

March 16, 2021

CERTIFICATE OF APPROPRIATENESS

Marques King
East Jefferson Development Corporation
300 River Place
Detroit, MI 48207

RE: Application Number 21-7124; 910 Marlborough, Jefferson Chalmers Historic Business District

Dear Mr. King:

At the regularly scheduled meeting held virtually on March 10, 2021, the Detroit Historic District Commission ("Commission") reviewed the above-referenced application for building permit. Pursuant to Section 5(10) of the Michigan Local Historic District Act, as amended, being MCL 399.205, MSA 5-3407(5)(10) and Section 21-2-73 of the 2019 Detroit City Code; the Commission has reviewed the above-referenced application for building permit and hereby issues a Certificate of Appropriateness, which is effective as of March 16, 2021.

The following proposed work meets the defined elements of design for the historic district and the Secretary of the Interior's Standards for Rehabilitation and guidelines for rehabilitating historic buildings (36 CFR Part 67).

Per the attached documents, the project consists of the following components:

- Installation of vinyl windows within the basement openings on the side and rear elevations.
- Operational change and enlargement of some basement windows in order to meet egress codes.
- Enclosure of rear elevation door openings: infilled with wood panels or flush wood doors.
- Condenser units will be located on roof of building.

The COA was issued with the following conditions:

- A roof plan confirming location and setbacks of the condensers will be submitted for staff review.
- Cut sheets confirming the material, design, dimensions and finish of the door panels proposed for the rear openings will be submitted for staff review.
- Cut sheets confirming the material, design, dimensions, and finish proposed for the exterior lighting will be submitted for staff review.

Please retain this COA for your files. You should now proceed to obtain a building permit from the City of Detroit Buildings, Safety, Engineering and Environmental Department. It is important to note that approval by the Detroit Historic District Commission does not waive the applicant's responsibility to comply with any other applicable ordinances or statutes.

For the Commission:



Audra Dye
Staff, Detroit Historic District Commission

910 Marlborough Historic District Commission Narrative

DRAFT. 03.04.21

The following items were noted in the Certificate of Appropriateness issued on September 17, 2018 by HDC. These items were originally communicated to the team at the August 5, 2017 HDC meeting.

- 1. The fence surrounding the front lawn will be removed.*
- 2. A guard rail will be installed along the stairs, only if required by code.*

Both of these items are reflected in the scope of work currently underway on site. The fence surrounding the front lawn was removed from the scope for the permit drawings submitted September 15, 2017. The guard rail located at the stairwell to the north basement unit is required by code. Changes in grade greater than 18" require a guard rail.

The following items were revised subsequent to the September 17, 2018 HDC Certificate of Appropriateness based on our interaction with the State Historic Preservation Office. These items were acknowledged in an April 5, 2019 letter from Antonio Aguilar, reviewer for the State Historic Preservation Office.

1. Glass Block at West Elevation

The removal of glass block at the west (primary) elevation and replacement with historically appropriate windows (aluminum clad wood windows) is reflected on the December 1, 2017 drawings and approved by a January 22, 2018 State Historic Preservation Office directive.

2. New Windows at North, south, and east elevations

The original documents called for replacement windows on the north, south, and east elevations. The existing windows are vinyl and the replacement windows were scheduled to be vinyl. The current scope direction is to repair the existing vinyl windows.

3. Rear door opening in fill material at east elevation

The existing door opening on the east elevation (assumed to be a former fire escape access) was originally noted to be filled in with brick to match the existing exterior brick. In our review with SHPO for our tax credit application, we were directed to, instead, infill the opening with a blank panel. This was deemed as more in keeping with the historic condition of the building.











Applicant Photos, 2021



















**CA13NA 018-060
Base Series Air Conditioner
with Puron® Refrigerant**



Product Data



Carrier's CA13 has been designed utilizing Carrier's non-ozone depleting Puron refrigerant.

NOTE: Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 13.0 SEER / Up to 11.0 EER (based on tested combination)
- Microtube Technology™ refrigeration system

Reliability

- Non-ozone depleting Puron® refrigerant
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier

Durability

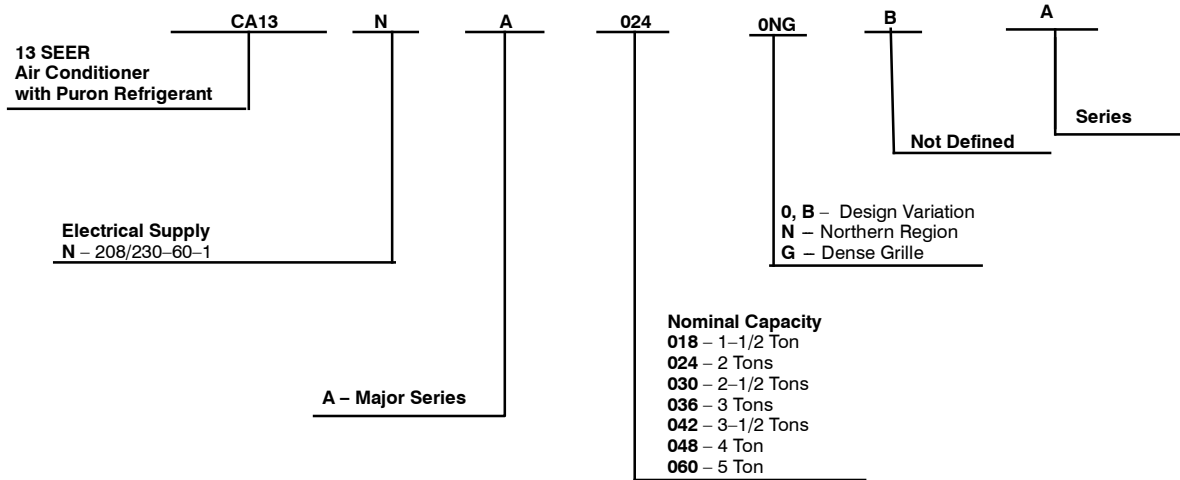
WeatherArmor™ protection package:

- Solid, durable sheet metal construction
- Dense wire coil guard

Applications

- Long-line – up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient (down to $-20^{\circ}\text{F}/-28.9^{\circ}\text{C}$) with accessory kit

PRODUCT NUMBER NOMENCLATURE



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to www.ahridirectory.org.



ISO 9001
QMI-SAI Global



STANDARD FEATURES

Feature	18	24	30	36	42	48	60
Puron Refrigerant	X	X	X	X	X	X	X
SEER	13	13	13	13	13	13	13
Scroll Compressor	X	X	X	X	X	X	X
Field Installed Filter Drier	X	X	X	X	X	X	X
Front Seating Service Valves	X	X	X	X	X	X	X
Internal Pressure Relief Valve	X	X	X	X	X	X	X
Internal Thermal Overload	X	X	X	X	X	X	X
Long Line capability	X	X	X	X	X	X	X
Low Ambient capability with Kit	X	X	X	X	X	X	X

X = Standard

PHYSICAL DATA

UNIT SIZE SERIES	18-E	24-F	30-D	36-D	42-A	48-E	60-C
Compressor Type	Scroll						
REFRIGERANT	Puron (R-410A)						
Control	TXV (Puron Hard Shutoff)						
Charge lb (kg)	3.15 (1.43)	3.15 (1.43)	4.62 (2.10)	5.42 (2.46)	6.07 (2.75)	7.10 (3.22)	8.80 (3.99)
COND FAN	Propeller Type, Direct Drive						
Air Discharge	Vertical						
Air Qty (CFM)	1700	2218	2169	3167	3000	3365	3400
Motor HP	1/12	1/10	1/10	1/5	1/5	1/4	1/4
Motor RPM	1100	1100	1100	1100	1100	1100	1100
COND COIL							
Face Area (Sq ft)	8.40	8.40	11.49	12.93	17.25	19.40	15.09
Fins per In.	20	25	25	25	25	25	20
Rows	1	1	1	1	1	1	2
Circuits	3	3	3	5	4	5	6
VALVE CONNECT. (In. ID)							
Vapor	3/4	3/4	3/4	7/8	7/8	7/8	7/8
Liquid	3/8						
REFRIGERANT TUBES (In. OD)							
Rated Vapor*	3/4	3/4	3/4	7/8	7/8	7/8	1-1/8
Max Liquid Line	3/8						

* Units are rated with 25 ft (7.6 m) of lineset length. See Vapor Line Sizing and Cooling Capacity Loss table when using other sizes and lengths of lineset.

Note: See unit Installation Instruction for proper installation.

OUTDOOR UNIT CONNECTED TO A FACTORY APPROVED INDOOR UNIT

Check piston size shipped with indoor unit to see if it matches required indoor piston size. If it does not match, replace indoor piston with correct piston size in table below:

OUTDOOR UNIT SIZE - SERIES	FAN COIL	PISTON SIZE BY OUTDOOR MODEL
018-E	FB4CNF*	49
024-F	FB4CNF*	55
030-D	FB4CNF*	61
036-D	FB4CNF*	-
042-A	FB4CNF*	73
048-E	FB4CNF*	78

* Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

NOTE: Pistons shipped with outdoor units are only qualified and approved with the above listed fan coils. The piston included with the FFMANP* and FPMAN* fan coils are unique to those products and CANNOT be replaced with the piston shipped with outdoor unit. Refer to the AHRI directory (www.ahridirectory.org) to check if your combination can use a piston or requires an accessory TXV.

REFRIGERANT PIPING LENGTH LIMITATIONS

Liquid Line Sizing and Maximum Total Equivalent Lengths† for Cooling Only Systems with Puron® Refrigerant:

The maximum allowable length of a residential split system depends on the liquid line diameter and vertical separation between indoor and outdoor units.

