXTRA DEEP, DOUBLE GANG COMMUNICATION OUTLET BOXES, (FLUSH MOUNTED WHEREVER PRACTICABLE), WITH SINGLE-GANG PLASTER RING AND 1" CONDUIT STUBBED-UP CONCEALED TO ACCESSIBLE CEILING SPACE, UNLESS NOTED OTHERWISE. PROVIDE SURFACE MOUNTED DATA BOXES WITHIN CABINETRY, AND SELECT OTHER LOCATIONS AS INDICATED ON THE DRAWINGS. COORDINATE TELEPHONE/DATA BOX AND CONDUIT LOCATIONS AND SIZES WITH OWNER AND OTHER TRADES PRIOR TO ROUGH-IN.
7. PROVIDE NYLON BUSHINGS FOR ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUITS AND SLEEVES, UNLESS NOTED OTHERWISE.
8. ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUIT SHALL BE INSTALLED WITH AN ACCESSIBLE PULLBOX BETWEEN EVERY 180 DEGREE CHANGE IN DIRECTION AND AT 100' INTERVALS OF CONTINUOUS RUNS.
9. MINIMUM BEND RADIUS FOR COMMUNICATIONS CONDUIT IS 6 TIMES THE INSIDE DIAMETER FOR CONDUITS 2" IN DIAMETER AND SMALLER AND 10 TIMES THE INSIDE DIAMETER FOR CONDUITS GREATER THAN 2" IN DIAMETER, UNLESS NOTED OTHERWISE.
10. ALL LOW VOLTAGE CLASS 2 OR 3 WIRING NOT IN CONDUIT SHALL BE PLENUM RATED WHERE APPLICABLE.
11. LOW VOLTAGE CABLE SHEATH LABELS AND RELATED MANUFACTURER INFO SHALL REMAIN APPARENT IN ALL EXPOSED APPLICATIONS. PROTECT ALL EXPOSED CABLING FROM PAINTING AND OVERSPRAY (INCLUDES CABLE NOT ROUTED IN CONDUIT AND THAT IS IN CABLE TRAY).

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MO. CORPORATE NO: E-556D
EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

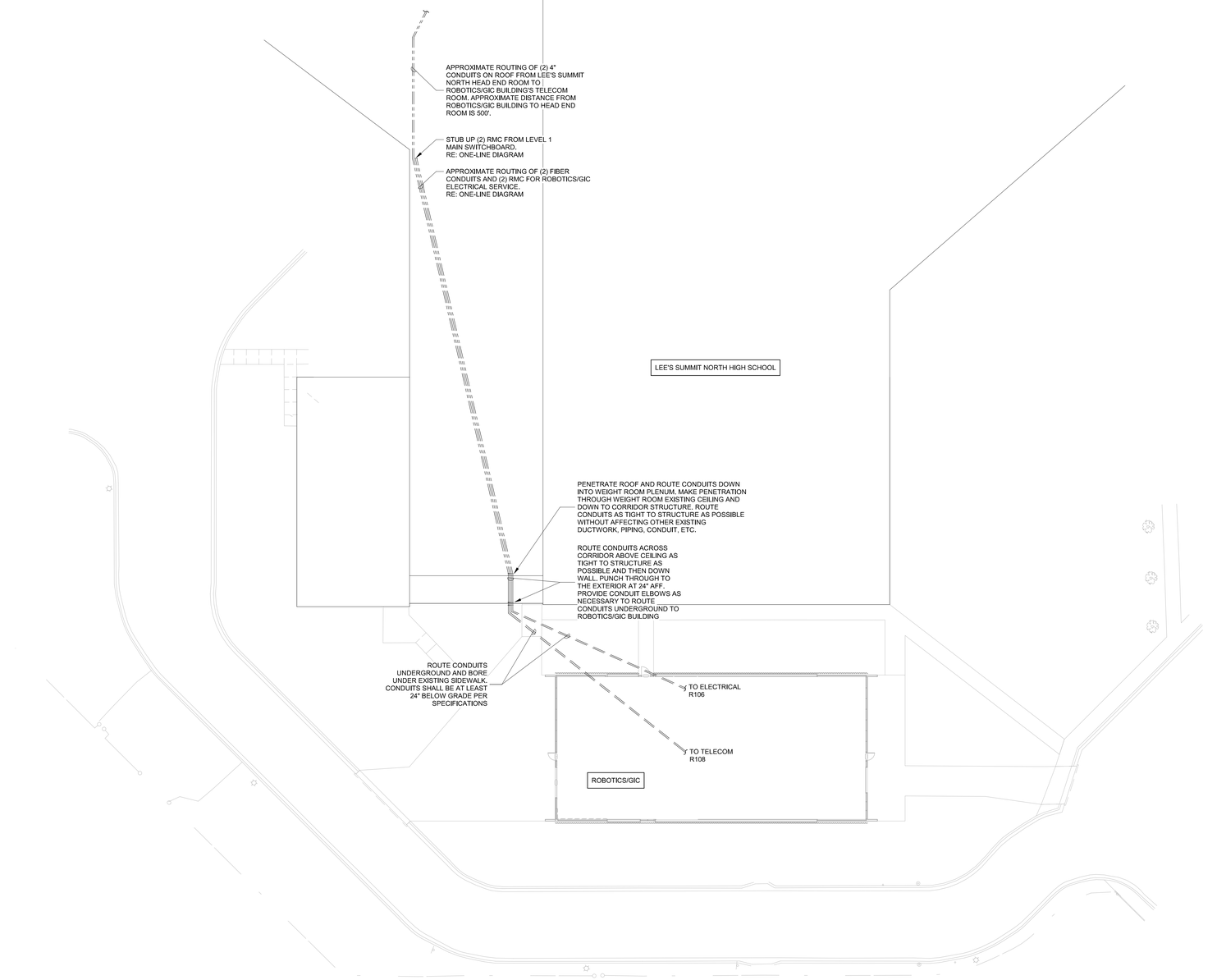
DOUGLAS M. EVERHART
NUMBER PE-2019007648
09/09/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

ELECTRICAL GENERAL NOTES AND LEGEND

E000

DOUGLAS M. EVERHART



1 ELECTRICAL SITE PLAN - LSN
1" = 20'-0"

EXTEND EXISTING LIGHTNING PROTECTION SYSTEM FOR MAIN HIGH SCHOOL TO NEW STRUCTURE.

SITE ELECTRICAL GENERAL NOTES:

1. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE THE FINAL LOCATION OF UNDERGROUND UTILITIES, CONDUITS, CIRCUITRY, TRANSFORMERS AND OTHER EQUIPMENT WITH CIVIL DRAWINGS, LANDSCAPING DRAWINGS AND OWNER PRIOR TO INSTALLATION.
2. SITE ELECTRICAL CONDUITS SHALL BE 1" MINIMUM, UNLESS NOTED OTHERWISE. WHERE PRACTICABLE, ALL SITE ELECTRICAL CONDUITS SHALL BE INSTALLED A MINIMUM OF 24" BELOW GRADE, UNLESS NOTED OTHERWISE. COORDINATE FINAL CONDUIT ROUTING WITH EXISTING OBSTRUCTIONS AND OTHER TRADES AND ADJUST AS NECESSARY.
3. MINIMUM WIRE SIZE FOR SITE ELECTRICAL CIRCUITS SHALL BE #10 AWG CU, UNLESS NOTED OTHERWISE. ALL SITE ELECTRICAL BRANCH CIRCUIT WIRING SHALL BE SIZED SUCH THAT THE MAXIMUM BRANCH CIRCUIT VOLTAGE DROP IS LESS THAN 3 PERCENT.
4. PROVIDE SPLICE AND PULL BOXES FOR SITE ELECTRICAL POWER TO LIMIT MAXIMUM CONDUIT RUN TO 300', PLACE BOXES IN A PLANTER AREA CLEAR OF VEGETATION WHEREVER PRACTICABLE; (COORDINATE FINAL LOCATION WITH CIVIL, LANDSCAPE CONTRACTOR AND OWNER). BOXES SHALL BE SUITABLE FOR LOCATION AND PROPERLY SIZED FOR QUANTITY AND SIZE OF CONDUITS IN AND OUT AND SHALL BE MARKED "ELECTRICAL". NOT ALL OF THESE BOXES ARE SHOWN ON SITE ELECTRICAL DRAWINGS; CONTRACTOR SHALL PROVIDE LOCATION ON AS-BUILT DRAWINGS AND SUBMIT TO OWNER. SPLICE BOX SHALL BE APPROPRIATE FOR LOCATION AND SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. SPLICE BOX SHALL HAVE A MINIMUM NOMINAL SIZE OF 12"X12"X12", SHALL BE AN OPEN BOTTOM NRTL LISTED UNDERGROUND ENCLOSURE, AND SHALL AT A MINIMUM BE TIER 15 TRAFFIC RATED.
5. PROVIDE SPLICE AND PULL BOXES FOR ROOFTOP CONDUIT ROUTING. PROVIDE MAXIMUM LENGTHS OF CONDUIT RUNS AND PULL BOXES PER NEC ARTICLE 314.
6. ALL CONDUIT ON ROOF SHALL BE MOUNTED AT A MINIMUM 7/8" ABOVE ROOFTOP.

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LSN - ELECTRICAL SITE PLAN

E100-B

DOUGLAS M. EVERHART

NO EXPOSED CONDUITS SHALL PENETRATE FINISHED PLYWOOD ON WALLS. ALL CONDUITS SHALL ROUTE ABOVE PLYWOOD WHEN PENETRATING WALLS. REFER TO ARCHITECTURAL SHEETS FOR EXACT HEIGHTS OF FINISHED PLYWOOD.

ELECTRICAL PLAN NOTES:

E34 PROVIDE EMERGENCY BATTERY PACK CAPABLE OF OPERATING 4' SECTION OF FIXTURE AT THIS LOCATION WITHIN CONTINUOUS FIXTURE RUN. REFER TO LIGHT FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION.

E36 SURFACE MOUNT OCCUPANCY SENSOR TO UNDERSIDE OF STRUCTURE.

E37 SURFACE MOUNT EXIT SIGN TO SIDE OF COLUMN 10' AFF.

E38 SURFACE MOUNT EXIT SIGN TO UNDERSIDE OF STRUCTURE.

E39 MOUNT FIXTURE TO UNDERSIDE OF BLOCKING BETWEEN EXTERIOR METAL SKIN AND BUILDING EXTERIOR. CIRCUIT WITH REMOTE BATTERY IOTA ILB CP10 HE SD (OR APPROVED EQUIVALENT) FOR EMERGENCY OPERATION. MOUNT BATTERY IN ENCLOSURE TIGHT TO STRUCTURE IN PLUMBING R102. REFER TO ARCHITECTURAL DETAILS FOR ADDITIONAL MOUNTING REQUIREMENTS AND INFORMATION.

E40 MOUNT EXIT SIGN 12' AFF.

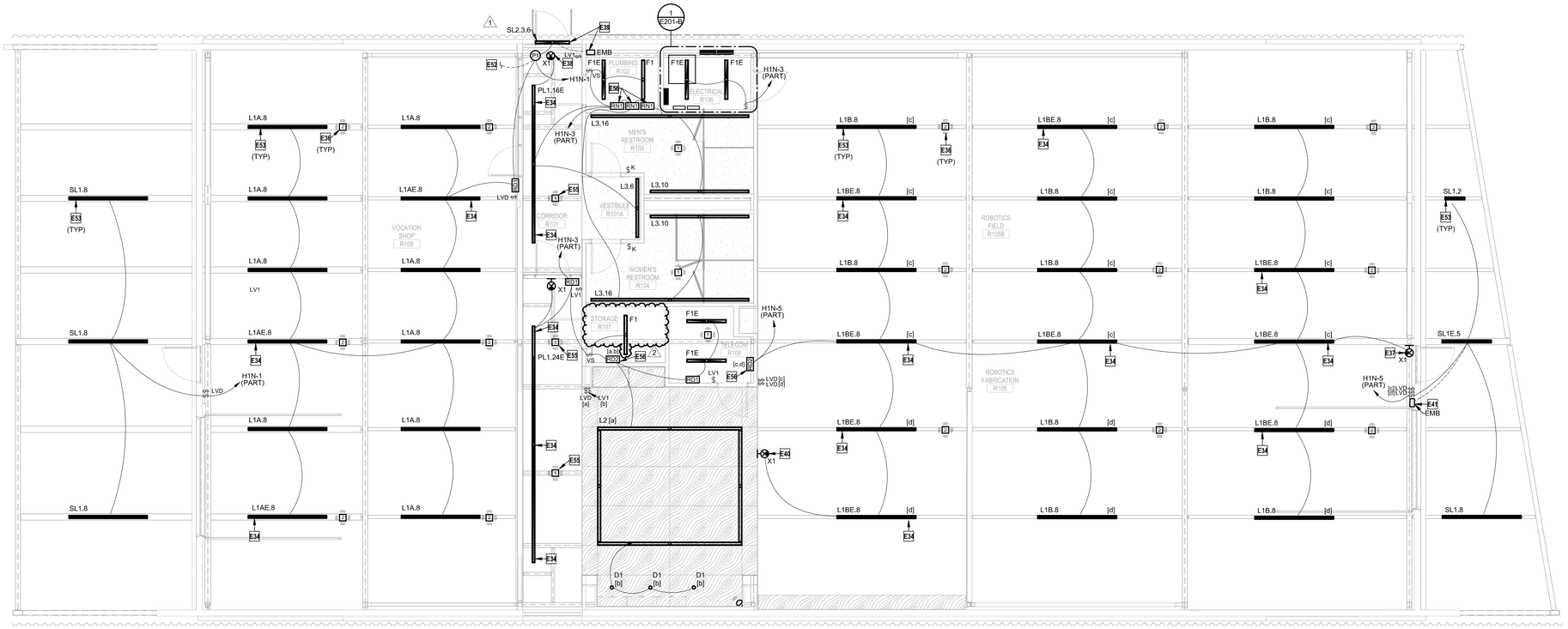
E41 CIRCUIT WITH REMOTE BATTERY IOTA ILB CP10 HE SD (OR APPROVED EQUIVALENT) FOR EMERGENCY OPERATION. MOUNT BATTERY IN ENCLOSURE TIGHT TO STRUCTURE.

E52 REFER TO ROOF PLAN FOR LOCATION OF PHOTOELECTRIC SWITCH FOR CONTROL CANOPY FIXTURE.

E53 SURFACE MOUNT FIXTURE TO UNDERSIDE OF STRUCTURE.

E55 PENDANT MOUNT OCCUPANCY SENSOR NO HIGHER THAN 12' AFF.

E56 PROVIDE LABEL FOR ROOM CONTROLLERS NOTING THE ROOMS THEY SERVE. MOUNT ON WALL NO HIGHER THAN 10' AFF.



1 LIGHTING LEVEL 1 RCP - LSN
3/16" = 1'-0"

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2	Addendum 02	09/23/2022

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09/23/2022
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LSN - LIGHTING RCP

E101-B

DOUGLAS M. EVERHART

NO EXPOSED CONDUITS SHALL PENETRATE FINISHED PLYWOOD ON WALLS. ALL CONDUITS SHALL ROUTE ABOVE PLYWOOD WHEN PENETRATING WALLS. REFER TO ARCHITECTURAL SHEETS FOR EXACT HEIGHTS OF FINISHED PLYWOOD.