See table below for liquid line sizing and maximum lengths :

Maximum Total Equivalent Length Outdoor Unit BELOW Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with Puron Refrigerant Maximum Total Equivalent Length†: Outdoor unit BELOW Indoor Vertical Separation ft (m)								
			0-5 (0-1.5)	6-10 (1.8-3.0)	11-20 (3.4-6.1)	21-30 (6.4-9.1)	31-40 (9.4-12.2)	41-50 (12.5-15.2)	51-60 (15.5-18.3)	61-70 (18.6-21.3)	71-80 (21.6-24.4)
018 AC with Puron	3/8	1/4	150	150	125	100	100	75	---	---	---
		5/16	250*	250*	250*	250*	250*	250*	250*	225*	150
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
024 AC with Puron	3/8	1/4	75	75	75	50	50	---	---	---	---
		5/16	250*	250*	250*	250*	250*	225*	175	125	100
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
030 AC with Puron	3/8	1/4	30	---	---	---	---	---	---	---	---
		5/16	175	225*	200	175	125	100	75	---	---
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
036 AC with Puron	3/8	5/16	175	150	150	100	100	100	75	---	---
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
042 AC with Puron	3/8	5/16	125	100	100	75	75	50	---	---	---
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	150
048 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	230	160	---
060 AC with Puron	3/8	3/8	250*	250*	250*	225*	190	150	110	---	---

* Maximum actual length not to exceed 200 ft (61 m)

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = outside acceptable range

Maximum Total Equivalent Length Outdoor Unit ABOVE Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with Puron Refrigerant Maximum Total Equivalent Length†: Outdoor unit ABOVE Indoor Vertical Separation ft (m)								
			25 (7.6)	26-50 (7.9-15.2)	51-75 (15.5-22.9)	76-100 (23.2-30.5)	101-125 (30.8-38.1)	126-150 (38.4-45.7)	151-175 (46.0-53.3)	176-200 (53.6-61.0)	
018 AC with Puron	3/8	1/4	175	250*	250*	250*	250*	250*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
024 AC with Puron	3/8	1/4	100	125	175	200	225*	250*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
030 AC with Puron	3/8	1/4	30	---	---	---	---	---	---	---	---
		5/16	250*	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
036 AC with Puron	3/8	5/16	225*	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
042 AC with Puron	3/8	5/16	175	200	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
048 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
060 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*

* Maximum actual length not to exceed 200 ft (61 m)

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = outside acceptable range

REFRIGERANT CHARGE ADJUSTMENTS

Liquid Line Size	Puron Charge oz/ft (g/m)
3/8	0.60 (17.74) (Factory charge for lineset = 9 oz / 266.16 g)
5/16	0.40 (11.83)
1/4	0.27 (7.98)

Units are factory charged for 15 ft (4.6 m) of 3/8" liquid line. The factory charge for 3/8" lineset 9 oz. When using other length or diameter liquid lines, charge adjustments are required per the chart above.

Charging Formula:

[(Lineset oz/ft x total length) – (factory charge for lineset)] = charge adjustment

Example 1: System has 15 ft of line set using existing 1/4" liquid line. What charge adjustment is required?

Formula: (.27 oz/ft x 15ft) – (9 oz) = (-4.95) oz.

Net result is to remove 4.95 oz of refrigerant from the system

Example 2: System has 45 ft of existing 5/16" liquid line. What is the charge adjustment?

Formula: (.40 oz/ft. x 45ft) – (9 oz.) = 9 oz.

Net result is to add 9 oz of refrigerant to the system

NOTE: Conditions must be favorable for charging by subcooling method. Indoor temperature must be 70°F to 80°F (21.1°C to 26.7°C), and outdoor temperature must be 70°F to 100°F (21.1°C to 37.8°C). If outside these conditions, adjust charge for long line sets by weigh-in method.

LONG LINE APPLICATIONS

An application is considered Long Line, when the refrigerant level in the system requires the use of accessories to maintain acceptable refrigerant management for systems reliability. See Accessory Usage Guideline table for required accessories. Defining a system as long line depends on the liquid line diameter, actual length of the tubing, and vertical separation between the indoor and outdoor units.

For Air Conditioner systems, the chart below shows when an application is considered Long Line.

AC with Puron® Refrigerant Long Line Description ft (m) Beyond these lengths, a TXV is required

Total Length	Outdoor Unit Above or Below Indoor Unit
TXV required beyond 50 ft. (15.2 m)	TXV required beyond 20 ft. (6.1 m)

AC with Puron® Refrigerant Long Line Description ft (m) (Beyond these lengths, long line accessories are required)

Liquid Line Size	Units On Same Level	Outdoor Below Indoor	Outdoor Above Indoor
1/4 + TXV	No accessories needed within allowed lengths	No accessories needed within allowed lengths	175 (53.3)
5/16 + TXV	120 (36.6)	50 (15.2) vertical or 120 (36.6) total	120 (36.6)
3/8 + TXV	80 (24.4)	35 (10.7) vertical or 80 (24.4) total	80 (24.4)

Note: See Residential Piping and Long Line Guideline for details

VAPOR LINE SIZING AND COOLING CAPACITY LOSS

Acceptable vapor line diameters provide adequate oil return to the compressor while avoiding excessive capacity loss. The suction line diameters shown in the chart below are acceptable for AC systems with Puron refrigerant:

Vapor Line Sizing and Cooling Capacity Losses — Puron® Refrigerant 1-Stage Air Conditioner Applications

Unit Nominal Size (Btuh)	Maximum Liquid Line Diameters (In. OD)	Vapor Line Diameters (In. OD)	Cooling Capacity Loss (%)									
			Total Equivalent Line Length ft. (m)									
			26–50 (7.9–15.2)	51–80 (15.5–24.4)	81–100 (24.7–30.5)	101–125 (30.8–38.1)	126–150 (38.4–45.7)	151–175 (46.0–53.3)	176–200 (53.6–61.0)	201–225 (61.3–68.6)	226–250 (68.9–76.2)	
018 1 Stage AC with Puron	3/8	1/2	1	2	3	5	6	7	8	9	11	
		5/8	0	1	1	1	2	2	2	3	3	
		3/4	0	0	0	0	1	1	1	1	1	
024 1 Stage AC with Puron	3/8	5/8	0	1	2	2	3	3	4	5	5	
		3/4	0	0	1	1	1	1	1	2	2	
		7/8	0	0	0	0	0	1	1	1	1	
030 1 Stage AC with Puron	3/8	5/8	1	2	3	3	4	5	6	7	8	
		3/4	0	0	1	1	1	2	2	2	3	
		7/8	0	0	0	0	1	1	1	1	1	
036 1 Stage AC with Puron	3/8	5/8	1	2	4	5	6	8	9	10	12	
		3/4	0	1	1	2	2	3	3	4	4	
		7/8	0	0	0	1	1	1	1	2	2	
042 1 Stage AC with Puron	3/8	3/4	0	1	2	2	3	4	4	5	6	
		7/8	0	0	1	1	1	2	2	2	3	
		1 1/8	0	0	0	0	0	0	0	0	0	
048 1 Stage AC with Puron	3/8	3/4	0	1	2	3	4	5	5	6	7	
		7/8	0	0	1	1	2	2	2	3	3	
		1 1/8	0	0	0	0	0	0	0	1	1	
060 1 Stage AC with Puron	3/8	3/4	1	2	4	5	6	7	9	10	11	
		7/8	0	1	2	2	3	4	4	5	5	
		1 1/8	0	0	0	1	1	1	1	1	1	

Applications in this area may be long line and may have height restrictions. See the Residential Piping and Long Line Guideline.

ACCESSORIES

KIT NUMBER	KIT NAME	18-E	24-F	30-D	36-D	42-A	48-E	60-C
KAACH1201AAA	CRANKCASE HEATER KIT					X	X	X
KAACH1401AAA	CRANKCASE HEATER KIT	X	X	X	X			
KAFT0101AAA	FREEZE THERMISTOR KIT	X	X	X	X	X	X	X
KAATD0101TDR	TIME DELAY KIT	X	X	X	X	X	X	X
KSACY0101AAA	CYCLE PROTECTOR KIT	X	X	X	X	X	X	X
KAAWS0101AAA	WINTER START KIT	X	X	X	X	X	X	X
KSALA0301410	LOW AMBIENT KIT	X	X	X	X	X	X	X
KSALA0601AAA	MOTORMASTER KIT	X	X	X	X	X	X	X
KAALP0401PUR	LOW PRESSURE SWITCH KIT	X	X	X	X	X	X	X
KAALP0501PUR	HIGH PRESSURE SWITCH KIT	X	X	X	X	X	X	X
KSASF0101AAA	SUPPORT FEET KIT				X	X	X	X
KSASF0201AAA	SUPPORT FEET KIT	X	X	X				
KSASH2301COP	SOUND BLANKET KIT			X		X	X	
KSASH2401COP	SOUND BLANKET KIT							X
KSASH2501COP	SOUND BLANKET KIT	X	X		X			
KAALS0201LLS	SOLENOID VALVE KIT	X	X	X	X	X	X	X
KSAS1501AAA	COMPRESSOR START ASSIST	X	X	X	X	X	X	X
KSATX0201PUR	TXV KIT	X	X					
KSATX0301PUR	TXV KIT			X	X	X		
KSATX0401PUR	TXV KIT						X	
KSATX0501PUR	TXV KIT							X
KSATX0201PUR	TXV KIT	X	X					
KSATX0301PUR	TXV KIT			X	X	X		
KSATX0401PUR	TXV KIT						X	X

x = Accessory

* Do not use hard shutoff TXV with liquid solenoid valve.

ACCESSORY THERMOSTATS

THERMOSTAT / SUBBASE PKG.	DESCRIPTION
TP-WEM01	Côr™ Thermostat
TP-PRH01-A	edge™ Programmable Relative Humidity Thermostat
TP-PAC01	edge™ Programmable Thermostat
TP-NRH01	edge™ Non-Programmable Relative Humidity Thermostat
TP-NAC01	edge™ Non-Programmable Thermostat
TC-WHS01	Wi-Fi® Thermostat
TC-PAC01	Programmable Thermostat
TC-NAC01	Non-Programmable Thermostat
TCSNAC01	Non-Programmable Standard Screen Thermostat

THERMOSTAT ACCESSORIES		
PART NUMBER	DESCRIPTION	THERMOSTATS USED WITH
TP-EXP	edge™ EXP® Card	Programmable edge™ thermostats
TSTATCCSEN01-B	Outdoor Air Temperature Sensor	TP-Pxx, TP-Nxx
TSTATXXCNV10	Thermostat Conversion Kit (4 to 5 wire) –10 pack	All Carrier® branded thermostats
TX-MBP01	Medium Decorative Backplate	TC-Nxx
TX-LBP01	Large Decorative Backplate	TP-Pxx, TP-Nxx, TC-Pxx

ACCESSORY USAGE GUIDELINE

ACCESSORY	REQUIRED FOR LOW-AMBIENT COOLING APPLICATIONS (Below 55°F/12.8°C)	REQUIRED FOR LONG LINE APPLICATIONS*	REQUIRED FOR SEA COAST APPLICATIONS (Within 2 miles/3.22 km)
Ball Bearing Fan Motor	Standard	Standard	Standard
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Hard Shut-Off TXV	Yes	Yes	Yes
Liquid Line Solenoid Valve	No	No	No
Motor Master® Control or Low-ambient Pressure Switch	Yes	No	No
Support Feet	Recommended	No	Recommended
Winter Start Control	Yes #	No	No

* For tubing set lengths between 80 and 200 ft. (24.38 and 60.96 m) horizontal or 35 ft. (10.7 m) vertical differential (total equivalent length), refer to the Residential Split-System Longline Application Guideline.