GIC EQUIPMENT SCHEDULE

TAG	EQUIPMENT DESCRIPTION	VOLTAGE	PHASE	RECEPTACLE TYPE
2A	MITER SAW	120 V	1	5-20R
3A	PANEL SAW	120 V	1	5-20R

ROBOTICS EQUIPMENT SCHEDULE

TAG	EQUIPMENT DESCRIPTION	VOLTAGE	PHASE	RECEPTACLE TYPE
1B	BRIDGEPORT 3-AXIS CNC	208 V	3	15-20R
2B	BRIDGEPORT TORQ CUT 22	208 V	3	15-50R
3B-1	BIRMINGHAM YCL-1340GH LATHE (MAIN)	208 V	1	6-30R
3B-2	BIRMINGHAM YCL-1340GH LATHE (CONTROLS)	120 V	1	5-20R
4B	WEN 3975T HORIZONTAL METAL BANDSAW	120 V	1	5-20R
5B	CRAFTSMAN VERTICAL METAL BANDSAW	120 V	1	RE: PLAN NOTE
6B	CENTRAL MACHINERY METAL CUTTING BANDSAW	120 V	1	5-20R
7B	GRIZZLY G7947 DRILL PRESS	120 V	1	5-20R
8B	OPEN TABLE CNC	208 V	3	HARDWIRED
9B/12B	BALDOR BUFFER BALDOR DISC SANDER	120 V	1	RE: PLAN NOTE
10B/17B	BALDOR DISC SANDER RYOBI BENCH GRINDER	120 V	1	RE: PLAN NOTE
11B	CRAFTSMAN MITER SAW	120 V	1	5-20R
13B	GRIZZLY DUST COLLECTOR	208 V	1	5-20R
16B	KARDEX STORAGE SYSTEM	120 V	1	5-20R
18B-1	TIG WELDER (MAIN)	208 V	1	6-30R
18B-2	TIG WELDER (MISC)	120 V	1	5-20R

ELECTRICAL PLAN NOTES:

E6 PROVIDE (2) DUAL CHANNEL ALUMINUM RACEWAYS, LEGRAND ALA4800 SERIES WITH RECEPTACLES AND DATA OUTLETS SPACED AT 1' INTERVALS. PROVIDE AT 4' AFF AND 5' AFF. REFER TO ARCHITECTURAL ELEVATIONS FOR ADDITIONAL INFORMATION.

E10 PROVIDE RECEPTACLE FOR SIGN-IN SYSTEM. COORDINATE FINAL MOUNTING HEIGHT WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.

E11 PROVIDE KH INDUSTRIES RTBB3L-WDD520-J12F RETRACTABLE CORD REEL OR APPROVED EQUIVALENT. 25' CORD LENGTH WITH #12/3 WIRES RATED FOR 20A AT 120V. (2) DUPLEX RECEPTACLES. NEMA 2 ENCLOSURE. SJOW BLACK CORD. 12 POSITION ADJUSTABLE GUIDE ARM WITH ADJUSTABLE RATCHED AND BALL STOP. 6' FEEDER CORD.

E12 PROVIDE KH INDUSTRIES RTAN3LW-WCL520-J12F RETRACTABLE CORD REEL OR APPROVED EQUIVALENT. 25' CORD LENGTH WITH #12/3 WIRES RATED FOR 20A AT 120V. (1) TWISTLOCK L5-20R RECEPTACLE, NEMA 2 ENCLOSURE, SJOW BLACK CORD, 4-POSITION ADJUSTABLE ARM WITH (4) ROLLER GUIDES AND ADJUSTABLE BALL STOP. 6' FEEDER CORD. WHITE FINISH.

E14 RECESS L5-20R TWISTLOCK RECEPTACLE IN WOOD CEILING.

E15 PROVIDE GFCI FEED-THRU DEVICE ABOVE COUNTER AND LABEL "REFRIGERATOR".

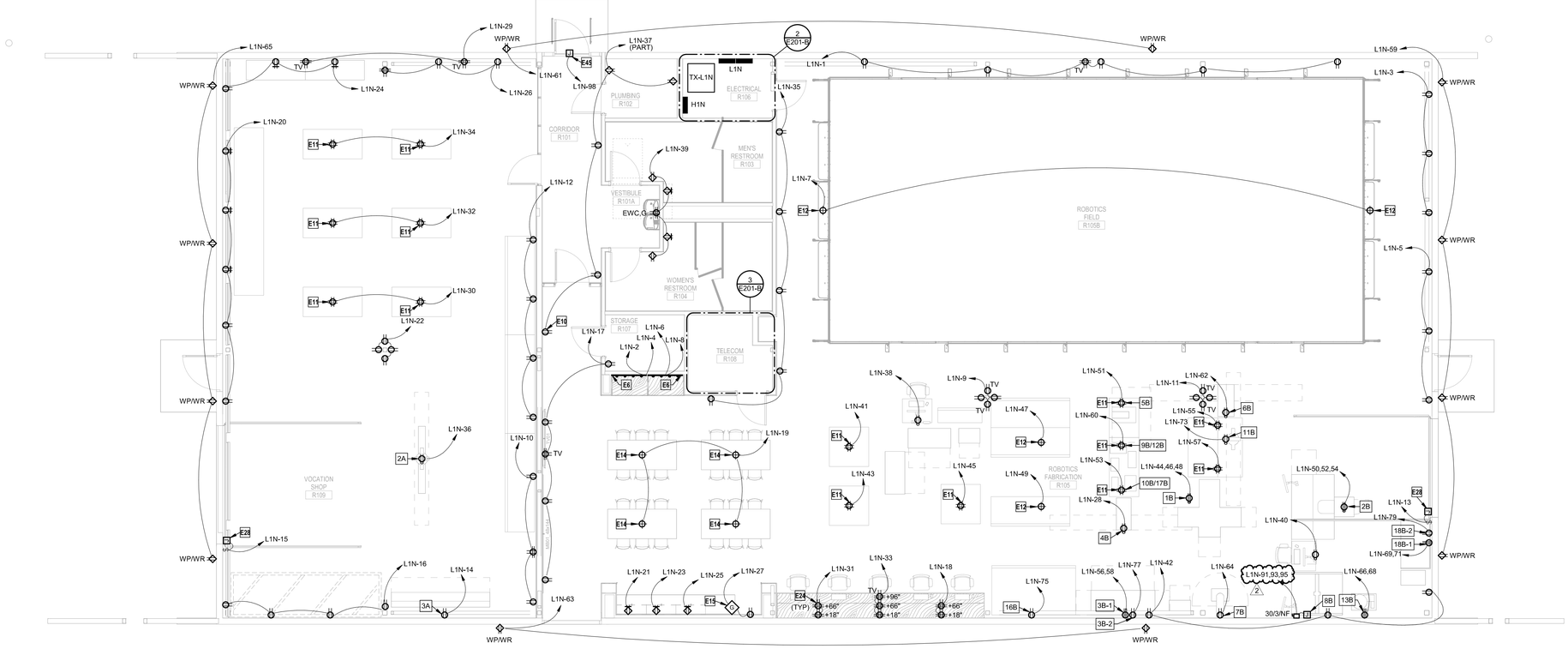
E22 PROVIDE POWER CONNECTION TO ACCESS CONTROL PANEL.

E23 MOUNTED RECEPTACLE TO LADDER RACK AT 7-0" AFF. COORDINATE FINAL LOCATION AND ROUTING WITH OWNER PRIOR TO ROUGH-IN.

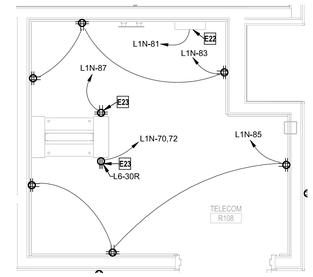
E24 REFER TO ARCHITECTURAL ELEVATIONS FOR RECEPTACLE MOUNTING HEIGHT(S) AT CAD STATIONS.

E28 PROVIDE JUNCTION BOX AND HARDWIRE CONNECTION TO MOTORIZED OVERHEAD GARAGE DOOR. COORDINATE ROUGH-IN AND CONTROL LOCATIONS WITH APPROVED MANUFACTURER PRIOR TO INSTALL.

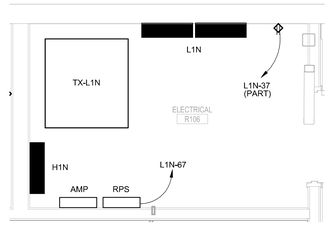
E45 PROVIDE LINE VOLTAGE CONNECTION TO ADA DOOR OPERATOR WITH LOW VOLTAGE WIRING TO PUSH BUTTON(S). COORDINATE WIRING CONFIGURATION WITH APPROVED MANUFACTURER PRIOR TO ROUGH-IN.



1 POWER LEVEL 1 PLAN - LSN
3/16" = 1'-0"



3 POWER LEVEL 1 PLAN - LSN - TELECOM ROOM
1/2" = 1'-0"



2 POWER LEVEL 1 PLAN - LSN - ELEC ROOM
1/2" = 1'-0"

DOUGLAS M. EVERHART

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2	Addendum 02	09/23/2022

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LSN - POWER PLAN

E201-B

NO EXPOSED CONDUITS SHALL PENETRATE FINISHED PLYWOOD ON WALLS. ALL CONDUITS SHALL ROUTE ABOVE PLYWOOD WHEN PENETRATING WALLS. REFER TO ARCHITECTURAL SHEETS FOR EXACT HEIGHTS OF FINISHED PLYWOOD.

☐ ELECTRICAL PLAN NOTES:

E44 PROVIDE CONNECTION TO BAS PANEL. COORDINATE FINAL LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

E63 PROVIDE PLUG AND CORD CONNECTION FOR ACD1. REFER TO PLUMBING PLANS FOR ADDITIONAL INFORMATION. COORDINATE FINAL REQUIREMENTS WITH DIVISION 22 PRIOR TO ROUGH-IN.

E64 PROVIDE HARDWIRE CONNECTION FOR RAD1. REFER TO PLUMBING PLANS FOR ADDITIONAL INFORMATION. COORDINATE FINAL REQUIREMENTS AND CONTROLS WITH DIVISION 22 PRIOR TO ROUGH-IN.

EQUIPMENT CONNECTION SCHEDULE

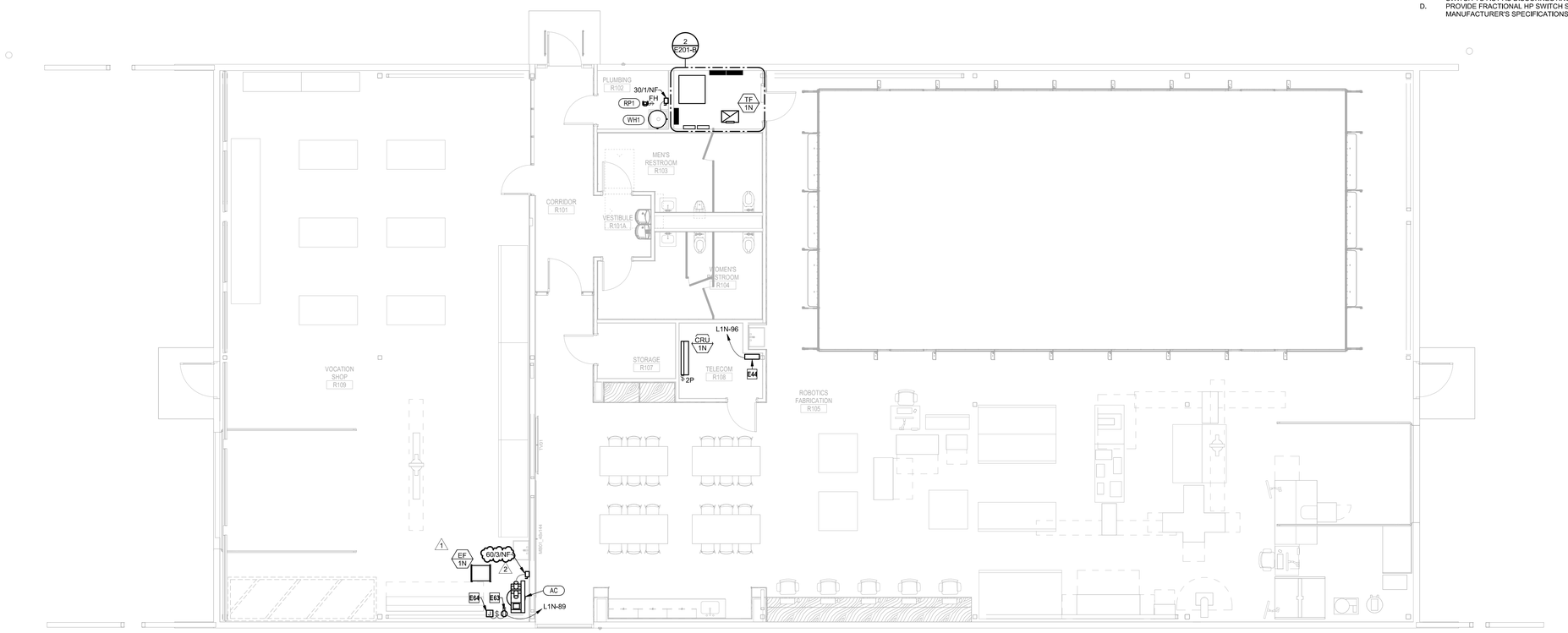
MARK	PANEL	CIRCUIT	NOTES
AIR COMPRESSOR			
AC	L1N	78,80,82	B
Electric Storage Water Heater			
WH1	H1N	14	B
FAN			
TF 1N	L1N	94	A
Recirculation Pump			
RP1	L1N	88	D
VRF INDOOR			
CRU 1N	L1N	74,76	C

EQUIPMENT CONNECTION GENERAL NOTES:

1. COORDINATE FINAL LOCATIONS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
2. REFER TO MECHANICAL SCHEDULES FOR ADDITIONAL INFORMATION WITHIN SCOPE OF DIVISION 26.
3. COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE FINAL POWER REQUIREMENTS FOR ALL SUBMITTED EQUIPMENT THAT DIFFERS FROM BASIS-OF-DESIGN.

EQUIPMENT CONNECTION SCHEDULE NOTES:

A. DISCONNECTING MEANS (FRACTIONAL HP SWITCH, FUSED DISCONNECT SWITCH, ETC.) AND/OR CONTROLLER (STARTER, VFD, ETC.) IS FACTORY MOUNTED OR PROVIDED BY DIVISION 23.
B. PROVIDE FUSED/NON-FUSED DISCONNECT SWITCH SIZED PER EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND THE NEC. REFER TO ELECTRICAL SYMBOLS LEGEND FOR NAMING DESIGNATIONS.
C. PROVIDE POWER AND CONTROL WIRING FROM ASSOCIATED CONDENSING UNIT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE FRACTIONAL HP SWITCH TO ACT AS DISCONNECTING MEANS.
D. PROVIDE FRACTIONAL HP SWITCH SIZED PER EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND THE NEC.



1 EQUIPMENT CONNECTION LEVEL 1 PLAN - LSN
3/16" = 1'-0"

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LSN - EQUIPMENT CONNECTION PLAN
E301-B

DOUGLAS M. EVERHART

☐ ELECTRICAL PLAN NOTES:

E51 PROVIDE PHOTOELECTRIC SWITCH ON ROOFTOP AND ORIENT NORTH PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. SWITCH IS POWERED VIA LOW-VOLTAGE CONNECTION TO POWER PACK ON FIRST FLOOR. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR ADDITIONAL INFORMATION.