Required if Low Pressure Switch is factory or field installed.

Accessory Description and Usage (Listed Alphabetically)

1. Ball-Bearing Fan Motor

A fan motor with ball bearings which permits speed reduction while maintaining bearing lubrication.

Usage Guideline:

Required on all units when MotorMaster® is used.

2. Compressor Start Assist - Capacitor and Relay

Start capacitor and relay gives a "hard" boost to compressor motor at each start up.

Usage Guideline:

Required for reciprocating compressors in the following applications:

- Long line
- Low ambient cooling
- Hard shut off expansion valve on indoor coil
- Liquid line solenoid on indoor coil

Required for single-phase scroll compressors in the following applications:

- Long line
- Low ambient cooling

Suggested for all compressors in areas with a history of low voltage problems.

3. Crankcase Heater

An electric resistance heater which mounts to the base of the compressor to keep the lubricant warm during off cycles. Improves compressor lubrication on restart and minimizes the chance of liquid slugging.

Usage Guideline:

- Required in low ambient cooling applications.
- Required in long line applications.
- Suggested in all commercial applications.

4. Cycle Protector

The cycle protector is designed to prevent compressor short cycling. This control provides an approximate 5-minute delay after power to the compressor has been interrupted for any reason, including power outage, protector control trip, thermostat jiggling, or normal cycling.

5. Evaporator Freeze Thermostat

An SPST temperature-actuated switch that stops unit operation when evaporator reaches freeze-up conditions.

Usage Guideline:

Required when low ambient kit has been added.

6. Low-Ambient Pressure Switch Kit

A long life pressure switch which is mounted to outdoor unit service valve. It is designed to cycle the outdoor fan motor in order to maintain head pressure within normal operating limits (approximately 100 psig to 225 psig). The control will maintain working head pressure at low-ambient temperatures down to 0°F (-18°C) when properly installed.

Usage Guideline:

A Low-Ambient Pressure Switch or MotorMaster® Low-Ambient Controller must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

7. MotorMaster® Low-Ambient Controller

A fan-speed control device activated by a temperature sensor, designed to control condenser fan motor speed in response to the saturated, condensing temperature during operation in cooling mode only. For outdoor temperatures down to -20°F (-28.9°C), it maintains condensing temperature at 100°F ±10°F (37.8°C ± 5.5°C).

Usage Guideline:

A MotorMaster® Low Ambient Controller or Low-Ambient Pressure Switch must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

Suggested for all commercial applications.

8. Outdoor Air Temperature Sensor

Designed for use with Carrier Thermostats listed in this publication. This device enables the thermostat to display the outdoor temperature. This device also

is required to enable special thermostat features such as auxiliary heat lock out.

Usage Guideline:

Suggested for all Carrier thermostats listed in this publication.

Accessory Description and Usage (Listed Alphabetically) (Continued)

9. Sound Hood

Wraparound sound reducing cover for the compressor. Reduces the sound level of the compressor.

Usage Guideline:

Suggested when unit is installed closer than 15 ft (4.57 m) to quiet areas, bedrooms, etc.

Suggested when unit is installed between two houses less than 10 ft (3.05 m) apart.

10. Support Feet

Four or five stick-on plastic feet that raise the unit 4 in. (101.6 mm) above the mounting pad. This allows sand, dirt, and other debris to be flushed from the unit base, minimizing corrosion.

Usage Guideline:

Suggested in the following applications:

Coastal installations.

Windy areas or where debris is normally circulating.

Rooftop installations.

For improved sound ratings.

11. Thermostatic Expansion Valve (TXV)

A modulating flow-control valve which meters refrigerant liquid flow rate into the evaporator in response to the superheat of the refrigerant gas leaving the evaporator.

Kit includes valve, adapter tubes, and external equalizer tube. Hard shut off types are available.

NOTE: When using a hard shut off TXV with single phase reciprocating compressors, a Compressor Start Assist Capacitor and Relay is required.

Usage Guideline:

Required to achieve AHRI ratings in certain equipment combinations. Refer to combination ratings.

Hard shut off TXV or LLS required in air conditioner long line applications.

Required for use on all zoning systems.

12. Time-Delay Relay

An SPST delay relay which briefly continues operation of indoor blower motor to provide additional cooling after the compressor cycles off.

NOTE: Most indoor unit controls include this feature. For those that do not, use the guideline below.

Usage Guideline:

For improved efficiency ratings for certain combinations of indoor and outdoor units. Refer to AHRI Unitary Directory.

13. Winter Start Control

This control is designed to alleviate nuisance opening of the low-pressure switch by bypassing it for the first 3 minutes of operation.

AHRI RATINGS

For AHRI ratings certificates, please refer to the AHRI directory www.ahridirectory.org

Additional ratings and system combinations can be accessed via the Carrier database at: www.MyCarrierRatings.com

For performance data at specific application &/or design conditions with various indoor unit combinations, the equipment performance calculator can be accessed at: <http://rpmob.wrightsoft.com/>

ELECTRICAL DATA

UNIT SIZE – SERIES	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MAX FUSE ** or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18-E	208/230/1	253	197	47.5	9.0	0.5	11.8	20
24-F				62.9	10.9	0.7	14.3	25
30-D				67.8	12.8	0.6	16.6	25
36-D				79.0	13.6	1.1	18.1	30
42-A				112.0	17.9	1.1	23.5	40
48-E				93.0	18.3	1.4	24.3	40
60-C				125.0	22.1	1.40	29.0	50

* Permissible limits of the voltage range at which the unit will operate satisfactorily

** Time-Delay fuse.

FLA – Full Load Amps

LRA – Locked Rotor Amps

MCA – Minimum Circuit Amps

RLA – Rated Load Amps

NOTE: Control circuit is 24-V on all units and requires external power source. Copper wire must be used from service disconnect to unit. All motors/compressors contain internal overload protection.

A-WEIGHTED SOUND POWER (dBA)

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
018-E	71	49.5	59.0	63.0	66.5	62.5	58.5	54.0
024-F	74	50.9	60.6	66.4	71.0	65.5	61.1	59.2
030-D	72	54.8	59.3	65.1	68.2	66.4	61.6	57.3
036-D	75	50.5	61.0	64.5	67.0	62.5	60.0	52.5
042-A	75	56.0	64.5	69.5	71.0	66.0	64.0	59.0
048-E	76	55.5	62.9	69.6	71.2	69.5	66.3	59.1
060-C	79	57.5	67.0	72.0	75.0	72.5	68.0	61.0

NOTE: Tested in compliance with AHRI 270-2008 (not listed with AHRI)

A-WEIGHTED SOUND POWER (dBA) WITH SOUND SHIELD

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
018-E	70	53.5	60.0	62.0	65.5	62.0	57.5	52.5
024-F	74	51.1	61.3	66.6	71.2	65.0	60.0	55.6
030-D	72	51.9	59.3	64.8	67.3	65.2	61.1	54.8
036-D	75	51.0	62.0	64.5	65.5	62.0	59.5	51.5
042-A	74	55.5	64.0	69.0	69.5	65.5	63.5	57.5
048-E	75	55.8	62.6	69.7	70.6	68.7	65.4	58.6
060-C	79	57.5	68.0	72.5	74.5	72.5	68.0	60.5

NOTE: Tested in compliance with AHRI 270-2008 (not listed with AHRI)

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE – SERIES	REQUIRED SUBCOOLING °F (°C)	INDOOOR
18-E	14 (7.8)	TXV*
24-F	10 (5.6)	
30-D	10 (5.6)	
36-D	11 (6.1)	
42-A	10 (5.6)	
48-E	13 (7.2)	
60-C	15 (8.3)	

* TXV must be ordered separately when indoor coil is not equipped with a TXV. TXV must be hard-shutoff type.

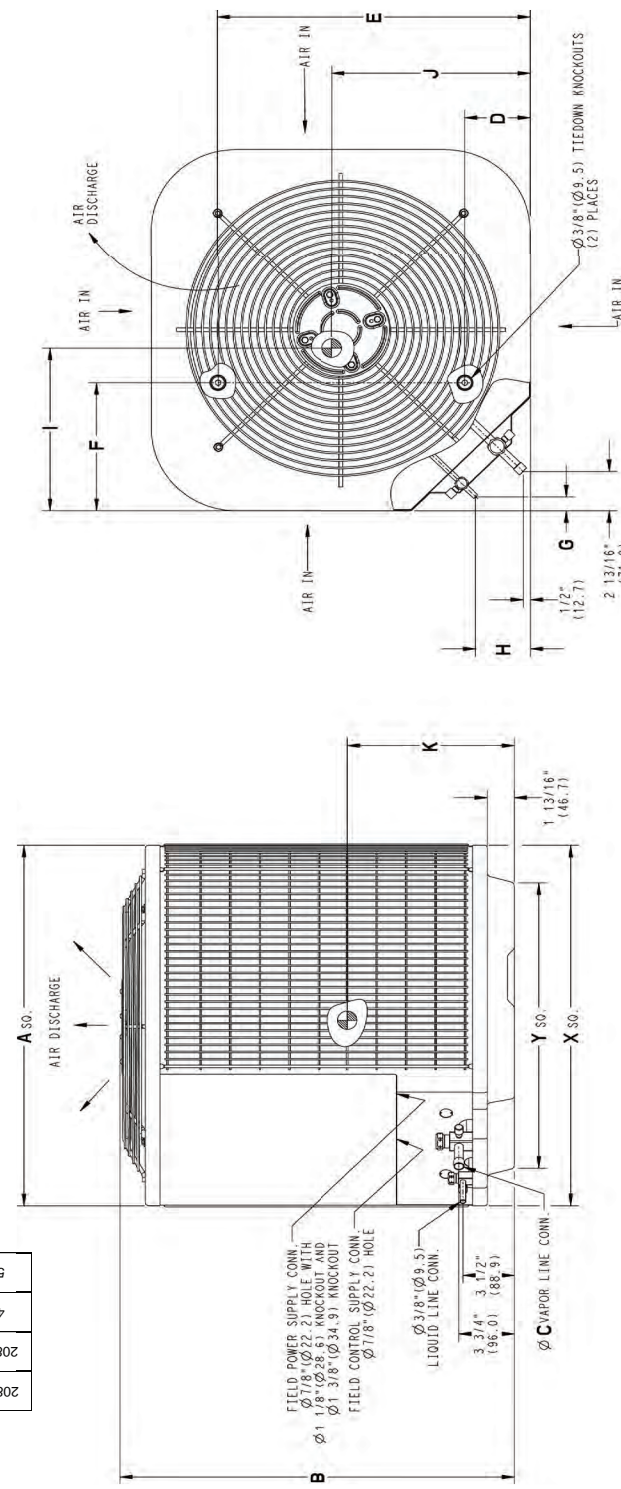
†† Units are rated with 25 ft (7.6 m) of lineset length. See *Vapor Line Sizing and Cooling Capacity Loss* table when using other sizes and lengths of lineset.

DIMENSIONS

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A		B		C		D		E		F		G		H		I		J		K		OPERATING WEIGHT		SHIPPING WEIGHT		SHIPPING LENGTH / WIDTH (Sq.)		SHIPPING HEIGHT	
		INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	Lbs	Kgs	INCH	MM	INCH	MM	INCH	MM
CA13NA018	E	Y	N	23 1/8	587.3	24 7/8	631.6	3/4	19.1	4 7/16	113.0	18 1/16	459.0	7 13/16	197.9	5/16	7.9	3	76.2	12	304.8	11 3/4	298.5	11 7/8	301.6	108	49.0	124	56.2	24 1/8	612.7	26 7/16	672.1
CA13NA024	F	Y	N	23 1/8	587.3	24 7/8	631.6	3/4	19.1	4 7/16	113.0	18 1/16	459.0	7 13/16	197.9	5/16	7.9	3	76.2	12 1/2	317.5	11	279.4	12	304.8	107	48.5	127	57.6	24 1/8	612.7	26 7/16	672.1
CA13NA030	D	Y	N	25 3/4	654.0	28 11/16	728.7	3/4	19.1	4 7/16	113.0	21 1/4	539.9	9 1/8	231.3	5/16	7.9	3	76.2	14 1/2	368.3	15 1/2	393.7	12 1/2	317.5	126	57.2	149	67.6	26 3/4	679.9	30 3/8	771.2
CA13NA036	D	Y	N	31 3/16	792.5	24 7/8	631.6	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	15 9/16	395.3	16 1/2	419.1	10 1/4	260.4	134	60.8	151	68.5	32 3/16	817.9	26 7/16	672.1
CA13NA042	A	Y	N	31 3/16	792.5	31 11/16	804.3	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	16	406.4	15 1/2	393.7	13 3/4	349.3	172	78.0	186	84.4	32 3/16	817.9	33 1/4	844.9
CA13NA048	E	Y	N	31 3/16	792.5	35 1/16	890.7	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	15 3/4	400.1	16 3/8	415.9	15 5/8	396.9	175	79.4	205	93.0	32 3/16	817.9	36 11/16	931.3
CA13NA060	C	Y	N	31 3/16	792.5	28 1/4	718.0	7/8	22.2	6 9/16	166.1	24 11/16	626.3	9 1/8	231.3	5/16	7.9	3	76.2	16	406.4	15 1/2	393.7	12 3/4	323.9	203	92.1	218	98.9	32 3/16	817.9	29 7/8	768.5

Y=YES
N=NO

208-230-1-60	460-3-60	575-3-60
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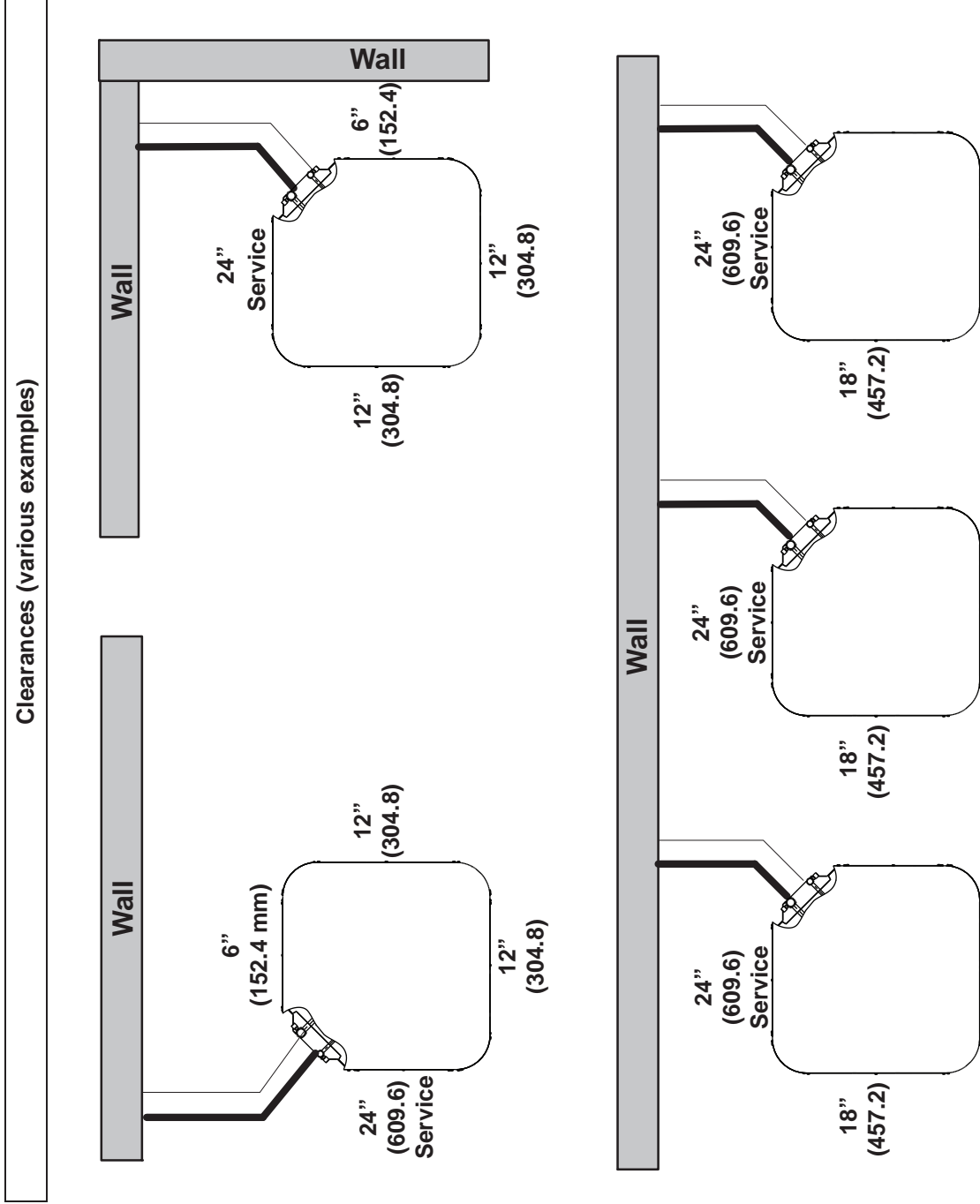
UNIT SIZE	"X" MINIMUM GROUND MOUNTING PAD APPLICATION DIMENSIONS		"Y" MINIMUM ROOF-TOP MOUNTING PAD APPLICATION DIMENSIONS	
	INCH	MM	INCH	MM
18.24	23 1/8	587.3	17 7/8	454.6
30	25 3/4	654.0	20 7/16	518.5
36.42,48.60	31 3/16	792.5	22 15/16	583.2

NOTE: ALL DIMENSIONS IN INCH (MM)

U.S. EXPORT CLASSIFICATION: EAR99

SD5412-4 REV. C

CLEARANCES



Note: Numbers in () = mm

IMPORTANT: When installing multiple units in an alcove, roof well, or partially enclosed area, ensure there is adequate ventilation to prevent re-circulation of discharge air.

DETAILED COOLING CAPACITIES#

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)					
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	
CA13NA018BN**E Outdoor Section With CNPV*2414AL* Indoor Section																			
525	72 (22.2)	21.21	11.38	1.27	20.31	11.05	1.42	19.41	10.71	1.59	18.37	10.33	1.78	17.33	9.96	2.02			
	67 (19.4)	19.33	14.06	1.28	18.52	13.73	1.43	17.82	13.36	1.60	16.64	12.96	1.79	15.65	12.56	2.02			
	63 (17.2)	18.04	16.20	1.29	17.23	15.83	1.44	16.39	15.44	1.60	15.49	15.02	1.79	14.60	14.56	2.02			
	62 (16.7)	17.76	16.72	1.29	16.97	16.34	1.44	16.16	15.93	1.60	15.36	15.36	1.79	14.58	14.58	2.02			
	57 (13.9)	17.47	17.47	1.30	16.77	16.77	1.44	16.08	16.08	1.60	14.56	15.34	1.79	14.56	14.56	2.02			
600	72 (22.2)	21.47	11.95	1.30	20.62	11.65	1.45	19.68	11.30	1.62	18.64	10.93	1.81	17.55	10.55	2.05			
	67 (19.4)	19.71	15.05	1.31	18.81	14.68	1.46	17.90	14.32	1.63	16.89	13.92	1.82	15.88	13.52	2.05			
	63 (17.2)	18.40	17.43	1.32	17.61	17.05	1.46	16.77	16.64	1.63	15.96	15.96	1.82	15.14	15.14	2.05			
	62 (16.7)	18.19	18.01	1.32	17.54	17.28	1.46	16.74	16.74	1.63	15.96	15.96	1.82	15.14	15.14	2.05			
	57 (13.9)	18.12	18.12	1.32	17.44	17.44	1.47	16.72	16.72	1.63	15.93	15.93	1.82	15.12	15.12	2.05			
675	72 (22.2)	21.70	12.59	1.33	20.81	12.21	1.48	19.86	11.87	1.65	18.78	11.49	1.84	17.62	11.09	2.08			
	67 (19.4)	19.88	15.95	1.34	19.03	15.61	1.49	18.11	15.24	1.66	17.08	14.83	1.85	16.07	14.43	2.08			
	63 (17.2)	18.79	18.56	1.35	18.02	18.02	1.49	17.27	17.27	1.66	16.44	16.44	1.85	15.60	15.60	2.08			
	62 (16.7)	18.71	18.71	1.34	18.02	18.02	1.49	17.26	17.26	1.66	16.44	16.44	1.85	15.59	15.59	2.08			
	57 (13.9)	18.70	18.70	1.34	18.00	18.00	1.49	17.24	17.24	1.66	16.41	16.41	1.85	15.57	15.57	2.08			