EQUIPMENT CONNECTION SCHEDULE

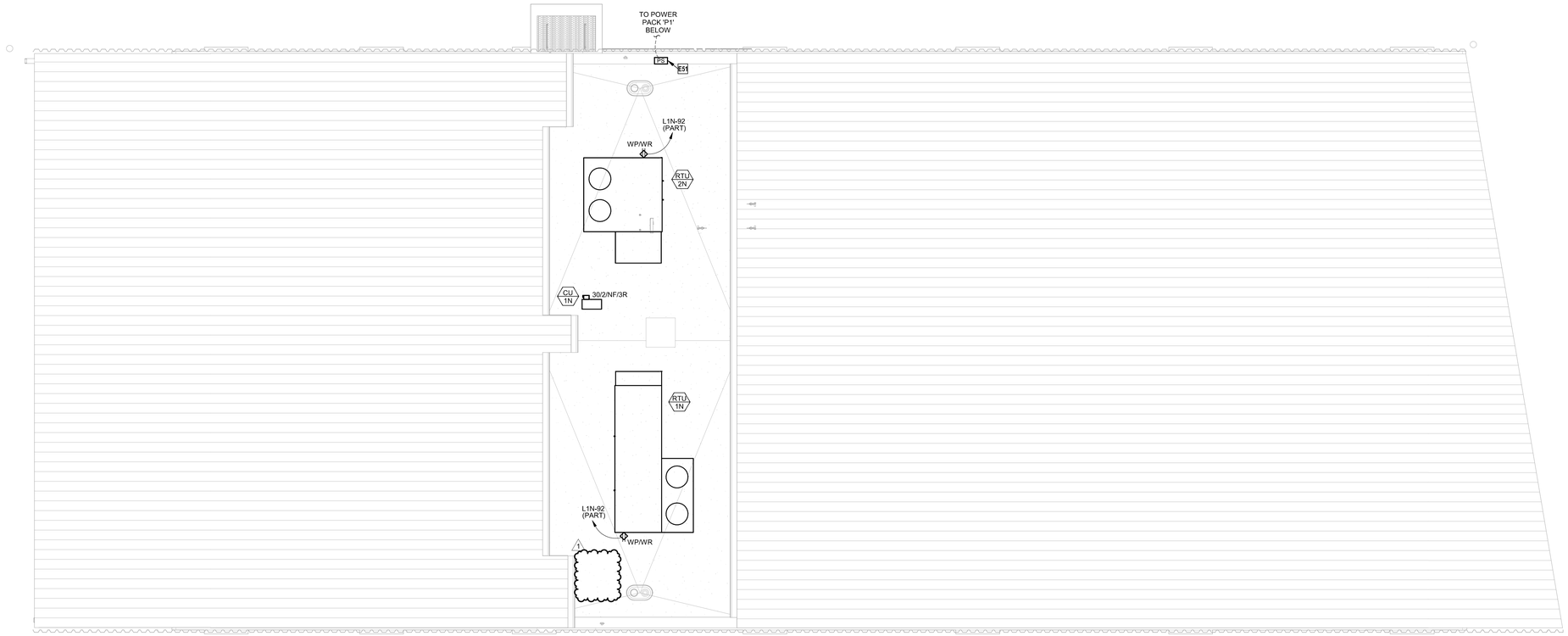
MARK	PANEL	CIRCUIT	NOTES
RTU 1N	H1N	2,4,6	A,D
RTU 2N	H1N	8,10,12	A,D
COMPUTER ROOM - OUTDOOR			
CU 1N	L1N	74,76	B
FAN			
EF 1N	L1N	90	A

EQUIPMENT CONNECTION GENERAL NOTES:

1. COORDINATE FINAL LOCATIONS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
2. REFER TO MECHANICAL SCHEDULES FOR ADDITIONAL INFORMATION WITHIN SCOPE OF DIVISION 26.
3. COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE FINAL POWER REQUIREMENTS FOR ALL SUBMITTED EQUIPMENT THAT DIFFERS FROM BASIS-OF-DESIGN.

EQUIPMENT CONNECTION SCHEDULE NOTES:

A. DISCONNECTING MEANS (FRACTIONAL HP SWITCH, FUSED DISCONNECT SWITCH, ETC.) AND/OR CONTROLLER (STARTER, VFD, ETC.) IS FACTORY MOUNTED OR PROVIDED BY DIVISION 23.
B. PROVIDE FUSED/NON-FUSED DISCONNECT SWITCH SIZED PER EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND THE NEC. REFER TO ELECTRICAL SYMBOLS LEGEND FOR NAMING DESIGNATIONS.
C. PROVIDE POWER AND CONTROL WIRING FROM ASSOCIATED CONDENSING UNIT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
D. PROVIDE CONNECTION TO FACTORY PROVIDED 120V 20A GFCI RECEPTACLE.



1 ELECTRICAL ROOF PLAN - LSN
3/16" = 1'-0"

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the evolution of gould evans

LSR7 Robotics, GiC & Phys Education

LSN: 901 NE Douglas St., Lee's Summit MO 64086
LSW: 2600 SW Ward Rd, Lee's Summit MO 64082
LSHS: 400 SE Blue Pkwy, Lee's Summit MO 64063

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owner:
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MO. CORPORATE NO: E-556D
EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/16/2022

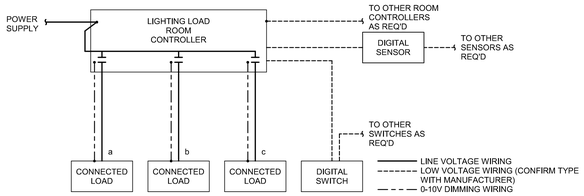
STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

09/15/2022
DOUGLAS M. EVERHART
LICENSE # PE-2019007648

LSN - ELECTRICAL ROOF PLAN

E302-B

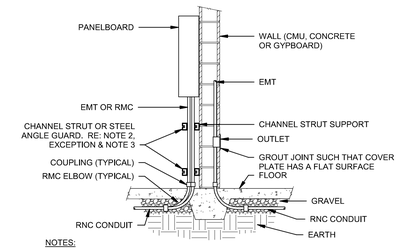
DOUGLAS M. EVERHART



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.

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



NOTES:

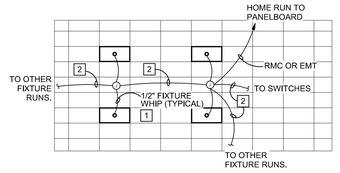
1. CONDUITS TURNED UP INSIDE WALLS MAY BE RNC FROM ABOVE THE SLAB TO RECESSED PANELBOARDS OR OUTLETS. FROM THE OUTLET UP IT SHALL BE EMT.
2. CONDUITS TURNED UP EXPOSED SHALL HAVE AN RMC ELBOW THROUGH THE SLAB. PROTECT THE ENTIRE ELBOW WITH RNC COATING OR MASTIC UP THROUGH THE TOP OF THE SLAB.

   EXCEPTION: IN LIEU OF RMC ELBOW, CONTRACTOR MAY USE RNC ELBOWS IF A CHANNEL STRUT OR STEEL ANGLE GUARD IS PROVIDED. GUARD SHALL STAND OFF THE WALL INDEPENDENT OF THE CONDUIT.
3. IN AREAS WITH VEHICULAR ACCESS, USE GALVANIZED RMC ELBOWS AND A STEEL GUARD.
4. APPLIES TO ALL STUB-UP LOCATIONS UNLESS NOTED OTHERWISE ON PLANS.

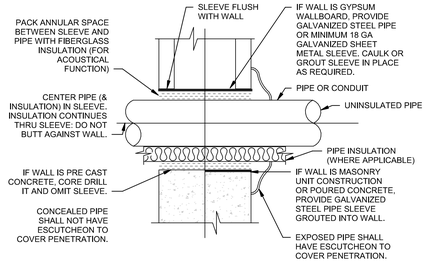
2 CONDUIT STUB-UP AT WALLS
NTS

ELECTRICAL NOTES:

1. PROVIDE SUFFICIENT LENGTH TO MOVE CENTER OF LUMINAIRE IN A 5'-0"
2. RADIUS OF THE LOCATION SHOWN ON THE PLANS. RMC OR EMT (UNLESS TYPE MC CABLE IS ALLOWED BY SPECIFICATIONS. IF MORE THAN 4 CURRENT CARRYING CONDUCTORS INCLUDING NEUTRALS, MC CABLE IS NOT ALLOWED).



5 LIGHTING STANDARD LUMINAIRE WIRING
NTS



REFER TO ARCHITECTURAL DRAWINGS FOR WALL LOCATIONS.
REFER TO SPECIFICATIONS FOR ALTERNATIVE INSTALLATIONS.
COORDINATE REQUIREMENTS WITH GENERAL CONTRACTOR.

1 CONDUIT PENETRATION THRU NON-FIREWALL
NTS

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09/09/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

ELECTRICAL DETAILS

E500

DOUGLAS M. EVERHART

PANELBOARD: H1N (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: MSB

SCHOOL
BUILDING SQUARE FOOTAGE: 7000

FAULT CURRENT: REFER TO ONE-LINE
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: ROBOTICS / GIC
MOUNTING: SURFACE
LOCATION: ELECTRICAL R106

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	LTG - GIC, GIC CANOPY, N	L Z		12	20	1	1808	10641								2
3	LTG - CENTRAL CORE	L Z		12	20	1		1255	10641	3	50	8		C M	RTU-1N	4
5	LTG - ROBOTICS, E CANOPY	L Z		12	20	1			1889 10641							6
7	SPARE				20	1	0	7593								8
9	SPARE				20	1		0	7593	3	35	8		C M	RTU-2N	10
11	SPARE				20	1			0 7593							12
13	SPARE				20	1	0	6000		1	30	10		U	WH-1	14
15	SPARE				20	1		0	0	1	20				SPARE	16
17	SPARE				20	1			0 0	1	20				SPARE	18
19	SPARE				20	1	0	0		1	20				SPARE	20
21	SPARE				20	1		0	0	1	20				SPARE	22
23	SPARE				20	1			0 0	1	20				SPARE	24
25	SPARE				20	1	0	0		1	20				SPARE	26
27	SPARE				20	1		0	0	1	20				SPARE	28
29	SPARE				20	1			0 0	1	20				SPARE	30
31	SPARE				20	1	0	0		1	20				SPARE	32
33	SPARE				20	1		0	0	1	20				SPARE	34
35	SPARE				20	1			0 0	1	20				SPARE	36
37	EQUIPPED SPACE					1	0	33934								38
39	EQUIPPED SPACE					1		0	32582	3	175	OL		R Z M	TX-L1N	40
41	EQUIPPED SPACE					1			0 35339							42
		TOTAL LOAD (VA):					59977 VA		52071 VA		55463 VA					
		TOTAL AMPS:					218 A		188 A		202 A					

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	31510 VA	100%	31510 VA
HEATING (H)	0 VA	0%	0 VA
LIGHTING (L) (PER NEC-220)	21000 VA	125%	26250 VA
RECEPTACLES (R)	25560 VA	70%	17780 VA
MOTORS (M)	60906 VA	100%	60906 VA
SUPPLEMENTAL HEAT (U)	6000 VA	100%	6000 VA
MISC EQUIP (Z)	26084 VA	100%	26084 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	14715 VA	125%	18394 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	185775 VA
TOTAL NEC LOAD	186924 VA
TOTAL CONNECTED CURRENT	223 A
TOTAL NEC DEMAND CURRENT	225 A

PANELBOARD: L1N (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: H1N VIA TX-L1N

FAULT CURRENT: REFER TO ONE-LINE
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: ROBOTICS / GIC
MOUNTING: SURFACE
LOCATION: ELECTRICAL R106

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	RCPT - N ROBOTICS FIELD	R		12	20	1	1260	360		1	20	12		R	PLGMLD 1 - 3D PRINTERS	2
3	RCPT - E ROB FIELD CKT 1	R		12	20	1		540	360	1	20	12		R	PLGMLD 2 - 3D PRINTERS	4
5	RCPT - E ROB FIELD CKT 2	R		12	20	1			540 360	1	20	12		R	PLGMLD 3 - 3D PRINTERS	6
7	RCPT - TWSTLCK ROB FIELD	R		12	20	1	360	360		1	20	12		R	PLGMLD 4 - 3D PRINTERS	8
9	RCPT - ROB FIELD COL 1	R		12	20	1		720	720	1	20	12		R	RCPT - GIC SE WALL	10
11	RCPT - ROB FIELD COL 2	R		12	20	1			720 720	1	20	12		R	RCPT - GIC E WALL	12
13	EAST GARAGE DOOR	M		12	20	1	500	1800		1	20	10	VD	M	RCPT - GIC PANEL SAW	14
15	WEST GARAGE DOOR	M		12	20	1		500	720	1	20	12		R	RCPT - GIC S WALL	16
17	RCPT - ROB CLSRM W WALL	R Z		12	20	1			1080 720	1	20	12		R	RCPT - CAD STATION CKT 3	18
19	RCPT - ROB CLSRM TWSTLCKS	R		12	20	1	720	900		1	20	12		R	RCPT - GIC W WALL	20
21	RCPT - MICROWAVE	Z		12	20	1		1200	720	1	20	12		R	RCPT - GIC CTR COLUMN	22
23	RCPT - ABV CTR 1	Z		12	20	1			1200 540	1	20	12		R	RCPT - GIC NW WALL	24
25	RCPT - ABV CTR 2	Z		12	20	1	1200	720		1	20	12		R	RCPT - GIC NE WALL	26
27	RCPT - FRIDGE	Z		12	20	1		800	540	1	20	12		M	DROP RCPT - HORIZ BANDSAW	28
29	RCPT - GIC TVS	Z		12	20	1			720 720	1	20	12		R	CRD REEL - GIC TABLES 1	30
31	RCPT - CAD STATION CKT 1	R		12	20	1	720	720		1	20	12		R	CRD REEL - GIC TABLES 2	32
33	RCPT - CAD STATION CKT 2	R		12	20	1		1080	720	1	20	12		R	CRD REEL - GIC TABLES 3	34
35	RCPT - W ROB FIELD	R		12	20	1			900 1800	1	20	12	VD	Z	DROP RCPT - GIC MITER SAW	36
37	RCPT - CORR, PLMB, ELEC	R		12	20	1	1080	500		1	20	12		Z	DROP RCPT - GEN ASSEMB COMP	38
39	RCPT - RESTROOMS, EWC	R Z		12	20	1		1200	500	1	20	12		Z	DROP RCPT - CNC COMP	40
41	CRD REEL - GEN ASSEMB 1	Z		12	20	1			1200 540	1	20	12		R	RCPT - ROB S WALL	42
43	CRD REEL - GEN ASSEMB 2	Z		12	20	1	1200	841								44
45	CRD REEL - GEN ASSEMB 3	Z		12	20	1		1200	841	3	20	12		M	DROP RCPT - 3 AXIS CNC	46
47	CRD REEL - GEN ASSEMB TL 1	Z		12	20	1			1200 841							48
49	CRD REEL - GEN ASSEMB TL 2	Z		12	20	1	1200	3038								50
51	CRD REEL - SHOP AREA 1	M		12	20	1		300	3038	3	50	6		M	DROP RCPT - TORQ CUT 22	52
53	CRD REEL - SHOP AREA 3	Z		12	20	1			1452 3038							54
55	CRD REEL - SHOP AREA 4	Z		12	20	1	1200	1383		2	30	10		M	RCPT - BIRMINGHAM LATHE	56
57	CRD REEL - SHOP AREA 5	Z		12	20	1		1200	1383							58
59	RCPT - E EXTERIOR	R		12	20	1			720 1608	1	20	12		Z	CRD REEL - SHOP AREA 2	60
61	RCPT - N EXTERIOR	R		12	20	1	360	1920		1	30	10		M	DROP RCPT - METAL BANDSAW	62
63	RCPT - S EXTERIOR	R		12	20	1		360	1920	1	20	10	VD	M	RCPT - GRIZZLY DRILL PRESS	64
65	RCPT - W EXTERIOR	R		12	20	1			720 1082	2	20	12		M	RCPT - GRIZZLY DUST COLLECTOR	66
67	FIRE RPS	Z		12	20	1	360	1082								68
69	RCPT - TIG WELDER MAIN	M	VD	8	30	2		2496	1500	2	30	10		Z	RCPT - TELECOM RACK (208V)	70
71								2496	1500							72
73	DROP RCPT - CRFTS MITER SAW	M	VD	10	20	1	1800	31		2	20	12		M C	CU-1N/CRU-1N	74
75	RCPT - KARDEX STOR SYST	R		12	20	1		180	31							76
77	RCPT - BIRMINGHAM LATHE CTRLS	R		12	20	1			180 3699							78
79	RCPT - TIG WELDER MISC	R		12	20	1	180	3699		3	60	6		M	GIC AIR COMPRESSOR	80
81	SECURITY PANEL	Z		12	20	1		500	3699							82
83	RCPT - TELECOM N WALL	R		12	20	1			1080 0	1	20				SPARE	84
85	RCPT - TELECOM S, E WALL	R		12	20	1	1080	0		1	20				SPARE	86
87	RCPT - TELECOM RACK	R		12	20	1		360	58							88
89	RCPT - RAP1	Z		12	20	1			964 0	1	20	12		M	EF-1N	90
91							2500	360		1	20	12		R	EXT RCPT - ROOFTOP	92
93	OPEN TABLE CNC	M		10	30	3		2500	696	1	20	12		M	TF-1N	94
95									2500 500	1	20	12		Z	BAS PANEL	96
97	SPARE				20	1	0	500		1	20	12		Z	N DOOR ACTUATOR	98
99	EQUIPPED SPACE					1		0	0	1					EQUIPPED SPACE	100
101	EQUIPPED SPACE					1			0 0	1					EQUIPPED SPACE	102
103	EQUIPPED SPACE					1	0	0		1					EQUIPPED SPACE	104
105	EQUIPPED SPACE					1		0	0	1					EQUIPPED SPACE	106
107	EQUIPPED SPACE					1			0 0	1					EQUIPPED SPACE	108
		TOTAL LOAD (VA):					33934 VA		32582 VA		35339 VA					
		TOTAL AMPS:					285 A		272 A		296 A					