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)					
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	
CA13NA024BN**F Outdoor Section With CNPV*2414AL* Indoor Section																			
700	72 (22.2)	27.00	13.49	1.54	26.00	13.12	1.78	24.88	12.71	2.05	23.60	12.25	2.37	22.20	11.77	2.74			
	67 (19.4)	24.70	16.72	1.54	23.76	16.33	1.78	22.68	15.90	2.05	21.51	15.44	2.37	20.23	14.95	2.74			
	63 (17.2)††	23.00	16.10	1.55	22.07	15.69	1.78	21.07	15.26	2.06	19.97	14.80	2.37	18.77	14.30	2.75			
	62 (16.7)	22.70	19.89	1.55	21.81	19.46	1.78	20.88	18.99	2.06	19.95	19.95	2.37	18.98	18.98	2.75			
	57 (13.9)	22.29	22.29	1.55	21.58	21.58	1.78	20.79	20.79	2.06	19.92	19.92	2.37	18.96	18.96	2.75			
800	72 (22.2)	27.39	14.17	1.57	26.35	13.79	1.81	25.20	13.38	2.09	23.87	12.92	2.41	22.42	12.43	2.78			
	67 (19.4)	25.08	17.82	1.58	24.11	17.43	1.82	23.00	17.00	2.09	21.79	16.53	2.41	20.47	16.03	2.78			
	63 (17.2)††	23.39	17.14	1.58	22.43	16.72	1.82	21.39	16.28	2.09	20.26	15.81	2.41	19.02	15.30	2.79			
	62 (16.7)	23.24	21.32	1.58	22.43	22.43	1.82	21.59	21.59	2.09	20.66	20.66	2.41	19.62	19.62	2.79			
	57 (13.9)	23.16	23.16	1.58	22.40	22.40	1.82	21.56	21.56	2.09	20.63	20.63	2.41	19.60	19.60	2.79			
900	72 (22.2)	27.66	14.81	1.61	26.59	14.43	1.85	25.41	14.02	2.13	24.05	13.56	2.45	22.57	13.06	2.82			
	67 (19.4)	25.36	18.88	1.61	24.37	18.49	1.85	23.24	18.05	2.13	22.00	17.57	2.45	20.85	17.05	2.82			
	63 (17.2)††	23.67	18.11	1.62	22.70	17.70	1.85	21.63	17.25	2.13	20.47	16.77	2.45	19.21	16.24	2.83			
	62 (16.7)	23.89	23.89	1.62	23.10	23.10	1.85	22.21	22.21	2.13	21.22	21.22	2.45	20.13	20.13	2.83			
	57 (13.9)	23.86	23.86	1.62	23.07	23.07	1.85	22.18	22.18	2.13	21.20	21.20	2.45	20.11	20.11	2.83			

See notes on page 15

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)														
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)		
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	
CA13NA036BN**D Outdoor Section With CAP**3172AL * Indoor Section																
875	72 (22.2)	33.22	16.91	2.06	31.69	16.39	2.26	30.06	15.84	2.50	28.48	15.31	2.77	27.41		
	67 (19.4)	30.28	21.08	2.05	28.91	20.56	2.25	27.54	20.04	2.49	26.13	19.52	2.76	24.98		
	63 (17.2)††	28.16	20.25	2.04	27.05	19.80	2.25	25.78	19.28	2.49	24.46	18.76	2.76	22.86		
	62 (16.7)	28.07	25.27	2.05	26.80	26.56	2.25	25.71	25.71	2.48	24.60	24.60	2.76	23.29		
	57 (13.9)	27.67	27.67	2.04	26.71	26.71	2.25	25.67	25.67	2.48	24.55	24.55	2.76	23.26		
970	72 (22.2)	33.81	17.69	2.10	32.00	17.08	2.30	30.30	16.51	2.53	28.71	15.99	2.81	27.49		
	67 (19.4)	30.64	22.21	2.09	29.20	21.67	2.29	27.80	21.15	2.53	26.35	20.61	2.80	25.09		
	63 (17.2)††	28.55	21.32	2.08	27.34	20.83	2.29	26.03	20.31	2.52	24.67	19.76	2.79	23.13		
	62 (16.7)	28.67	28.67	2.09	27.47	27.47	2.29	26.36	26.36	2.52	25.20	25.20	2.80	24.14		
	57 (13.9)	28.57	28.57	2.09	27.43	27.43	2.29	26.33	26.33	2.52	25.14	25.14	2.79	24.21		
1125	72 (22.2)	34.10	18.74	2.16	32.36	18.17	2.36	30.60	17.59	2.60	28.93	17.05	2.87	27.70		
	67 (19.4)	31.10	23.99	2.15	29.57	23.42	2.36	28.11	22.88	2.59	26.63	22.32	2.86	25.46		
	63 (17.2)††	29.25	23.06	2.15	27.68	22.44	2.35	26.34	21.90	2.59	24.91	21.33	2.86	23.65		
	62 (16.7)	29.57	29.57	2.15	28.41	28.41	2.35	27.20	27.20	2.59	25.99	25.99	2.86	25.03		
	57 (13.9)	29.57	29.57	2.15	28.38	28.38	2.35	27.20	27.20	2.59	25.95	25.95	2.86	24.99		

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)														
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)		
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	Capacity MBtuh Total	Sens†	Total Sys-tem KW**	
CA13NA036BN**D Outdoor Section With CAP**372AL * Indoor Section																
1050	72 (22.2)	41.02	21.66	2.54	39.40	21.07	2.83	37.67	20.45	3.14	35.71	19.75	3.48	33.44		
	67 (19.4)	37.34	26.81	2.53	35.82	26.20	2.81	34.20	25.55	3.11	32.39	24.83	3.45	30.24		
	63 (17.2)††	34.68	25.78	2.53	33.23	25.15	2.81	31.71	24.49	3.10	29.97	23.75	3.44	27.94		
	62 (16.7)	34.09	31.81	2.53	32.69	31.14	2.81	31.25	31.03	3.10	29.79	29.79	3.44	28.17		
	57 (13.9)	33.44	33.44	2.53	32.31	32.31	2.81	31.10	31.10	3.10	29.74	29.74	3.43	28.12		
1200	72 (22.2)	41.67	22.87	2.60	40.00	22.28	2.90	38.19	21.64	3.21	36.16	20.93	3.56	33.84		
	67 (19.4)	37.97	28.72	2.59	36.42	28.10	2.88	34.74	27.44	3.18	32.86	26.71	3.52	30.66		
	63 (17.2)††	35.32	27.56	2.59	33.82	26.92	2.87	32.24	26.25	3.17	30.45	25.49	3.50	28.36		
	62 (16.7)	35.04	34.70	2.59	33.72	33.72	2.87	32.44	32.44	3.16	30.99	30.99	3.50	29.26		
	57 (13.9)	34.87	34.87	2.59	33.67	33.67	2.87	32.39	32.39	3.16	30.95	30.95	3.50	29.22		
1350	72 (22.2)	42.14	24.02	2.67	40.41	23.42	2.97	38.56	22.78	3.28	36.48	22.06	3.63	34.10		
	67 (19.4)	38.45	30.58	2.65	36.85	29.95	2.94	35.14	29.28	3.24	33.22	28.53	3.58	30.99		
	63 (17.2)††	35.80	29.28	2.65	34.26	28.63	2.93	32.63	27.95	3.23	30.83	27.19	3.57	28.68		
	62 (16.7)	36.12	36.12	2.65	34.86	34.86	2.93	33.50	33.50	3.23	31.98	31.98	3.57	30.16		
	57 (13.9)	36.07	36.07	2.65	34.81	34.81	2.93	33.45	33.45	3.23	31.94	31.94	3.57	30.12		

See notes on page 15

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)					
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**		
		72 (22.2)	48.49	25.49	3.39	46.39	3.73	44.18	23.85	4.11	41.83	22.97	4.52	39.28	22.03	4.98			
		67 (19.4)	44.47	31.36	3.33	42.52	3.67	40.46	29.67	4.05	38.28	28.77	4.47	35.93	27.82	4.92			
		63 (17.2)	41.53	30.43	3.29	39.69	3.63	37.74	28.72	4.01	35.68	27.80	4.43	33.47	26.84	4.88			
		62 (16.7)	40.83	37.19	3.28	39.07	3.63	37.22	35.45	4.00	35.29	34.48	4.42	33.32	33.32	4.88			
		57 (13.9)	39.73	39.73	3.27	38.29	3.62	36.76	4.00	33.12	4.42	33.34	4.88						
		72 (22.2)	49.21	26.62	3.47	47.02	3.81	44.73	24.95	4.19	42.30	24.06	4.61	39.67	23.11	5.06			
		67 (19.4)	45.16	33.20	3.42	43.14	3.72	41.00	31.49	4.13	38.75	30.59	4.55	36.34	29.63	5.01			
		63 (17.2)	42.22	32.16	3.38	40.31	3.72	38.28	30.42	4.09	36.17	29.51	4.51	33.89	28.53	4.97			
		62 (16.7)	41.69	39.75	3.37	39.91	3.71	38.02	38.02	4.09	36.34	36.34	4.51	34.45	34.45	4.98			
		57 (13.9)	41.25	41.25	3.37	39.72	3.71	38.08	38.08	4.09	36.34	36.34	4.51	34.45	34.45	4.98			
		72 (22.2)	49.75	27.70	3.56	47.50	3.90	45.14	26.02	4.27	42.64	25.12	4.69	39.94	24.16	5.14			
		67 (19.4)	45.69	34.99	3.50	43.61	3.84	41.42	33.28	4.22	39.12	32.36	4.63	36.65	31.38	5.09			
		63 (17.2)	42.75	33.85	3.46	40.79	3.80	38.72	32.11	4.17	36.55	31.18	4.59	34.23	30.18	5.05			
		62 (16.7)	42.52	42.08	3.46	40.87	3.80	39.14	39.14	4.18	37.31	37.31	4.61	35.32	35.32	5.07			
		57 (13.9)	42.49	42.49	3.46	40.87	3.80	39.15	39.15	4.18	37.32	37.32	4.61	35.32	35.32	5.07			

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)					
		CFM	EWB ° F (° C)	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**	Capacity MBtuh Total	Total Sys-tem KW**		
		72 (22.2)	53.87	27.47	3.18	51.45	3.59	48.92	25.05	4.07	46.25	23.82	4.61	43.41	22.56	5.21			
		67 (19.4)	49.06	33.61	3.16	46.83	3.56	44.50	31.00	4.05	42.04	29.66	4.59	39.41	28.30	5.19			
		63 (17.2)††	45.60	32.39	3.14	43.53	3.55	41.33	29.80	4.03	39.02	28.47	4.57	36.55	27.11	5.18			
		62 (16.7)	44.79	39.62	3.14	42.76	3.55	40.64	36.76	4.02	38.42	35.26	4.57	36.16	36.16	5.17			
		57 (13.9)	43.29	43.29	3.13	41.65	3.54	39.91	39.91	4.02	38.08	38.08	4.56	36.11	36.11	5.17			
		72 (22.2)	54.71	28.64	3.23	52.22	3.65	49.58	26.17	4.13	46.83	24.91	4.67	43.91	23.63	5.28			
		67 (19.4)	49.84	35.47	3.22	47.54	3.63	45.12	32.78	4.11	42.58	31.40	4.65	39.90	29.99	5.26			
		63 (17.2)††	46.35	34.12	3.21	44.20	3.61	41.94	31.45	4.09	39.55	30.08	4.64	37.02	28.68	5.24			
		62 (16.7)	45.62	42.07	3.20	43.55	3.61	41.43	41.12	4.09	39.37	39.37	4.63	37.29	37.29	5.24			
		57 (13.9)	44.80	44.80	3.20	43.09	3.61	41.25	41.25	4.09	39.31	39.31	4.63	37.24	37.24	5.24			
		72 (22.2)	55.37	29.76	3.29	52.79	3.71	50.09	27.24	4.19	47.26	25.96	4.74	44.27	24.65	5.34			
		67 (19.4)	50.46	37.27	3.28	48.09	3.69	45.61	35.89	4.17	43.01	33.08	4.71	40.26	31.63	5.32			
		63 (17.2)††	46.96	35.79	3.27	44.74	3.67	42.42	33.04	4.15	39.97	31.63	4.70	37.38	30.19	5.30			
		62 (16.7)	46.40	44.30	3.26	44.37	3.67	42.45	42.45	4.15	40.42	40.42	4.70	38.25	38.25	5.31			
		57 (13.9)	46.10	46.10	3.26	44.30	3.67	42.39	42.39	4.15	40.36	40.36	4.70	38.20	38.20	5.31			

See notes on page 15

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)																			
		75 (23.9)				85 (29.4)				95 (35)				105 (40.6)				115 (46.1)			
		CFM	EWB ° F (° C)	Capacity MBtuh		Total Sys- tem KW**	Capacity MBtuh	Sens†	Total Sys- tem KW**	Capacity MBtuh	Sens†	Total Sys- tem KW**	Capacity MBtuh	Sens†	Total Sys- tem KW**	Capacity MBtuh	Sens†	Total Sys- tem KW**			
Total	Sens†			Total	Sens†														Total	Sens†	Total
		72 (22.2)	68.59	35.06	4.21	65.48	33.92	4.68	61.98	32.86	5.19	58.14	31.29	5.74	53.87	29.80	6.33				
		67 (19.4)	62.70	43.20	4.16	59.86	42.05	4.62	56.72	40.80	5.12	53.22	39.43	5.67	49.33	37.93	6.27				
1750		63 (17.2)	58.47	41.67	4.13	55.83	40.53	4.58	52.92	39.28	5.08	49.67	37.91	5.63	46.05	36.40	6.23				
		62 (16.7)	57.51	51.24	4.12	54.99	50.08	4.57	52.23	48.77	5.07	49.21	49.21	5.62	46.28	46.28	6.23				
		57 (13.9)	56.15	56.15	4.11	54.07	54.07	4.56	51.79	51.79	5.06	49.18	49.18	5.82	46.22	46.22	6.23				
		72 (22.2)	69.65	36.74	4.31	66.37	35.57	4.79	62.77	34.30	5.29	58.77	32.91	5.85	54.38	31.39	6.44				
2000		67 (19.4)	63.71	45.91	4.26	60.74	44.75	4.72	57.50	43.49	5.23	53.86	42.09	5.78	49.84	40.55	6.37				
		63 (17.2)	59.45	44.20	4.23	56.70	43.03	4.68	53.69	41.77	5.18	50.31	40.37	5.73	46.59	38.83	6.33				
		62 (16.7)	58.76	54.88	4.22	56.20	55.73	4.68	53.66	53.66	5.18	50.87	50.87	5.74	47.70	47.70	6.34				
		57 (13.9)	58.28	58.28	4.22	56.05	56.05	4.68	53.59	53.59	5.18	50.80	50.80	5.74	47.64	47.64	6.34				
2250		72 (22.2)	70.43	38.33	4.42	67.03	37.14	4.89	63.31	35.85	5.40	59.20	34.44	5.95	54.69	32.90	6.54				
		67 (19.4)	64.43	48.49	4.36	61.40	47.33	4.82	58.04	46.04	5.33	54.30	44.60	5.88	50.21	43.02	6.48				
		63 (17.2)	60.19	46.60	4.33	57.35	45.42	4.78	54.23	44.13	5.28	50.79	42.71	5.83	46.97	41.11	6.43				
		62 (16.7)	60.10	60.10	4.33	57.73	57.73	4.79	55.11	55.11	5.29	52.15	52.15	5.85	48.81	48.81	6.46				
		57 (13.9)	60.02	60.02	4.33	57.66	57.66	4.79	55.05	55.05	5.29	52.10	52.10	5.85	48.76	48.76	6.45				

NOTES:

- * Tested combination.
- † Total and sensible capacities are net capacities. Blower motor heat has been subtracted.
- ‡ Sensible capacities shown are based on 80°F (27°C) entering air at the indoor coil. For sensible capacities at other than 80°F (27°C), deduct 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air for each degree below 80°F (27°C), or add 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air per degree above 80°F (27°C).
- # Detailed cooling capacities are based on indoor and outdoor unit at the same elevation per AHRI standard 210/240-2008. If additional tubing length and/or indoor unit is located above outdoor unit, a slight variation in capacity may occur.
- ** System kw is total of indoor and outdoor unit kilowatts.
- †† At TVA rating indoor condition (75°F edb/63°F ewb). All other indoor air temperatures are at 80°F edb.
- EWB** — Entering Wet Bulb
- NOTE:** When the required data fall between the published data, interpolation may be performed. Extrapolation is not an acceptable practice. 1.

CONDENSER ONLY RATINGS

SST ° F (° C)		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)						
		55 (12.78)	65 (18.33)	75 (23.89)	85 (29.44)	95 (35.0)	105 (40.56)	115 (46.11)
CA13NA018BN**E								
30 (-1.11)	TCG	16.90	15.70	14.60	13.60	12.60	10.50	9.30
	SDT	71.20	79.70	88.40	97.90	107.30	126.60	137.10
	KW	0.88	0.99	1.10	1.24	1.39	1.78	2.04
35 (1.67)	TCG	18.60	17.40	16.20	15.10	14.00	11.80	10.50
	SDT	71.50	80.80	89.50	98.90	108.20	127.40	138.00
	KW	0.86	0.98	1.10	1.24	1.40	1.78	2.06
40 (4.44)	TCG	20.40	19.10	17.90	16.70	15.60	13.20	11.80
	SDT	73.50	81.90	90.60	99.90	109.20	128.70	137.60
	KW	0.87	0.98	1.10	1.24	1.40	1.80	2.03
45 (7.22)	TCG	22.20	20.90	19.60	18.40	17.20	14.60	13.20
	SDT	73.40	83.10	91.70	101.00	110.30	129.40	138.50
	KW	0.84	0.97	1.09	1.24	1.40	1.80	2.04
50 (10.0)	TCG	24.10	22.70	21.40	20.20	18.90	16.20	14.60
	SDT	74.30	83.50	92.80	102.10	111.40	130.40	139.50
	KW	0.83	0.95	1.09	1.24	1.40	1.81	2.04
55 (12.78)	TCG	26.10	24.70	23.40	22.00	20.60	17.80	16.10
	SDT	75.50	84.80	94.00	103.30	112.50	131.50	140.30
	KW	0.81	0.94	1.08	1.23	1.40	1.81	2.04
CA13NA024BN**F								
30 (-1.11)	TCG	18.60	18.00	17.40	16.60	15.80	14.90	13.80
	SDT	78.20	87.90	97.80	107.70	117.70	127.80	138.10
	KW	1.03	1.19	1.39	1.61	1.88	2.19	2.57
35 (1.67)	TCG	20.60	20.00	19.30	18.50	17.60	16.60	15.40
	SDT	79.80	89.50	99.30	109.10	119.10	129.20	139.30
	KW	1.04	1.20	1.39	1.62	1.89	2.21	2.59
40 (4.44)	TCG	22.70	22.10	21.30	20.50	19.50	18.40	17.20
	SDT	81.40	91.10	100.80	110.60	120.50	130.50	140.40
	KW	1.04	1.21	1.40	1.64	1.91	2.23	2.60
45 (7.22)	TCG	25.00	24.30	23.50	22.60	21.60	20.40	19.10
	SDT	83.10	92.80	102.40	112.10	121.90	131.80	141.60
	KW	1.04	1.21	1.41	1.65	1.92	2.24	2.62
50 (10.0)	TCG	27.50	26.70	25.80	24.90	23.80	22.50	21.10
	SDT	84.90	94.50	104.00	113.60	123.30	133.10	142.70
	KW	1.05	1.22	1.42	1.66	1.93	2.26	2.63
55 (12.78)	TCG	30.10	29.30	28.30	27.30	26.10	24.80	23.30
	SDT	86.70	96.20	105.70	115.20	124.80	134.40	143.90
	KW	1.05	1.22	1.43	1.66	1.94	2.27	2.64
CA13NA030BN**D								
30 (-1.11)	TCG	26.40	24.90	23.20	21.70	20.20	18.70	17.10
	SDT	71.50	80.00	88.80	98.10	107.40	116.70	126.00
	KW	1.43	1.58	1.75	1.95	2.18	2.44	2.74
35 (1.67)	TCG	28.80	27.50	25.50	23.90	22.20	20.60	19.20
	SDT	71.70	81.30	89.90	99.20	108.40	117.70	127.20
	KW	1.41	1.58	1.75	1.96	2.19	2.45	2.76
40 (4.44)	TCG	31.90	29.60	27.90	26.20	24.40	22.60	20.70
	SDT	73.40	82.00	91.20	100.30	109.50	118.70	127.90
	KW	1.42	1.57	1.76	1.96	2.20	2.46	2.77
45 (7.22)	TCG	34.60	32.60	30.50	28.60	26.60	24.60	23.30
	SDT	74.50	83.50	92.50	101.60	110.70	119.70	129.40
	KW	1.42	1.58	1.76	1.97	2.20	2.47	2.80
50 (10.0)	TCG	37.40	35.60	33.40	31.10	29.00	26.70	25.40
	SDT	75.80	85.00	94.00	102.90	111.90	120.90	130.50
	KW	1.41	1.59	1.77	1.97	2.21	2.48	2.81
55 (12.78)	TCG	40.80	38.60	36.10	33.80	31.50	29.10	28.00
	SDT	77.50	86.50	95.30	104.30	113.20	122.10	132.00
	KW	1.41	1.59	1.77	1.98	2.22	2.49	2.83