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	2080 VA	100%	2080 VA
HEATING (H)	0 VA	0%	0 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	25560 VA	70%	17780 VA
MOTORS (M)	39251 VA	100%	39251 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	26044 VA	100%	26044 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	11096 VA	125%	13870 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	104031 VA
TOTAL NEC LOAD	99025 VA
TOTAL CONNECTED CURRENT	289 A
TOTAL NEC DEMAND CURRENT	275 A

PANELBOARD LEGEND

ABBREVIATIONS V1.01

AF	ARC FAULT CIRCUIT INTERRUPTER.
C#	CIRCUIT VIA CONTACTOR #.
CL	CIRCUIT VIA CURRENT LIMITING DEVICE.
D	DISCONNECT CIRCUITRY FOR REMOVED LOAD, UPDATE CIRCUIT DIRECTORY TO SPARE AND TURN OFF.
EM	EMERGENCY LIGHTING HANDLE-ON CLAMP.
EX	EXISTING.
F	FUTURE LOAD; NOTE AS SPARE AND TURN OFF.
FA	RED/HANDLE-ON CLAMP.
GF	GROUND-FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKER (5 mA).
GFEP	GROUND FAULT EQUIPMENT PROTECTION BREAKER (30 mA).
HT	PROVIDE HANDLE-TIE FOR MULTI-WIRE BRANCH CIRCUIT PER CODE.
IG	ISOLATED GROUND CIRCUIT.
L#	LIGHTING CONTROL SCHEME NUMBER.
LCK	HANDLE PADLOCKABLE-OFF DEVICE.
LO	HANDLE-ON CLAMP.
N	PROVIDE NEW CIRCUIT BREAKER.
OL	REFER TO ELECTRICAL ONE-LINE/RISER DIAGRAM.
PS	POWER-SWITCHING CIRCUIT BREAKER.
PSE	EMERGENCY POWER-SWITCHING CIRCUIT BREAKER.
R	REUSE EXISTING CIRCUIT BREAKER FOR NEW/REVISED LOAD.
RP	CIRCUIT VIA RELAY PANEL.
ST	SHUNT TRIP CIRCUIT BREAKER.
V	CIRCUITS RECONNECTED FROM DEMOLISHED PANEL. VERIFY EXISTING LOAD AND UPDATE DIRECTORY, IF UNUSED, NOTE AS SPARE AND TURN OFF.
VD	BRANCH CIRCUITRY HAS BEEN UPSIZED TO REDUCE VOLTAGE DROP. ADJUST GROUND WIRE SIZE PER CODE. PROVIDE LUG ADAPTORS IF REQUIRED.
Z	CORRECT/REPAIR EXISTING HAZARD TO MAKE CODE COMPLIANT INSTALLATION.

NOT ALL ABBREVIATIONS ARE USED.

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LSN - PANELBOARD SCHEDULES

E600-B

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES / MODEL	APPROVED ALTERNATES	SOURCE TYPE	SOURCE CRI	SOURCE CCT	SOURCE LUMENS	DIMMING TYPE	VOLTAGE	INPUT WATTS	INPUT VA	DESCRIPTION
D 1	H.E. WILLIAMS	4DR SERIES 4DR-TL-L10/935-DIM-UNV-OW-OF-CS-TD-N-F1	PORTFOLIO LD4C SERIES LITHONIA LDN4 SERIES INTENSE GRAVITY SERIES PRESCOLITE LTR-4RD SERIES	LED	90	3500K	1000 LM	0-10V	277	9	10	NOMINAL 4" DIAMETER DOWNLIGHT WITH WIDE DISTRIBUTION OPTICS. CLEAR SEMI-SPECULAR ANODIZED REFLECTOR FINISH. DIFFUSE POLYCARBONATE LENS MEDIA AT TOP OF OPEN REFLECTOR.
F1	COLUMBIA	MPS SERIES MPS4-35LW-FW-ED-U-PAF CM48SCF3-KIT	HE WILLIAMS 75 SERIES LITHONIA ZL1N SERIES UTOPIA SS LED SERIES DAY-BRITE FLUXTREAM EZ SERIES	LED	80	3500K	4000 LM	0-10V	277	27	30	NOMINAL 4' LINEAR STRIP WITH A FLAT, FROSTED ACRYLIC LENS AND WIDE DISTRIBUTION. WHITE FINISH PAINTED AFTER FABRICATION. 48" ADJUSTABLE AIRCRAFT CABLE FOR SUSPENSION.
F1E	COLUMBIA	MPS SERIES MPS4-35LW-FW-ED-U-ELL14-PAF CM48SCF3-KIT	REFER TO TYPE F1	LED	80	3500K	4000 LM	0-10V	277	27	30	SIMILAR TO TYPE F1 EXCEPT WITH 10W EMERGENCY BATTERY BACKUP.
L1A.8	H.E. WILLIAMS	MX4 SERIES MX4D-8-L15/935-P-DIM-UNV-MOD MX4 END PLATE WITH 1.3125" DIAMETER HOLE	AXIS BEAM SERIES LUMENWERX VIA 4 SERIES ALW LIGHTPLANE SERIES METALUMEN RAIL SERIES PINNACLE EDGE SERIES LITECONTROL MOD SERIES	LED	90	3500K	1500 LM/FT	0-10V	277	112	123	NOMINAL 4" W X 4" H X 8' LONG FULLY EXTRUDED LINEAR WITH DIRECT OPTICS. PROUD, DIFFUSE ACRYLIC LENS WITH 5/16" DROP. PROVIDE WITH CUSTOM CONFIGURATION FOR CONDUIT END FEED. SURFACE MOUNTED TO UNDERSIDE OF STRUCTURE. BLACK FINISH.
L1AE.8	H.E. WILLIAMS	MX4 SERIES MX4D-8-L15/935-P-EM/7W-DIM-UNV-MOD MX4 END PLATE WITH 1.3125" DIAMETER HOLE	REFER TO TYPE L1A.8	LED	90	3500K	1500 LM/FT	0-10V	277	112	123	SIMILAR TO TYPE L1A.8 EXCEPT WITH 7W EMERGENCY BATTERY BACKUP.
L1B.8	H.E. WILLIAMS	MX4 SERIES MX4D-8-L12/935-P-DIM-UNV-MOD MX4 END PLATE WITH 1.3125" DIAMETER HOLE	REFER TO TYPE L1A.8	LED	90	3500K	1200 LM/FT	0-10V	277	88	97	SIMILAR TO TYPE L1A.8 EXCEPT WITH LOWER LUMEN PACKAGE.
L1BE.8	H.E. WILLIAMS	MX4 SERIES MX4D-8-L12/935-P-EM/7W-DIM-UNV-MOD MX4 END PLATE WITH 1.3125" DIAMETER HOLE	REFER TO TYPE L1A.8	LED	90	3500K	1200 LM/FT	0-10V	277	88	97	SIMILAR TO TYPE L1B.8 EXCEPT WITH 7W EMERGENCY BATTERY BACKUP.
L2	AXIS	BEAM 2 SERIES BRLED-400-90-35-SO-SL-BLK-UNV-DP-1-DF-C 12' X 15' CONTINUOUSLY ILLUMINATED RECTANGLE	FINELITE HP-2 SERIES LUX EOS SERIES LUMENWERX VIA 2 SERIES FOCAL POINT SEEM 2 SERIES ALW LIGHTPLANE SERIES PINNACLE EDGE SERIES	LED	90	3500K	400 LM/FT	0-10V	277	<varies>	<varies>	NOMINAL 2-3/8" W X 3-5/8" DEEP RECESSED LINEAR WITH FULLY ILLUMINATED CORNERS TO CREATE 12' X 15' RECTANGLE. SPOTLESS DIFFUSED LENS WITH DRYWALL FLANGELESS MOUNTING SUITABLE FOR PLYWOOD CEILINGS. BLACK FINISH. MANUFACTURER TO SUBMIT SHOP DRAWINGS DOCUMENTING CUSTOM CONFIGURATION FOR APPLICATION.
L3.6	FINELITE	HP-2 SERIES HP-2-R-6-S-835-DAO-L-96LG-277-SC-FC-10%-VF-FE-FB	LUMENWERX VIA 2 SERIES LUX EOS SERIES FOCAL POINT SEEM 2 SERIES ALW LIGHTPLANE SERIES PINNACLE EDGE SERIES LITECONTROL MOD 2 SERIES AXIS BEAM SERIES	LED	80	3500K	336 LM/FT	0-10V	277	53	59	NOMINAL 2-1/4" W X 4" TALL X 6' LONG RECESSED LINEAR WITH "LEFT" ASYMMETRIC OPTICS. DIRECT DISTRIBUTION WITH LOW GLOSS WHITE REFLECTOR. VISIBLE FLANGE FOR HARD CEILING APPLICATIONS. BLACK FINISH.
L3.10	FINELITE	HP-2 SERIES HP-2-R-10-S-835-DAO-L-96LG-277-SC-FC-10%-VF-FE-SW	REFER TO TYPE L3.6	LED	80	3500K	336 LM/FT	0-10V	277	89	98	SIMILAR TO TYPE L3.6 EXCEPT 10' IN LENGTH AND WITH WHITE FINISH.
L3.16	FINELITE	HP-2 SERIES HP-2-R-16-S-835-DAO-R-96LG-277-SC-FC-10%-VF-FE-SW	REFER TO TYPE L3.6	LED	80	3500K	336 LM/FT	0-10V	277	143	147	SIMILAR TO TYPE L3.10 EXCEPT WITH "RIGHT" ASYMMETRIC OPTICS AND 16' IN LENGTH.
PL1.16E	AXIS	BEAM 2 SERIES TB2DLED-500-80-35-ASO-S(16)-BLK-UNV-DP-1-CTS(48)-B	LUMENWERX VIA 2 SERIES LUX EOS SERIES FOCAL POINT SEEM 2 SERIES ALW LIGHTPLANE SERIES PINNACLE EDGE SERIES	LED	80	3500K	500 LM/FT	0-10V	277	80	88	NOMINAL 2-1/2" W X 3-7/8" H X 16' LONG FULLY EXTRUDED LINEAR WITH ASYMMETRIC SHIELDING. SCREW SLOT=48" CABLE LENGTH FOR OPEN TO STRUCTURE PENDANT APPLICATIONS. (2) INTEGRAL 5' BATTERY PACKS FOR EMERGENCY OPERATION. BLACK FINISH.
PL1.24E	AXIS	BEAM 2 SERIES TB2DLED-500-80-35-ASO-S(24)-BLK-UNV-DP-1-CTS(48)-B	REFER TO TYPE PL1.16E	LED	80	3500K	500 LM/FT	0-10V	277	120	132	SIMILAR TO PL1.16E EXCEPT 24' IN LENGTH AND WITH (3) INTEGRAL 5' BATTERY PACKS FOR EMERGENCY OPERATION.
SL1.2	STARTEK	BEAM DIRECT SERIES BEAMD-2-500-SD-40K-80-PB-MOD SIDE CONDUIT FEED FOR SURFACE MOUNTING	AXIS BEAM WET SERIES LUMENWERX VIA SEAL SERIES LUX EOS WET SERIES	LED	80	4000K	500 LM/FT	0-10V	277	16	18	NOMINAL 3.5" W X 3.5" TALL X 2' LONG FULLY EXTRUDED LINEAR RATED FOR DAMP LOCATIONS. SATIN ICE DIFFUSE DISTRIBUTION WITH POWDER COAT BLACK FINISH. MANUFACTURER TO CONFIRM CONDUIT END FEED FOR SURFACE MOUNTED APPLICATIONS.
SL1.8	STARTEK	BEAM DIRECT SERIES BEAMD-8-500-SD-40K-80-PB-MOD SIDE CONDUIT FEED FOR SURFACE MOUNTING	REFER TO TYPE SL1.2	LED	80	4000K	500 LM/FT	0-10V	277	64	71	SIMILAR TO TYPE SL1.2 EXCEPT 8' IN LENGTH.
SL1E.5	STARTEK	BEAM DIRECT SERIES BEAMD-5-500-SD-40K-80-PB-MOD SIDE CONDUIT FEED FOR SURFACE MOUNTING	REFER TO TYPE SL1.2	LED	80	4000K	500 LM/FT	0-10V	277	40	44	SIMILAR TO TYPE SL1.2 EXCEPT 5' IN LENGTH AND CONNECTED TO EXTERNAL EMERGENCY BATTERY PACK FOR EMERGENCY APPLICATIONS.
SL2.3,6	LUMENWERX	VIA 3 SEAL SERIES V3SEALS-D-WETL-EPDO-SW-80-5000-35-3FT6IN-UNV-D1-1 C-NA-GSM-CF(BLACK)-EF-NA	-	LED	80	3500K	354 LM/FT	0-10V 10%	277	112	114	NOMINAL 3" W X 4-1/4" TALL X 3'-6" LONG FULLY EXTRUDED GASKETED LINEAR SUITABLE FOR WET LOCATIONS (IP54). DIRECT OPTICS WITH STATIC WHITE LIGHT SOURCE. CUSTOM MATTE BLACK FINISH. MANUFACTURER TO CONFIRM RAL WITH ARCHITECT PRIOR TO ORDER. END POWER FEED. CONNECTED TO EXTERNAL EMERGENCY BATTERY PACK FOR EMERGENCY APPLICATIONS.
X1	SURE-LITES	EUX SERIES EUX7RSD	LITHONIA COLUMBIA SIGNIFY	LED	N/A	N/A	N/A	N/A	277	5	5	UNIVERSALLY MOUNTED EDGE-LIT EXIT SIGN. RED LETTERING. SELF DIAGNOSTICS.

LIGHT FIXTURE SCHEDULE GENERAL NOTES:

1. ALL LIGHT FIXTURES AND RELATED COMPONENTS SHALL BE PROVIDED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE.
2. THE PARTY SUPPLYING THE LIGHT FIXTURES IS RESPONSIBLE FOR SUPPLYING THE PROPER QUANTITY OF LIGHT FIXTURES.

LIGHT FIXTURE SCHEDULE SUPPLEMENTAL SPECIFICATIONS:

1. PACKAGING OF LIGHT FIXTURES WILL NOT BE CONSIDERED OR APPROVED. REPRESENTATIVE AGENTS SHALL BE ALLOWED TO OFFER MINI-LOT PRICING (MLP) FOR LIGHT FIXTURES AS ALLOWED IN ELECTRICAL SPECIFICATIONS.
2. LIGHTING CONTROLS PRICING, INCLUDING BUT NOT LIMITED TO THOSE REFERENCED IN ELECTRICAL SPECIFICATIONS, SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING. ANY LIGHTING CONTROLS PRICING THAT IS SUBMITTED WITH LIGHT FIXTURE PRICING (UNIT OR MINI-LOT) WILL BE IMMEDIATELY REJECTED IN ITS ENTIRETY.
3. CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND CATALOG NUMBERS ONLY. FIRST READ THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS IN CONJUNCTION WITH THE CATALOG NUMBER TO DETERMINE THE MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.
4. COORDINATE LIGHT FIXTURE MOUNTING HARDWARE AND TRIMS NEEDED TO SUIT CEILING CONDITIONS. LIGHT FIXTURES NEAR OR IN CONTACT WITH INSULATION SHALL COMPLY WITH CODE. MAINTAIN 3" MINIMUM WORKING CLEARANCE BETWEEN NON-IC RATED LIGHT FIXTURE HOUSINGS AND INSULATION ON ALL ADJACENT DUCTWORK, PIPING, WALLS, AND CEILINGS.

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 CRESTRON, 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	

STAND-ALONE LOW-VOLTAGE PHOTOELECTRIC SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
PS	LEGRAND EM-24D2	ACUITY HUBBELL LEVITON	EXTERIOR LOW-VOLTAGE PHOTOELECTRIC SWITCH. FACE SENSOR NORTH AND ORIENT VERTICALLY. 0-15 FC.	24	

STAND-ALONE LOW-VOLTAGE POWER PACKS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
P1	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	

NETWORK LIGHTING CONTROL SYSTEMS

NETWORK OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
2	LEGRAND LMPC-100-5	ACUITY, CRESTRON ETC	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. 360 DEGREE COVERAGE. DIGITAL. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP. UP TO 40' MOUNTING HEIGHT.	MAJOR 70' Ø MINOR 40' Ø	24	
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	
	LEGRAND LMDX-100	ACUITY, ETC HUBBELL	CEILING/WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 90 DEGREE COVERAGE. DIGITAL. (1) RJ45 PORT. IR TRANSCEIVER FOR WIRELESS SETUP.	PIR MAJOR 40' Ø PIR MINOR 15' Ø ULT MAJOR 28' Ø	24	

NETWORK ROOM CONTROLLERS (POWER PACK)

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
RN1	LEGRAND LMRC-101 (NON-DIM)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT. MANUAL- AND AUTO-ON MODES.	120/ 277	
RD1	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	
RD2	LEGRAND LMRC-212 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (2) 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
$ LVD	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: 4.06

LIGHTING CONTROL SEQUENCE OF OPERATIONS

A. GENERAL REQUIREMENTS
1. Emergency Lighting: Emergency egress lighting is powered from emergency battery drivers integral to fixtures designated as emergency. Upon loss of power, all lights designated as emergency shall turn on at full emergency battery back-up output.
2. Lighting Control Zones: Lighting control zones, where applicable, are noted by lowercase lettering adjacent to light fixtures and switches on drawings.

B. EXTERIOR
1. Photocell Control: Fixtures shall automatically turn off when adequate daylight levels are present and shall activate if low light levels are detected (heavy cloud cover, etc.) via input from rooftop photocell(s). Refer to drawings for fixture(s) connected to rooftop photocell.

C. EXTERIOR WORK AREAS
1. Manual Control: Occupant can manually control lights via line-voltage on/off toggle switch.
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: Occupant must manually turn off lights.

D. GIC/ROBOTICS
1. Manual Control: Occupant can manually control lights via digital low-voltage switch(es) with dimming capabilities.
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: After 20 minutes, all controlled loads shall turn off.

E. CORRIDOR
1. Manual Control: Occupant can manually control lights via digital low-voltage switch(es).
2. Occupancy: Controlled loads shall automatically increase to 100% power upon detection of occupancy.
3. Vacancy: After 20 minutes, all controlled loads shall reduce to 50%.

F. PLUMBING, STORAGE
1. Manual Control: Occupant can manually control lights via line-voltage vacancy-sensing wall switch(es).
2. Occupancy: Lights shall automatically turn on upon detection of occupancy.
3. Vacancy: After 20 minutes, all controlled loads shall turn off.

G. PUBLIC RESTROOM
1. Manual Control: Occupant can manually control lights via digital keyed switch(es).
2. Occupancy: Lights shall automatically turn on upon detection of occupancy.
3. Vacancy: After 20 minutes, all controlled loads shall turn off.

H. ELECTRICAL
1. Manual Control: Occupant can manually control lights via line-voltage on/off toggle switch.
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: Occupant must manually turn off lights.

I. IT
1. Manual Control: Occupant can manually control lights via digital low-voltage switch(es).
2. Occupancy: Occupant must manually turn on lights.
3. Vacancy: After 20 minutes, all controlled loads shall turn off.

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Revisions

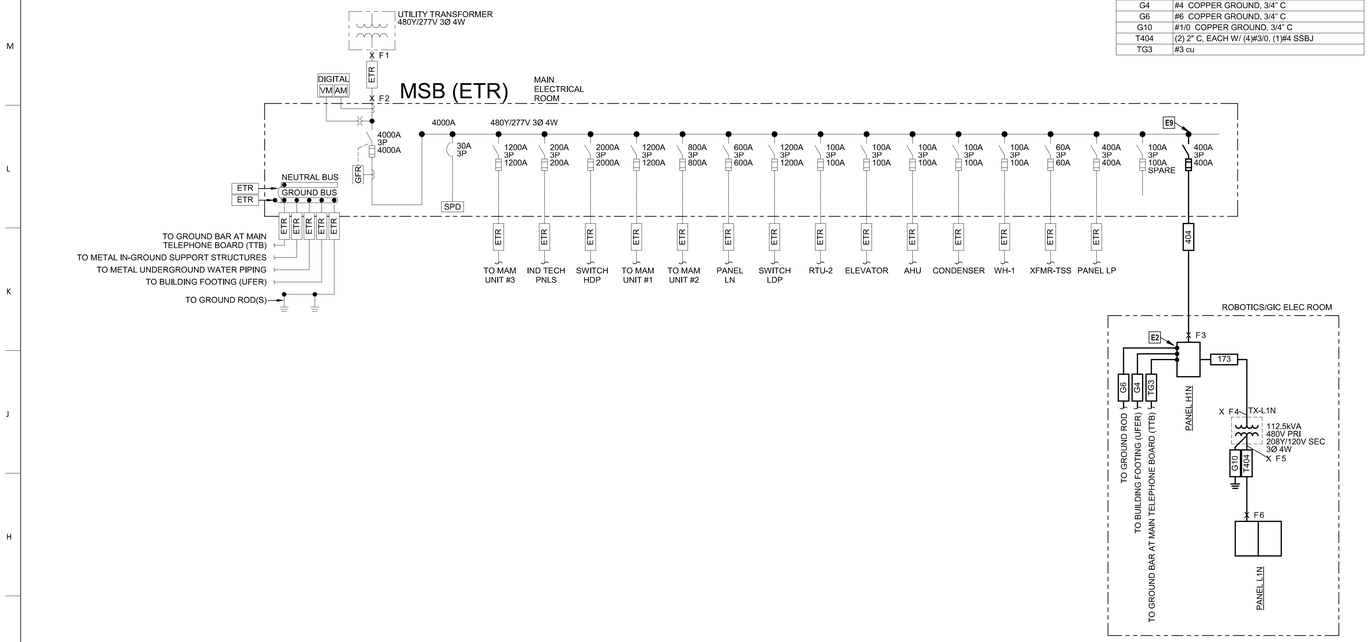
NUMBER	DESCRIPTION	DATE
1	Addendum 01	09/16/2022
2	Addendum 02	09/23/2022
3	ASI01	11/10/2022

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
11/10/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

LIGHTING SCHEDULES
E700

DOUGLAS M. EVERHART



3 ELECTRICAL PARTIAL ONE-LINE DIAGRAM - LSN
NTS

FEEDER SCHEDULE:

SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNO. ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS, UNO. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC. ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

FEEDER TAG	FEEDER DESCRIPTION
173	(3)#2/0, (1)#6 G, 1-1/2" C
404	(2) 2" C, EACH W/ (4)#3/0, (1)#3 G
G4	#4 COPPER GROUND, 3/4" C
G6	#6 COPPER GROUND, 3/4" C
G10	#1/0 COPPER GROUND, 3/4" C
T404	(2) 2" C, EACH W/ (4)#3/0, (1)#4 SSBJ
TG3	#3 cu

☐ ELECTRICAL PLAN NOTES:

E2 PROVIDE GROUNDING ELECTRODE CONDUCTOR(S) AS REQUIRED BY NEC 250.32. DO NOT BOND GROUND AND NEUTRAL BAR TOGETHER.

E9 MAIN SERVICE ENTRANCE LOCATION IS ON MEZZANINE LEVEL ABOVE. EQUIPMENT IS ETR.

LOAD SUMMARY: MSB

PANEL DESCRIPTION:
480Y/277 V

LOAD TYPE	CONNECTED LOAD KVA	DEMAND FACTOR	NEC DEMAND KVA
EXISTING PEAK UTILITY (@ 0.9 pf)	1666.67	125%	2083.33
COOLING (C)	31.51	100%	31.51
HEATING (H)	0.00	0%	0.00
LIGHTING (L)	4.88	125%	6.10
RECEPTACLES (R)	25.74	69%	17.87
MOTORS (M)	56.80	100%	56.80
SUPPLEMENTAL HEAT (U)	6.00	100%	6.00
MISC EQUIP (Z)	25.60	100%	25.60
REFRIGERATION (F)	0.00	100%	0.00
SIGNAGE (S)	0.00	125%	0.00
KITCHEN (K)	0.00	100%	0.00
LARGEST MOTOR	14.72	125%	18.39
SHOW WINDOW (W)	0.00	125%	0.00
TRACK LIGHTING	0.00	100%	0.00
EXISTING LOAD TO BE DELETED	0.00	100%	0.00
ELEVATOR (V)	0.00	100%	0.00
TOTAL LOAD	1831.92	KVA	2245.61
TOTAL AMPACITY	2203.47	AMPS	2701.07
PANEL AMPACITY		AMPS	4000.00
SPARE CAPACITY		AMPS	1298.93
*PER UTILITY COMPANY BILLING PEAK DEMAND OF:		1500.00 KW	01/2021

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 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 75 DEG C RATED TERMINATIONS, UNLESS NOTED OTHERWISE. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
4. INSTALL FEEDERS OVERHEAD AS HIGH AS PRACTICABLE AND ORTHOGONALLY ALONG BUILDING STRUCTURE, UNLESS NOTED OTHERWISE. COORDINATE FINAL ROUTING WITH OTHER TRADES.
5. 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: PHILLIP INGRAM
PHONE: 816-347-4339
EMAIL: PHILLIP.INGRAM@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 51,742A IS BASED ON AN INFINITE BUS CALCULATION AT THE UTILITY TRANSFORMER. CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE FAULT CURRENT VALUE WITH UTILITY PRIOR TO BEGINNING CONSTRUCTION. NOTIFY ENGINEER IF ACTUAL VALUE EXCEEDS ESTIMATED CALCULATED VALUE. ESTIMATED DESIGN VALUE IS BASED ON THE FOLLOWING:

UTILITY TRANSFORMER SECONDARY VOLTAGE: 480V
UTILITY TRANSFORMER SIZE: 2000 KVA, 3PH 4W

OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY GENERAL NOTE:

CONTRACTOR SHALL PROVIDE AN OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY TO DETERMINE THE CORRECT SETTINGS FOR THE ADJUSTABLE TRIP CIRCUIT BREAKERS TO DOCUMENT ARC-FLASH HAZARDS. 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 GENERAL NOTES:

1. COORDINATE WORK WITH ARCHITECTURAL PHASING DRAWINGS TO PROPERLY STAGE TRANSITION TO PROVIDE POWER TO EXISTING, NEW AND TEMPORARY LOADS. MONITOR LOADS ON DISTRIBUTION SYSTEM TO MAKE SURE SHIFTING OF LOADS DOES NOT OVERLOAD ELECTRICAL EQUIPMENT.
2. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE EXISTING AIC/SCCR RATING OF EACH PANELBOARD/SWITCHBOARD. ALL NEW AND EXISTING OVER-CURRENT PROTECTION DEVICES (CIRCUIT BREAKERS AND FUSES) MUST HAVE AN AIC/SCCR RATING EXCEEDING THE AVAILABLE FAULT CURRENT AT THAT POINT IN THE SYSTEM. NOTIFY THE OWNER AND THE ENGINEER IF THE EXISTING EQUIPMENT DOES NOT COMPLY WITH THIS REQUIREMENT.
3. VERIFY THE INTEGRITY OF THE EXISTING GROUNDING ELECTRODE SYSTEM AND THAT THE NEUTRAL AND GROUND ARE PROPERLY BONDED TOGETHER AT THE POINT OF SERVICE ENTRANCE. NOTIFY THE LANDLORD, OWNER AND THE ENGINEER OF ANY EXISTING DEFICIENCIES.

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 2.12

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

XFMR: f (3Ø) = IP(sca)x Vp x 1.73 x %Z / 100,000 x KVA

IS(sca)= Vp x M x IP(sca) / Vs

Feeder: f (1Ø)= 2 x L x Isc / C x E

XFMR: f (1Ø)= IP(sca)x Vp x %Z / 100,000 x KVA

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

E = Line to line volts
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

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

Feeder Types: NM - Non Magnetic Conduit, M - Magnetic Conduit, FB - Feeder Busway, PB - Plug-in Busway, TX - Transformer

System Voltage: 480Y/277V - 3 phase

Date of Calculations: 08/29/2022

Fault Point (F#)	Bus/Feeder Description	Source (Fault Point)	Phase	Source Isc (amps)	Feeder: Conduit Type/ TX	Feeder: Material	Feeder: 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)	Conductor: Reactance (X)	Conductor: 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			51,742	at the secondary of the utility transformer																		Source Isc = 6X Motor Contribution =			61,342			1
	Motor Contribution			1,600	The connected full load motor amps (includes compressors) on the system																								
2	MSB (LSN)	1	3	61,342	NM	CU	12 Set(s) of 400 kcmil	24297	--	480	50	0.9	2,631	0.000033	0.000040	0.451027								0.038	0.96	59,099	-0.19%	-0.19%	2
3	H1N	2	3	59,099	M	CU	2 Set(s) of 3/0 AWG	12844	--	480	305	0.9	230	0.000079	0.000052	0.451027								2.532	0.28	16,732	-1.19%	-1.37%	3
4	TO TX-L1N	3	3	16,732	M	CU	1 Set(s) of 2/0 AWG	10755	--	480	10	0.9	230	0.000100	0.000054	0.451027								0.056	0.95	15,843	-0.09%	-1.47%	4
5	TX-L1N	4	3	15,843	TX					480							DOE	150	112.5	4.37		208		5.116	0.16	5,978		-1.47%	5
6	L1N	5	3	5,978	M	CU	2 Set(s) of 3/0 AWG	12844	--	208	10	0.9	300	0.000079	0.000052	0.451027								0.019	0.98	5,864	-0.12%	-1.58%	6
7	RTU-1N	3	3	16,732	M	CU	1 Set(s) of 8 AWG	1557	--	480	75	0.85	38	0.000780	0.000065	0.554811								2.908	0.26	4,281	-0.72%	-2.09%	7
8	RTU-2N	3	3	16,732	M	CU	1 Set(s) of 8 AWG	1557	--	480	50	0.85	28	0.000780	0.000065	0.554811								1.939	0.34	5,693	-0.35%	-1.73%	8

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EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
09/09/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

LSN - ELECTRICAL ONE-LINE DIAGRAM AND CALCULATIONS

E800-B

DOUGLAS M. EVERHART

FIRE ALARM SCOPE NOTES:

1. FIRE ALARM SCOPE AT LSN AND LSW BOTH INCLUDES THE MODIFICATION OF THE EXISTING FIRE ALARM SYSTEM. PROVIDE NEW EMERGENCY VOICE ALARM NOTIFICATION IN THE NEW LSSD ROBOTICS FACILITY IN ACCORDANCE WITH NFPA 72 AND ANY LOCAL LAWS.