See notes on page 18

CONDENSER ONLY RATINGS CONTINUED

SST ° F (° C)		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)						
		55 (12.78)	65 (18.33)	75 (23.89)	85 (29.44)	95 (35.0)	105 (40.56)	115 (46.11)
CA13NA036BN**D								
30 (-1.11)	TCG	30.70	28.50	26.70	25.10	23.50	21.90	20.00
	SDT	70.70	80.00	89.40	98.80	108.20	117.60	127.00
	KW	1.61	1.94	2.21	2.47	2.73	3.03	3.41
35 (1.67)	TCG	33.70	31.40	29.50	27.80	26.10	24.30	22.20
	SDT	71.80	81.10	90.40	99.80	109.20	118.50	127.80
	KW	1.58	1.91	2.19	2.45	2.72	3.03	3.41
40 (4.44)	TCG	36.90	34.60	32.50	30.70	28.80	26.80	24.60
	SDT	72.90	82.20	91.50	100.90	110.20	119.40	128.60
	KW	1.55	1.89	2.17	2.44	2.71	3.02	3.41
45 (7.22)	TCG	40.40	37.90	35.80	33.80	31.70	29.50	27.10
	SDT	74.20	83.40	92.70	102.00	111.20	120.40	129.50
	KW	1.53	1.87	2.16	2.43	2.71	3.03	3.41
50 (10.0)	TCG	44.20	41.60	39.30	37.10	34.80	32.40	29.80
	SDT	75.50	84.70	94.00	103.20	112.30	121.40	130.50
	KW	1.52	1.86	2.16	2.44	2.72	3.04	3.43
55 (12.78)	TCG	48.20	45.50	43.00	40.60	38.10	35.50	32.60
	SDT	77.00	86.10	95.30	104.40	113.50	122.50	131.50
	KW	1.52	1.87	2.17	2.45	2.74	3.07	3.46
CA13NA042*N**A								
30 (-1.11)	TCG	38.00	36.00	33.90	31.90	29.70	27.60	25.30
	SDT	73.20	82.30	91.40	100.60	109.80	119.10	128.40
	KW	1.95	2.20	2.48	2.80	3.14	3.53	3.95
35 (1.67)	TCG	41.90	39.70	37.40	35.10	32.80	30.50	28.00
	SDT	74.80	83.70	92.80	101.90	111.00	120.20	129.40
	KW	1.97	2.22	2.50	2.81	3.16	3.54	3.97
40 (4.44)	TCG	46.00	43.60	41.10	38.70	36.20	33.60	30.90
	SDT	76.40	85.20	94.20	103.20	112.20	121.30	130.40
	KW	1.98	2.23	2.52	2.83	3.18	3.56	3.98
45 (7.22)	TCG	50.30	47.70	45.10	42.40	39.60	36.80	33.90
	SDT	78.10	86.90	95.70	104.60	113.50	122.50	131.40
	KW	2.01	2.26	2.54	2.85	3.19	3.58	4.00
50 (10.0)	TCG	54.90	52.10	49.20	46.20	43.20	40.20	37.00
	SDT	80.00	88.60	97.20	106.00	114.80	123.70	132.50
	KW	2.03	2.28	2.56	2.87	3.21	3.60	4.01
55 (12.78)	TCG	59.70	56.60	53.40	50.20	46.90	43.50	40.10
	SDT	81.90	90.30	98.90	107.50	116.20	124.90	133.60
	KW	2.06	2.30	2.58	2.89	3.23	3.62	4.03
CA13NA048BN**E								
30 (-1.11)	TCG	39.10	37.90	36.60	35.10	33.40	31.50	29.40
	SDT	72.80	82.00	91.40	100.60	110.00	119.20	128.40
	KW	2.02	2.26	2.58	2.98	3.45	3.99	4.60
35 (1.67)	TCG	43.00	41.70	40.20	38.60	36.80	34.80	32.60
	SDT	74.20	83.40	92.60	101.90	111.10	120.30	129.40
	KW	2.04	2.29	2.61	3.01	3.49	4.03	4.64
40 (4.44)	TCG	47.20	45.80	44.20	42.40	40.50	38.30	35.90
	SDT	75.80	84.90	94.00	103.20	112.40	121.50	130.50
	KW	2.06	2.31	2.64	3.05	3.53	4.08	4.69
45 (7.22)	TCG	51.80	50.20	48.40	46.50	44.40	42.10	39.50
	SDT	77.40	86.50	95.50	104.60	113.70	122.70	131.70
	KW	2.08	2.34	2.67	3.08	3.57	4.12	4.73
50 (10.0)	TCG	56.70	54.90	53.00	50.90	48.60	46.10	43.30
	SDT	79.20	88.10	97.10	106.10	115.10	124.00	132.90
	KW	2.10	2.36	2.70	3.12	3.60	4.16	4.77
55 (12.78)	TCG	62.00	60.00	57.90	55.60	53.10	50.30	47.20
	SDT	81.10	89.90	98.80	107.70	116.60	125.40	134.20
	KW	2.11	2.38	2.73	3.14	3.63	4.19	4.81

See notes on page 18

CONDENSER ONLY RATINGS CONTINUED

SST ° F (° C)		CONDENSER ENTERING AIR TEMPERATURES ° F (° C)						
		55 (12.78)	65 (18.33)	75 (23.89)	85 (29.44)	95 (35.0)	105 (40.56)	115 (46.11)
CA13NA060*N**C								
30 (-1.11)	TCG	53.70	51.10	48.30	45.40	42.30	39.20	36.10
	SDT	75.80	84.90	94.10	103.10	112.20	121.30	130.40
	KW	2.65	3.00	3.38	3.78	4.24	4.77	5.38
35 (1.67)	TCG	58.90	56.10	53.00	49.80	46.50	43.20	39.70
	SDT	77.50	86.60	95.70	104.70	113.60	122.60	131.60
	KW	2.72	3.06	3.43	3.84	4.29	4.82	5.44
40 (4.44)	TCG	64.60	61.40	58.00	54.50	50.90	47.20	43.40
	SDT	79.40	88.40	97.30	106.20	115.10	124.00	132.90
	KW	2.79	3.13	3.50	3.90	4.35	4.88	5.50
45 (7.22)	TCG	70.60	67.00	63.30	59.40	55.50	51.40	47.30
	SDT	81.40	90.30	99.10	107.90	116.70	125.40	134.20
	KW	2.87	3.20	3.56	3.97	4.42	4.95	5.56
50 (10.0)	TCG	76.90	73.00	68.80	64.60	60.20	55.70	51.20
	SDT	83.50	92.20	100.90	109.60	118.30	126.90	135.60
	KW	2.95	3.29	3.64	4.04	4.50	5.03	5.64
55 (12.78)	TCG	83.60	79.20	74.60	69.90	65.10	60.20	55.20
	SDT	85.80	94.30	102.90	111.40	119.90	128.50	137.00
	KW	3.05	3.38	3.73	4.13	4.59	5.12	5.73

* AHRI listing applies only to systems shown in Combination Ratings table.

KW – Outdoor Unit Kilowatts Only.

SDT – Saturated Temperature Leaving Compressor (° F)

SST – Saturated Temperature Entering Compressor (° F/° C)

TCG – Gross Cooling Capacity (1000 Btuh)

GUIDE SPECIFICATIONS

GENERAL

System Description

Outdoor-mounted, air-cooled, split-system air conditioner unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

Quality Assurance

- Unit will be rated in accordance with the latest edition of AHRI Standard 210.
- Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.
- Unit construction will comply with latest edition of ANSI/ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL-us approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 450 psig.
- Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

PRODUCTS

Equipment

Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A), and special features required prior to field start-up.

Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

Fans

- Condenser fan will be direct-drive propeller type, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER CA13NA 1-1/2 TO 5 NOMINAL TONS

Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.

Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

Refrigeration Components

- Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, and compressor oil.
- Unit will be equipped with high-pressure switch, low pressure switch and filter drier for Puron refrigerant.

Operating Characteristics

- The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F/°C wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.
- The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

- Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- Nominal unit electrical characteristics will be _____ v, three phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

SYSTEM DESIGN SUMMARY

14. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01-IN W.C.
15. Minimum outdoor operating air temperature without low-ambient operation accessory is 55°F (12.8°C).
16. Maximum outdoor operating air temperature is 115°F (46.1°C).
17. For reliable operation, unit should be level in all horizontal planes.
18. For interconnecting refrigerant tube lengths greater than 80 ft (23.4 m) and/or 35 ft (10.7 m) vertical differential, consult Residential Piping and Longline Guideline and Service Manual available from equipment distributor.
19. If any refrigerant tubing is buried, provide a 6 in. (152.4 mm) vertical rise to the valve connections at the unit. Refrigerant tubing lengths up to 36 in. (914.4 mm) may be buried without further consideration. Do not bury refrigerant lines longer than 36 in. (914.4 mm).
20. Use only copper wire for electric connection at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
21. Do not apply capillary tube indoor coils to these units.
22. Factory-supplied filter drier must be installed.



Contract - Detailed

Sales Rep Name: Reeves, Dana
Sales Rep Phone: 248-464-8601
Sales Rep Fax: 248-292-5031
Sales Rep E-Mail: reevesdj@pella.com

Table with 3 columns: Customer Information, Project/Delivery Address, and Order Information. Includes details for WEST CONSTRUCTION SERVICES, 910 Marlborough apartments, and various order numbers and dates.