FIRE ALARM 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. WHERE EXISTING SYSTEMS ARE PRESENT, CONTRACTOR SHALL MODIFY, RELOCATE AND/OR PROVIDE ADDITIONAL EQUIPMENT AS REQUIRED FOR SCOPE OF WORK AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. COORDINATE WITH WALLS, CEILINGS, LIGHTS, DIFFUSERS, STRUCTURE, OBSTRUCTIONS, ETC. IN AREAS AFFECTED BY SCOPE OF WORK. NEW EQUIPMENT SHALL BE COMPATIBLE WITH EXISTING SYSTEMS. CONTRACTOR SHALL REMOVE ALL ABANDONED EQUIPMENT. COORDINATE SYSTEM MODIFICATIONS TO MINIMIZE SYSTEM IMPAIRMENT, AND PROVIDE FIRE WATCH AND/OR INTERIM FIRE PROTECTION MEASURES WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION, INSURANCE CARRIER OR OWNER.
8. 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.
9. FORWARD COMPLETED CERTIFICATE OF COMPLETION AND CONTRACTOR MATERIAL TEST CERTIFICATES TO THE OWNER.
10. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

FIRE ALARM GENERAL DEMOLITION NOTES:

1. COORDINATE ALL DEMOLITION WITH WHAT IS SHOWN ON ARCHITECTURAL PLANS. NOTIFY ARCHITECT OF ANY DISCREPANCIES.
2. COORDINATE NEW WORK AND DEMOLITION WITH OTHER DISCIPLINES AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
3. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER OR OWNER, AS DEFINED IN BID DOCUMENTS, OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID. ADDITIONAL COMPENSATION WILL NOT BE PAID FOR LACK OF SUCH DETERMINATION, FAMILIARIZATION, AND/OR ALLOWANCE.
4. EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS AND SITE VISITS AND MAY NOT REFLECT EXACT "AS-BUILT" CONDITIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING FINAL BIDS. COORDINATE NEW WORK AND DEMOLITION WITH OTHER DISCIPLINES AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
5. OWNER RETAINS RIGHTS OF SALVAGE FOR EQUIPMENT AND FIXTURES TO BE REMOVED. COORDINATE WITH THE OWNER THE EQUIPMENT AND FIXTURES TO BE SALVAGED AND THE LOCATION FOR STORAGE. AVOID DAMAGE TO EQUIPMENT DURING DEMOLITION WORK AND DURING TRANSPORT TO OWNER'S DESIGNATED STORAGE LOCATION. PROPERLY DISPOSE OF MATERIALS THAT ARE REMOVED AND ARE NOT REQUESTED TO BE SALVAGED BY THE OWNER.
6. EQUIPMENT TO BE REMOVED SHALL BE KEPT FOR REINSTALLATION DURING THE CONSTRUCTION PHASE WHEN POSSIBLE AND/OR INDICATED ON THE DRAWINGS. AVOID DAMAGING EXISTING SURFACES AND EQUIPMENT TO REMAIN FOR NEW INSTALLATION. REPAIR ANY DAMAGE CAUSED DURING WORK AT NO EXTRA COST TO THE OWNER.
7. SEAL PENETRATIONS THROUGH FLOORS, WALLS, CEILINGS AND ROOFS WHERE COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR THE NEW INSTALLATION. REPAIR DAMAGED SURFACES TO MATCH ADJACENT AREAS OR AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
8. PERFORM ALL WORK ACCORDING TO THE PHASING SCHEDULE FOR THIS PROJECT. PROVIDE ALL TEMPORARY DESIGN AND/OR CONFIGURATIONS THAT MEET APPLICABLE CODE REQUIREMENTS AS NECESSARY TO CONFORM TO THE REQUIRED CONSTRUCTION PHASING OF THE PROJECT.
9. ONLY THE PORTIONS OF THE BUILDING AFFECTED BY THE SCOPE OF THE PROJECT HAVE BEEN SHOWN. INFORMATION SHOWN AS EXISTING TO REMAIN IS NOT BEING MODIFIED AS A PART OF THIS PROJECT.
10. ALL WORK SHALL BE PERFORMED SO AS TO NOT INTERRUPT SERVICE. THE CONTRACTOR SHALL PROPERLY NOTIFY THE BUILDING OWNER, LANDLORD, THE LEASER AND ADJACENT TENANTS AS APPLICABLE A MINIMUM OF 48 HOURS IN ADVANCE BEFORE PROCEEDING WITH THIS WORK.
11. REMOVE ALL UNUSED AND DEMOLISHED EQUIPMENT AND ASSOCIATED MATERIALS FROM SITE. ABANDONING UNUSED PORTIONS WILL NOT BE ACCEPTABLE.
12. SYSTEM(S) NOT ASSOCIATED WITH THE DEMOLITION SHALL BE LEFT IN SERVICE AS APPLICABLE.
13. INSPECT EXISTING EQUIPMENT TO REMAIN TO VERIFY THAT EQUIPMENT IS OPERATING PROPERLY. NOTIFY OWNER OF DAMAGED AND/OR MALFUNCTIONING COMPONENTS.
14. ALL SYSTEMS TO BE LEFT IN SERVICE PRIOR TO THE END OF EACH WORKDAY.

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
JB/J-BOX	JUNCTION BOX	UNO	UNLESS NOTES OTHERWISE
MAX	MAXIMUM	V	VOLT(S)
MIN	MINIMUM	W	WATTS
N/A	NOT APPLICABLE	WP	WEATHERPROOF

ANNOTATION

- 1 — FIRE PROTECTION PLAN NOTE CALLOUT
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / F1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 / F1 — SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

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.

CALL OUTS

ENLARGED PLAN CALLOUT

NOT IN SCOPE

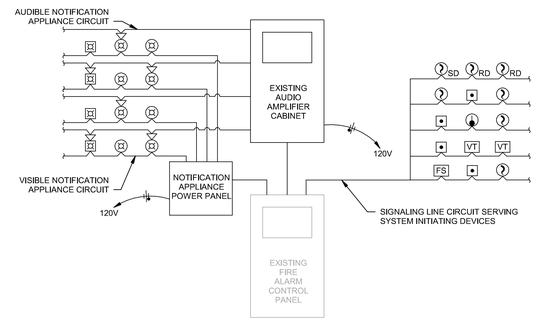
LINETYPE LEGEND

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

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 #W — WALL MOUNTED AUDIBLE NOTIFICATION APPLIANCE #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- # — WALL MOUNTED VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA
- #W # — 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
- #W # — CEILING MOUNTED AUDIBLE/VISIBLE NOTIFICATION APPLIANCE ## INDICATES CANDELA #W INDICATES WATTAGE (VOICE EVACUATION SYSTEMS ONLY)
- END OF LINE RESISTOR
- ABORT SWITCH
- BELL



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 (VOICE)
NTS

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Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE

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NUMBER PE-2013037646
PROFESSIONAL ENGINEER

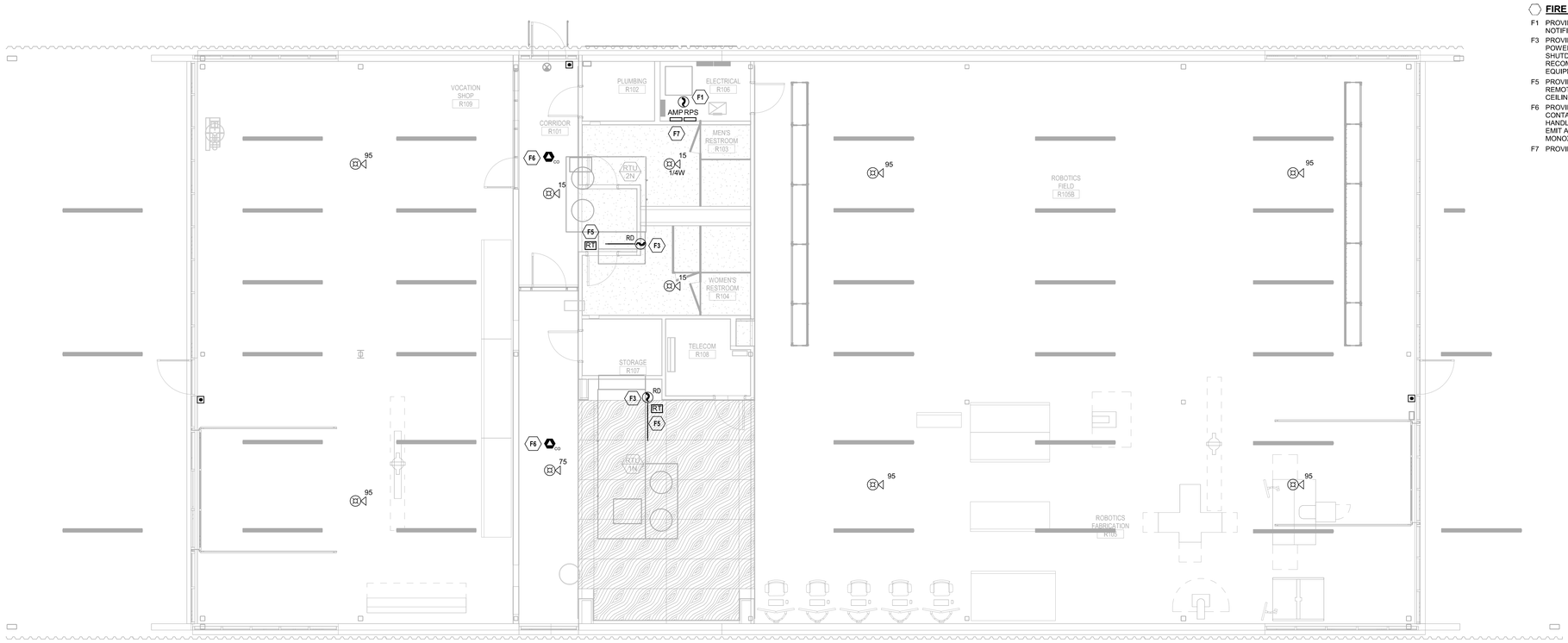
CHRISTOPHER J. CULP
LICENSE # PE-2013037646

09/08/2022

FIRE ALARM GENERAL NOTES AND LEGEND

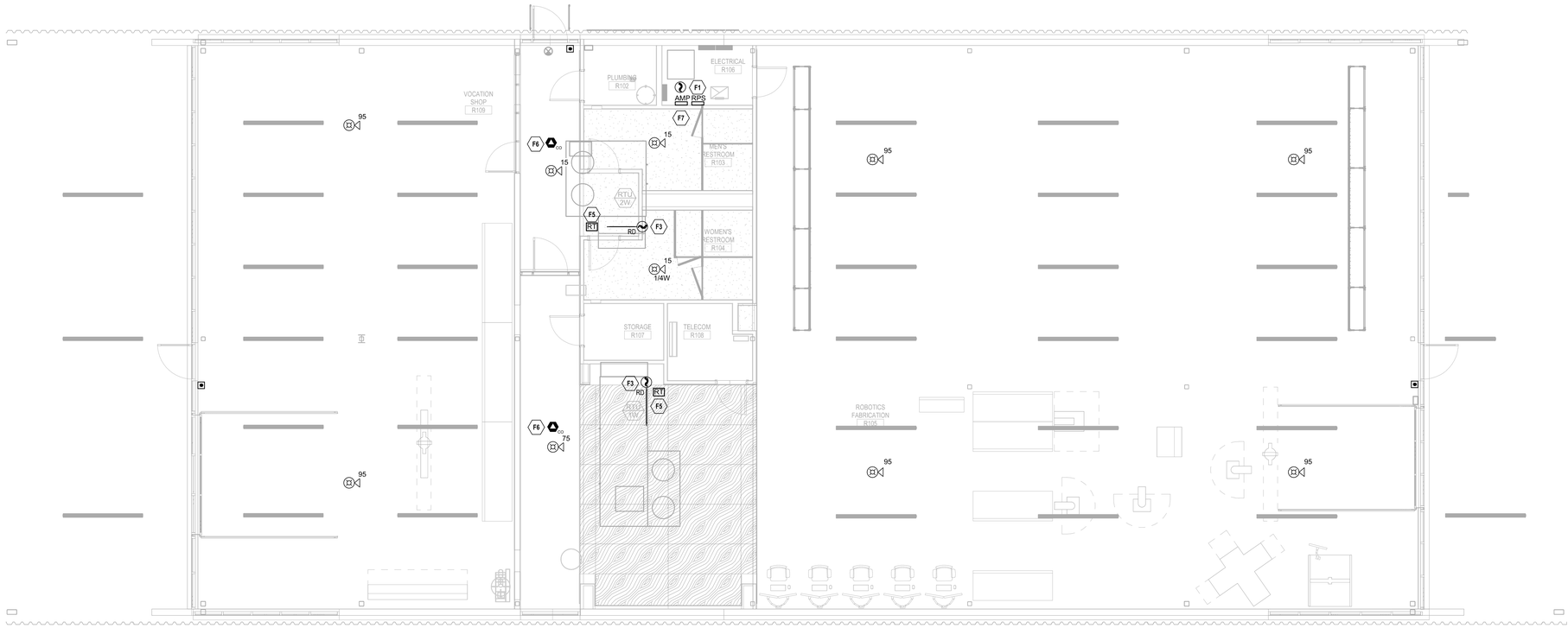
FA000

CHRISTOPHER J. CULP



2 FIRE ALARM PLAN - LSN
3/16" = 1'-0"

0 2' 4' 6' 8'
SCALE: 3/16"=1'-0"



1 FIRE ALARM PLAN - LSW
3/16" = 1'-0"

0 2' 4' 6' 8'
SCALE: 3/16"=1'-0"

FIRE ALARM PLAN NOTES:

F1 PROVIDE REMOTE POWER SUPPLY TO POWER VISIBLE NOTIFICATION APPLIANCES.

F3 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.

F5 PROVIDE LOW VOLTAGE WIRING FROM DUCT DETECTOR TO REMOTE TEST STATION. MOUNT REMOTE TEST STATION IN CEILING.

F6 PROVIDE A CARBON MONOXIDE DETECTOR IN ROOMS CONTAINING FIRST DIFFUSER FROM GAS POWERED AIR HANDLING UNITS. CARBON MONOXIDE DETECTOR SHALL EMIT A LOCAL ALARM TONE UPON DETECTION OF CARBON MONOXIDE.

F7 PROVIDE NEW FIRE ALARM VOICE AMPLIFIER PANEL.

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NUMBER PE-2013037646
PROFESSIONAL ENGINEER

CHRISTOPHER J. CULP
LICENSE # PE-2013037646

09/08/2022

FIRE ALARM PLAN

FA101

CHRISTOPHER J. CULP

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	- - - - - - - -

CABLE TYPES

A	CATEGORY 6 CABLE
B	PAGING SPEAKER CABLE
C	HDMI CABLE

PATHWAYS

- 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) A	B	C	DETAIL
▽ 2D	DATA WALL OUTLET	2	0	0	7/TN400-A/B
▽ 4D	DATA WALL OUTLET	4	0	0	7/TN400-A/B
▽ 4D	DATA WALL OUTLET	4	0	0	7/TN400-A/B
▽ 2D	DATA CEILING OUTLET	2	0	0	6/TN400-A/B
▽ W,2D	TELEPHONE, VoIP WALL OUTLET	2	0	0	7/TN400-A/B

TELECOMMUNICATIONS END-POINT DEVICES

DEVICE SCHEDULE

SYMBOL	DESCRIPTION	CABLE(S) A	B	C	DETAIL
C S	CLOCK, ANALOG SINGLE SIDED, WALL MOUNT	0	0	0	N/A
S RC	PAGING SPEAKER, RECESSED CAN CEILING MOUNT	0	1	0	5/TN400-A/B
P	PAGING SPEAKER, PENDANT CEILING MOUNT	0	1	0	5/TN400-A/B

AUDIO-VIDEO IP END-POINT DEVICES

REFER TO TA-SERIES DRAWINGS FOR AV DEVICES

SYMBOL	DESCRIPTION	CABLE(S) A	B	C	DETAIL
1	TELEVISION WALL OUTLET	1	0	2	9/TN400-A/B
2	HDMI INTERFACE PLATE	2	0	1	8/TN400-A/B

TELECOMMUNICATIONS RESPONSIBILITY MATRIX

Description	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		
Cable Trays	X		X		
Underground pathways for utility entrance and floor boxes	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 Backbone Cable and Connectivity	X		X		
Copper Backbone Cable and Connectivity	X		X		
Copper Horizontal Cable and Connectivity	X		X		
Data Communications					
Router / Firewall		X		X	
Core Switch / Edge Switch		X		X	
Wireless Access Points		X		X	
Servers / Storage and Backup		X		X	
Laptops / Desktops / Copiers / Printers / Scanners		X		X	
Software		X		X	
Voice Communications					
VoIP Gateway / Analog handsets		X		X	
VoIP handset wall mount kit		X		X	
VoIP handsets		X		X	
VoIP Network licensing		X		X	
Audio-Video Communications					
Conduits and Backboxes for AV systems	X		X		
HDMI Classroom Cabling and Connectivity	X		X		
Refer to AV drawings for AV Scope					
Distributed & Monitoring Communications					
K12 Classroom Analog Paging	X		X		
Wireless Clock Systems	X		X		
Electronic Safety and Security					
Conduits and Backboxes for Security systems	X		X		
Refer to Security drawings for Security Scope					

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

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Revisions

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NUMBER PE-2019007648
PROFESSIONAL ENGINEER

09/09/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

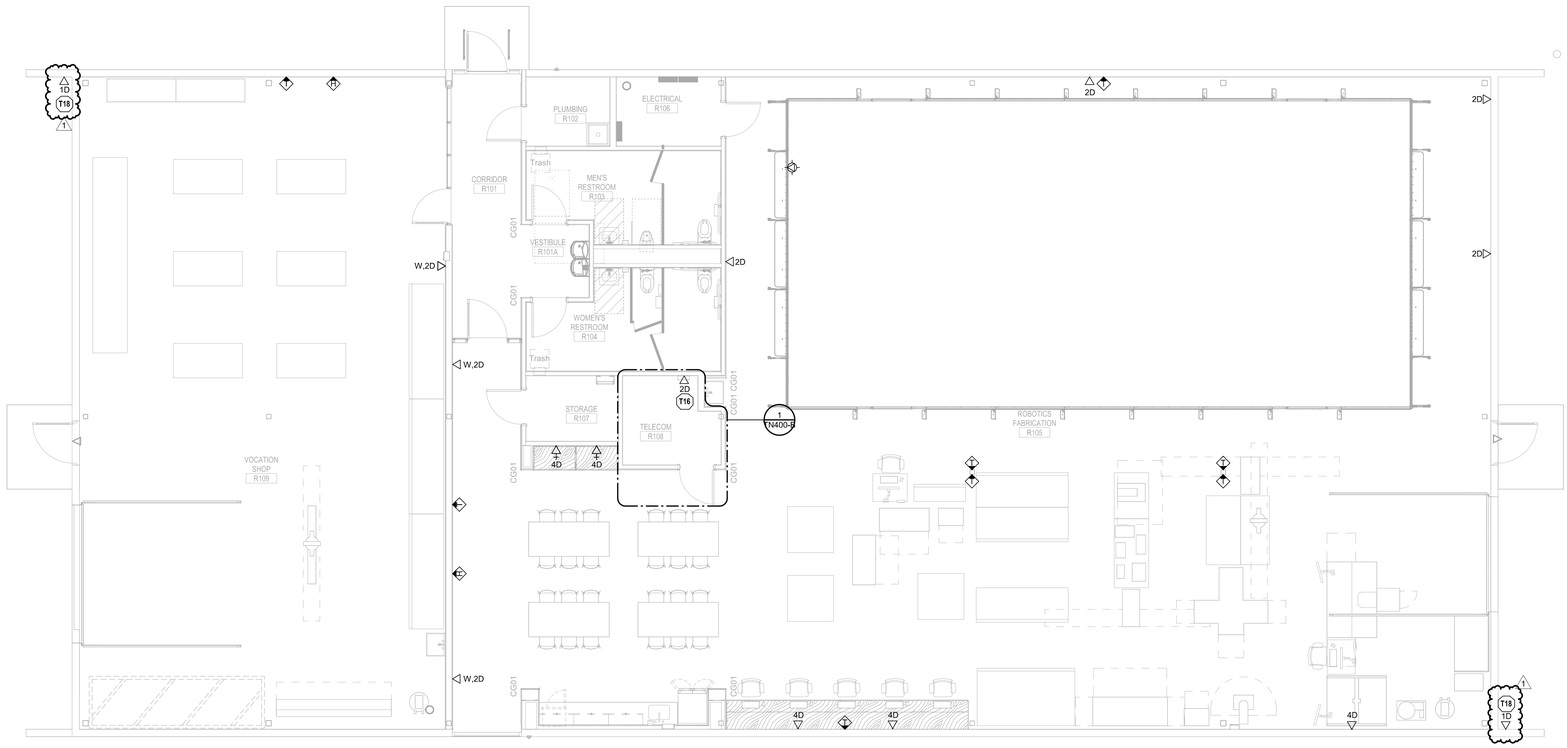
TECHNOLOGY GENERAL NOTES AND LEGEND

TN000

DOUGLAS M. EVERHART

TECHNOLOGY PLAN NOTES:

T16 PROVIDE DATA FOR ACCESS CONTROL PANEL.
T18 DATA SHOWN FOR SECURITY CAMERA. REFER TO TY DRAWINGS FOR EXACT LOCATION PRIOR TO INSTALLATION.



1 TECHNOLOGY LEVEL 1 PLAN - LSN
3/16" = 1'-0"

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1	Addendum 01	09/16/2022

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09/15/2022
DOUGLAS M. EVERHART
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LSN - TECHNOLOGY PLAN - LEVEL 1

TN101-B

DOUGLAS M. EVERHART

1 TECHNOLOGY LEVEL 1 RCP - LSN
3/16" = 1'-0"

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2	Addendum 02	09/23/2022

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09/23/2022
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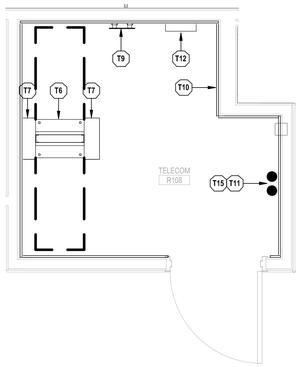
LICENSE # PE-2019007648

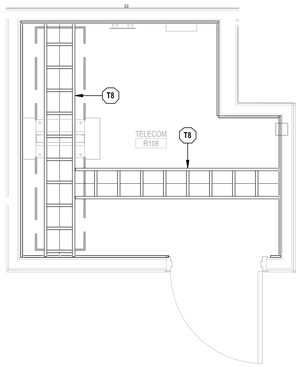
LSN - TECHNOLOGY RCP - LEVEL 1

TN201-B

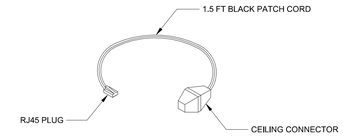
DOUGLAS M. EVERHART



1 LSN TELECOM ROOM #R108 - ENLARGED PLAN
1/2" = 1'-0"



2 LSN TELECOM ROOM #R108 - ENLARGED PATHWAY
1/2" = 1'-0"



3 ACCESS POINT CONNECTOR ASSEMBLY
NTS

TECHNOLOGY PLAN NOTES:

T6 PROVIDE 19" WIDE TWO-POST EQUIPMENT RACK. REFER TO SECTION 271100 FOR FURTHER REQUIREMENTS.

T7 PROVIDE 6" VERTICAL WIRE MANAGER. REFER TO SECTION 271100 FOR FURTHER REQUIREMENTS.

T8 PROVIDE 12" WIDE LADDER RACK. REFER TO SECTION 271100 FOR FURTHER REQUIREMENTS.

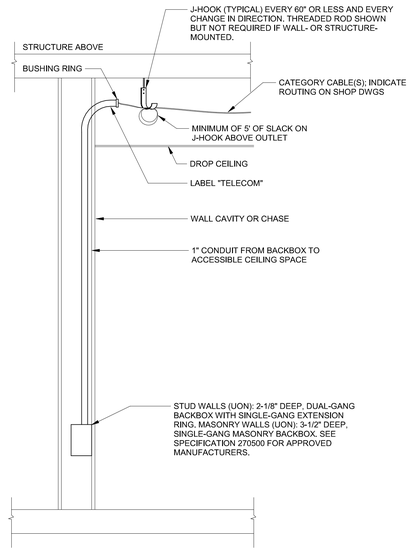
T9 PROVIDE TELECOMMUNICATIONS GROUNDING BUS BAR. SEE DETAILS SHEET AND SECTIONS 270500 FOR FURTHER REQUIREMENTS.

T10 PROVIDE 3/4" FIRE-RATED TELECOMMUNICATIONS PLYWOOD BACKBOARD DOUBLE COATED IN UL 723 CLASSIFIED FIRE RETARDANT LOW GLOSS WHITE PAINT. PLYWOOD SHALL BE PAINTED PRIOR TO INSTALLATION.

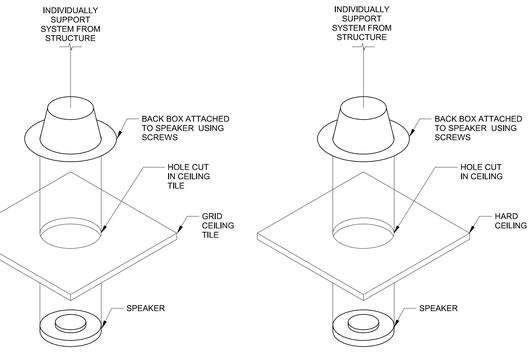
T11 (2) 4" CONDUIT INCOMING SERVICE CONDUITS. REFER TO ELECTRICAL SITE PLANS FOR EXACT ROUTING AND FURTHER INFORMATION.

T12 ACCESS CONTROL PANEL. REFER TO SECURITY DRAWINGS FOR FURTHER REQUIREMENTS.

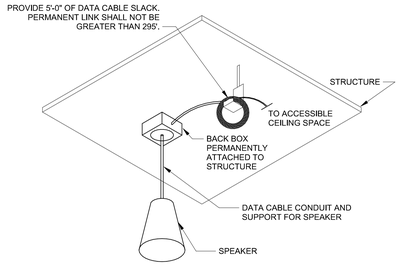
T15 PROVIDE 12" WIDE VERTICAL LADDER RACK. REFER TO SECTION 271100 FOR FURTHER REQUIREMENTS.



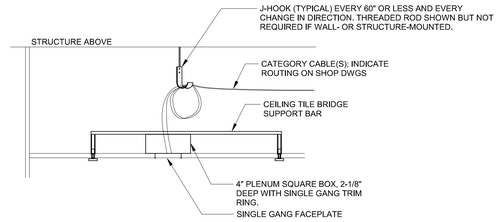
4 COMMUNICATIONS OUTLET MOUNTING
NTS



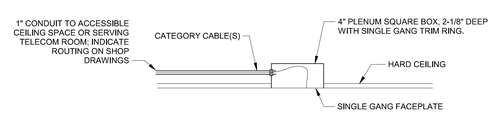
5 SPEAKER INSTALLATION
NTS



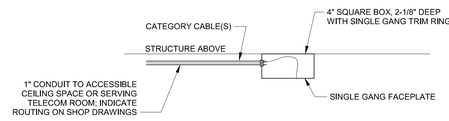
FOR OUTLETS IN SUSPENDED CEILING TILES



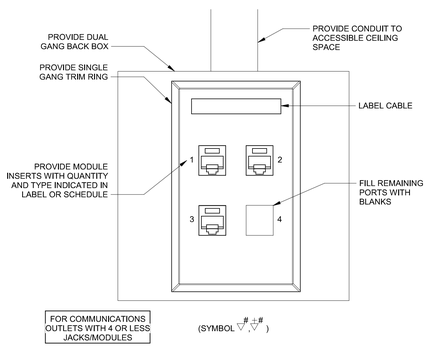
FOR OUTLETS IN GYPSUM BOARD CEILINGS



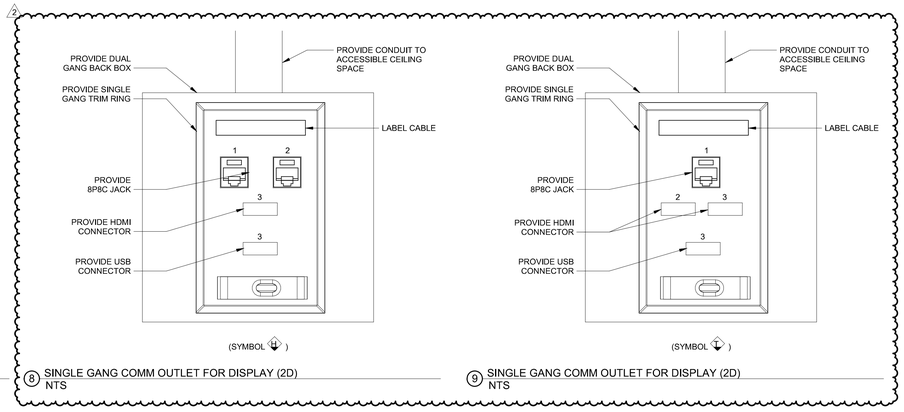
FOR OUTLETS IN EXPOSED TO STRUCTURE AREAS



6 CEILING COMM OUTLET 2D
NTS

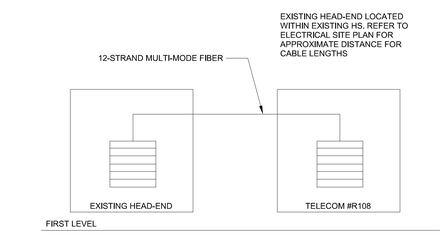


7 SINGLE GANG COMM OUTLET (2D)
NTS



8 SINGLE GANG COMM OUTLET FOR DISPLAY (2D)
NTS

9 SINGLE GANG COMM OUTLET FOR DISPLAY (2D)
NTS



10 RISER DIAGRAM - BACKBONE CABLES
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EXPIRES 12/31/2022

Issue Date: September 9, 2022

Revisions

NUMBER	DESCRIPTION	DATE
2	Addendum 02	09/23/2022

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
09/23/2022

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

LSN - TECHNOLOGY ENLARGED PLANS AND DETAILS

TN400-B

DOUGLAS M. EVERHART

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"
EMERGENCY LOCK RELEASE	48"
EMERGENCY PHONE (OPERABLE PARTS)	48"

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.

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
CCTV	CLOSED CIRCUIT TELEVISION
CD	CAMPUS DISTRIBUTOR
CMP	COMMUNICATIONS PLENUM JACKET
CMR	COMMUNICATIONS RISER JACKET
(D)	REMOTE DEVICE
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
GYP	GYPSUM BOARD
HH	HAND HOLE
Hz	HERTZ
IMC	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
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET
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
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
VMS	VIDEO MANAGEMENT SYSTEM
WAO	WORK AREA OUTLET
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION-PROOF

( ) - INDICATES MODIFIER FOR SPECIAL OPERATION IN LABELING SCHEME

ANNOTATION

- 1 — SECURITY PLAN CALLOUT
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / TY1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER. LOWER NUMBER INDICATES SHEET NUMBER
- 1 / TY1 — 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) CARD READER
- (CW) X — CLIENT WORKSTATION WHERE X = NUMBER OF MONITORS (AC) ACCESS CONTROL (SM) SECURITY MANAGEMENT (TS) TOUCHSCREEN CONTROL (VS) VIDEO SURVEILLANCE
- (DO) DOOR OPERATOR
- (DB) DOOR BELL (PB) PUSH BUTTON (CH) CHIME
- (DM) DOOR POSITION SWITCH SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- (DL) DOOR POSITION SWITCH AND LATCHBOLT MONITOR SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- (EL) ELECTRIFIED LOCKING DEVICE SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- (EO) ELECTRIFIED LOOKING DEVICE SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- (EP) EMERGENCY PHONE
- (GB) GLASS BREAK DETECTOR
- (IC) INTERCOM (CR) WITH CARD READER (DS) DOOR STATION (RS) RECEIVING (MASTER) STATION (VS) VIDEO STATION
- (IP) INMATE 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

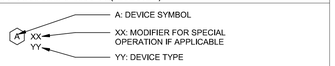
- FIXED CAMERA
- PTZ CAMERA
- 360 CAMERA
- 180 CAMERA
- TWO IMAGER CAMERA
- FOUR IMAGER CAMERA

MOUNTING TYPE SYMBOLS (APPLIES TO ANY SECURITY DEVICE SYMBOL)

- CEILING MOUNT
- WALL MOUNT
- POLE / BOLLARD MOUNT
- CORNER MOUNT
- PENDANT MOUNT
- WALL MOUNT PENDANT ARM

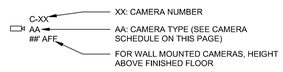
LABELING SCHEME

SECURITY DEVICES (TYPICAL)



SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

SECURITY CAMERAS (TYPICAL)



SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

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. 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 FOURTY (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 FOURTY (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. 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.
9. VERIFY ALL CAMERA LOCATIONS PRIOR TO ROUGH-IN. FIELD OF VIEW SHALL NOT BE OBSTRUCTED BY OTHER ELEMENTS INCLUDING, BUT NOT LIMITED TO, EXIT SIGNS, LIGHT FIXTURES, MILLWORK, SPRINKLERS, CURTAINS, AND SIGNAGE.
10. ALL WIRING SHALL BE INSTALLED COMPLETE AND UNSPLICED FROM THE SERVING EQUIPMENT PANEL TO DEVICE.
11. REFER TO TN0.1 FOR TECHNOLOGY GENERAL NOTES THAT ALSO DESCRIBES SECURITY COMPONENTS.

SECURITY ROUGH-IN

ROUGH-IN ONLY SCHEDULE

SYMBOL	DESCRIPTION	BACK BOX	CONDUIT	CABLE(S)	MOUNTING HEIGHT	DETAIL
EL	SECURITY ELECTRIFIED LOCK	N/A	(1) 1/2" EMT TO DOOR FRAME	C	N/A	
CR	SECURITY CARD READER, WALL	2-GANG BACKBOX WITH 1-GANG MUD RING	(1) 3/4" EMT	B	44"	
CR M	SECURITY CARD READER, MULLION	N/A	(1) 3/4" EMT	B	44"	
RE	SECURITY REQUEST-TO-EXIT	1-GANG BACKBOX WITH 1-GANG MUD RING	(1) 1/2" EMT	E	REFER TO DOOR HARDWARE SCHEDULE	
	SECURITY CAMERA, CEILING - RECESSED	INSTALL SECURITY PROVIDER'S BACKBOX	(1) 3/4" EMT	A	N/A	
	SECURITY CAMERA, CEILING - SURFACE	2-GANG BACKBOX WITH 1-GANG MUD RING	(1) 3/4" EMT	A	N/A	
	SECURITY CAMERA, WALL - INTERIOR	2-GANG BACKBOX WITH 1-GANG MUD RING	(1) 3/4" EMT	A	9' - 0"	
	SECURITY CAMERA, WALL - EXTERIOR	INSTALL SECURITY PROVIDER'S BACKBOX	(1) 3/4" EMT	A	10' - 0"	
IC	SECURITY VIDEO INTERCOM, WALL	4-GANG BACKBOX WITH PROVIDER'S PLATE	(1) 3/4" EMT	A,E	48" TO PUSH BUTTON	
PB	SECURITY PANIC BUTTON, DESK/WALL	1-GANG BACKBOX WITH 1-GANG MUD RING	(1) 1/2" EMT	D	N/A	
DM	DOOR POSTION SWITCH	N/A	(1) 1/2" EMT TO DOOR FRAME	D	N/A	

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CABLE TYPES

A	CATEGORY 6 CABLE
B	22 AWG, 6C SHIELDED
C	18 AWG, 4C UNSHIELDED
D	22 AWG, 2C UNSHIELDED
E	22 AWG, 4C UNSHEILDED

CABLE TYPES SHOWN ABOVE ARE TYPICAL FOR CABLE DISTANCES LESS THAN 500 FEET. REFER TO DEVICE MANUFACTUERER'S INSTALLATION REQUIREMENTS FOR LONGER DISTANCES. COORDINATE WITH DOOR HARDWARE PROVIDER TO CONFIRM CABLING REQUIREMENTS FOR LOCK POWER.

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PROFESSIONAL ENGINEER

09/09/2022

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LICENSE # PE-2019007648

SECURITY GENERAL NOTES AND LEGEND

TY000

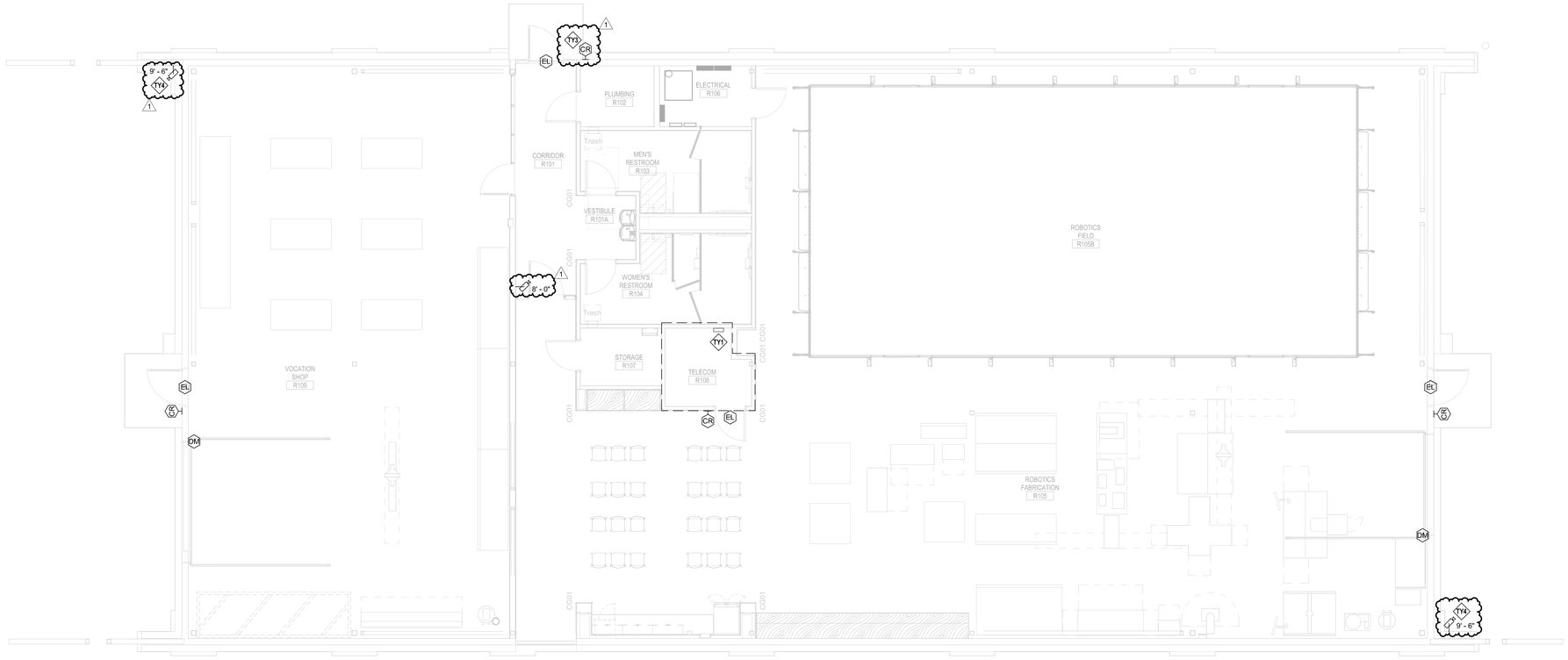
DOUGLAS M. EVERHART

SECURITY PLAN NOTES:

TY1 PROPOSED ACCESS CONTROL LOCATION. OWNER'S VENDOR SHALL COORDINATE FINAL LOCATION.

TY3 ADA ACTUATOR. REFER TO DIVISION 08 DOOR HARDWARE. ENSURE ADA ACTUATOR WILL ONLY OPERATE WHEN THE DOOR IS UNLOCKED OR WITHIN 10 SECONDS OF A VALID CARD READ.

TY4 CENTER BOX AT ~9'-6" VERTICALLY ON THE STRUCTURAL BEAM AND ROUTE HARD CONDUIT INTO NEAREST ACCESSIBLE CEILING. ENSURE ALL PATHWAY IS WEATHERTIGHT.



1 SECURITY LEVEL 1 PLAN - LSN
3/16" = 1'-0"

DOUGLAS M. EVERHART

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1	Addendum 01	09/16/2022

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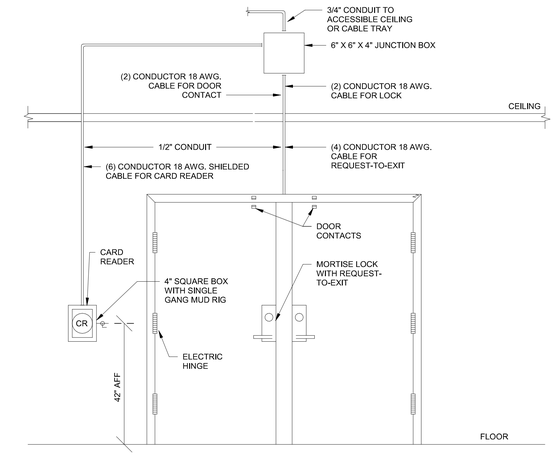
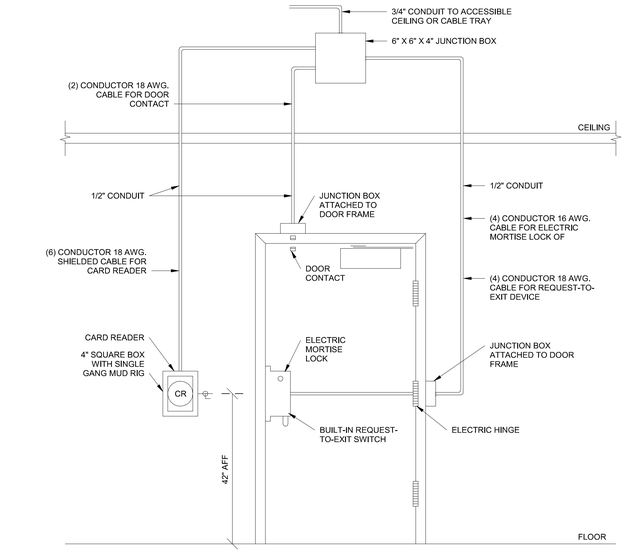
LSN - SECURITY PLAN - LEVEL 1

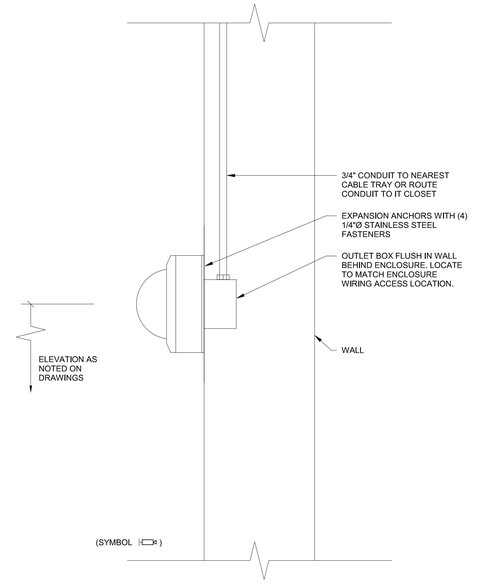
TY101-B



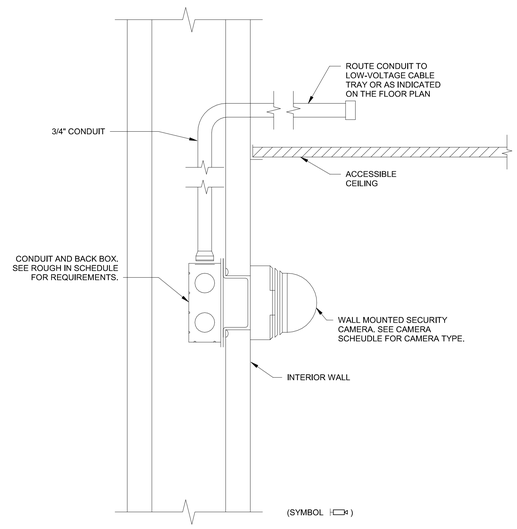
5 DOUBLE DOOR LSW/LSN
NTS



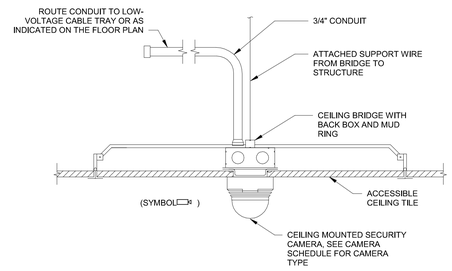
4 SINGLE DOOR LSW/LSN
NTS



3 SURFACE MOUNTED DOME CAMERA DETAIL
NTS



2 TYPICAL CAMERA INSTALLATION DETAIL - INTERIOR WALL MOUNT SURFACE
NTS



1 TYPICAL CAMERA INSTALLATION DETAIL - INTERIOR CEILING MOUNT SURFACE
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SECURITY DETAILS

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