Customer Notes: ROOM LOCATION: Listed as: Window Type_Elevation_Room Location_(Floor_ Opening # on Floor, Starting at Left Corner of Elv.)
What is shown in parenthesis above will not print out on unit label.

The line item number will print on product's label, and all 2-digit line item #'s are lower level, all 100's are first floor, all 200's are 2nd floor and all 300's are third floor.

*** West Constructions original PO #3325 dated 5/29/20 remains the contract of record. Signoff on this Pella contract is to confirm new sizes, as field measured by Joe Owens, and to confirm all product, attributes, and line item notes. ***

See Masonry Opening schedule, provided separately, for all clearances between frame and MO size. See provided specification sheet, for easy view of all attributes. Original shops still accurate for head, jamb and sill details, though not for unit sizes.

DISREGARD all performance ratings listed for the Reserve product, with LowE 272 glass. Because these units are special order, they have not been tested and have NO PERFORMANCE RATING

MK initial here that you have reviewed the above notes

Line #	Location:	Attributes
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5 E W K/Din Lwr1

Special Pella® Reserve, Traditional, 2-Wide Double Hung, 68.25 X 48.75, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 32.62548.75 Double Hung, Equal**Frame Size:** 32 5/8 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, 32.62548.75 Double Hung, Equal****Frame Size:** 32 5/8 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 234".**Rough Opening:** 69" X 49.5"

Customer Notes: TEMPERED - proximity to exterior stair

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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10 E W LR Lwr2

Special Pella® Reserve, Traditional, 2-Wide Double Hung, 80.25 X 48.75, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 38.62548.75 Double Hung, Equal**Frame Size:** 38 5/8 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, 38.62548.75 Double Hung, Equal****Frame Size:** 38 5/8 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 258".**Rough Opening:** 81" X 49.5"

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

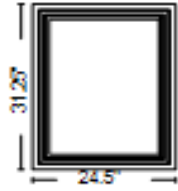
Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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15 Foyer N/S

Special Pella® Reserve, Traditional, Sash Set Fixed, 24.5 X 31.25, Almond

Qty
2



PK #
2073

Viewed From Exterior

1: Traditional, 24.531.25 Fixed Sash Set

Frame Size: 24 1/2 X 31 1/4

General Information: Standard, Clad, Pine, 5", 3 11/16"

Exterior Color / Finish: Painted, Standard Enduraclad, Almond

Interior Color / Finish: Primed Interior

Sash / Panel: Ogee, Ogee, Standard

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm

Performance Information: U-Factor 0.27, SHGC 0.30, VLT 0.55, CPD PEL-N-1-53567-00002, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 11

Grille: No Grille,

Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 112".

Rough Opening: 25 - 1/4" X 32"

Customer Notes: 3-11/16" - No JE

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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20 E W LR Lwr3

Special Pella® Reserve, Traditional, 2-Wide Double Hung, 80.5 X 48.75, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 38.7548.75 Double Hung, Equal**Frame Size:** 38 3/4 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, 38.7548.75 Double Hung, Equal****Frame Size:** 38 3/4 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 259".**Rough Opening:** 81 - 1/4" X 49 - 1/2"

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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25 G W Hall Lwr4

Special Pella® Reserve, Traditional, Double Hung, 30.5 X 48, AlmondQty

1

PK #
2073

Viewed From Exterior

1: Traditional, 30.548 Double Hung, Equal**Frame Size:** 30 1/2 X 48**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 157".**Rough Opening:** 31 - 1/4" X 48 - 3/4"

Customer Notes: ADDED TEMPERING to this unit

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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30 F W K/Din Lwr5

Special Pella® Reserve, Traditional, 2-Wide Double Hung, 68.5 X 48.75, AlmondQty

1

PK #
2073

Viewed From Exterior

1: Traditional, 32.7548.75 Double Hung, Equal**Frame Size:** 32 3/4 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, 32.7548.75 Double Hung, Equal****Frame Size:** 32 3/4 X 48 3/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-232-00253-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 235".**Rough Opening:** 69 - 1/4" X 49 - 1/2"

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

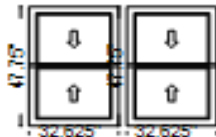
Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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35 F S BR3 Lwr1

Pella 250 Series, 2-Wide Double Hung, 68.25 X 47.75, AlmondQty

1



PK #

2073

Viewed From Exterior

1: 32.62547.75 Double Hung, Equal**Frame Size:** 32 5/8 X 47 3/4**General Information:** Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included**Exterior Color / Finish:** Almond**Interior Color / Finish:** Almond**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware**Screen:** Full Screen, Conventional Fiberglass**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00001, Performance Class R, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** AlignedWith, 3"**2: 32.62547.75 Double Hung, Equal****Frame Size:** 32 5/8 X 47 3/4**General Information:** Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included**Exterior Color / Finish:** Almond**Interior Color / Finish:** Almond**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware**Screen:** Full Screen, Conventional Fiberglass**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00001, Performance Class R, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** Pella Recommended Clearance, Perimeter Length = 232".**Rough Opening:** 33 - 1/8" X 48 - 1/4"

Customer Notes: Ships as two separate units. Install with units 3" apart, framing structure between. Mull covers & framing by others. Full screens.

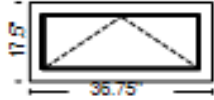
PERFORMANCE CLASS of R does not meet specs

Line #	Location:	Attributes
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40 K S BR3 Lwr2

Pella 250 Series, Awning Vent, 36.75 X 17.5, Almond

Qty
1



PK #
2073

Viewed From Exterior

1: 36.7517.5 Vent Awning
Frame Size: 36 3/4 X 17 1/2

General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included

Exterior Color / Finish: Almond

Interior Color / Finish: Almond

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude

Hardware Options: Standard, Wash Hinge Hardware, Fold-Away Crank, Almond, No Limited Opening Hardware

Screen: Full Screen, Conventional Fiberglass

Performance Information: U-Factor 0.27, SHGC 0.25, VLT 0.46, CPD PEL-N-241-00005-00001, Performance Class LC, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Not Applicable

Grille: No Grille,

Wrapping Information: User Defined Rough Opening Clearance, 3/8", 1/4", 1/4", 3/8", Perimeter Length = 109".

Rough Opening: 37 - 1/4" X 18 - 1/4"

Customer Notes: Standard Advnced LowE glass

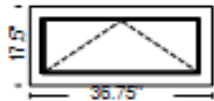
Does NOT meet egress

Line #	Location:	Attributes
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45 K S BR2 Lwr3

Pella 250 Series, Awning Vent, 36.75 X 17.5, Almond

Qty
1



PK #
2073

Viewed From Exterior

1: 36.7517.5 Vent Awning

Frame Size: 36 3/4 X 17 1/2

General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included

Exterior Color / Finish: Almond

Interior Color / Finish: Almond

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude

Hardware Options: Standard, Wash Hinge Hardware, Fold-Away Crank, Almond, No Limited Opening Hardware

Screen: Full Screen, Conventional Fiberglass

Performance Information: U-Factor 0.27, SHGC 0.25, VLT 0.46, CPD PEL-N-241-00005-00001, Performance Class LC, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Not Applicable


Grille: No Grille,

Wrapping Information: Pella Recommended Clearance, Perimeter Length = 109".

Rough Opening: 37 - 1/4" X 18"

Customer Notes: Standard Advnced LowE glass

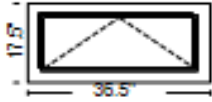
Does NOT meet egress

Line #	Location:	Attributes	
50	I E Bath Lwr1	Pella 250 Series, Direct Set Fixed, 36.5 X 25, Almond	<u>Qty</u> 1
		<p>1: Non-Standard Size Non-Standard Size Fixed Direct Set Frame Size: 36 1/2 X 25 General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included Exterior Color / Finish: Almond Interior Color / Finish: Almond Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Performance Information: U-Factor 0.27, SHGC 0.30, VLT 0.57, CPD PEL-N-240-00005-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08 11 Grille: No Grille, Wrapping Information: Pella Recommended Clearance, Perimeter Length = 123".</p>	<p>PK # 2073</p> <p>Viewed From Exterior</p>

Rough Opening: 37" X 25.5"

Customer Notes: 1/2" shorter than other (3) units on this floor/elv, but not directly adjacent

Standard Advnced LowE glass

Line #	Location:	Attributes	
55	K E BR1 Lwr2	Pella 250 Series, Awning Vent, 36.5 X 17.5, Almond	<u>Qty</u> 1
		<p>1: Non-Standard Size Vent Awning Frame Size: 36 1/2 X 17 1/2 General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included Exterior Color / Finish: Almond Interior Color / Finish: Almond Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Hardware Options: Standard, Wash Hinge Hardware, Fold-Away Crank, Almond, No Limited Opening Hardware Screen: Full Screen, Conventional Fiberglass Performance Information: U-Factor 0.27, SHGC 0.25, VLT 0.46, CPD PEL-N-241-00005-00001, Performance Class LC, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08 11, Egress Not Applicable Grille: No Grille, Wrapping Information: Pella Recommended Clearance, Perimeter Length = 108".</p>	<p>PK # 2073</p> <p>Viewed From Exterior</p>

Rough Opening: 37" X 18"

Customer Notes: Standard Advnced LowE glass

Does NOT meet egress

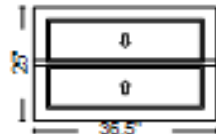
Line #	Location:	Attributes	
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60 I E BR1 Lwr3

Pella 250 Series, Double Hung, 36.5 X 25, Almond

Qty

1



PK #
2073

Viewed From Exterior

1: Non-Standard Size Non-Standard Size Double Hung, Equal

Frame Size: 36 1/2 X 25

General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included

Exterior Color / Finish: Almond

Interior Color / Finish: Almond

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude

Hardware Options: Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware

Screen: Full Screen, Conventional Fiberglass

Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00001, Performance Class R, PG 30, Calculated Positive DP Rating 30, Calculated Negative DP Rating 30, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements

Grille: No Grille,

Wrapping Information: User Defined Rough Opening Clearance, 1/2", 1/4", 1/4", 1/2", Perimeter Length = 123".

Rough Opening: 37" X 26"

Customer Notes: MO hgt. 1/2" taller than left & right end units on this floor/elv

Standard Advnced LowE glass

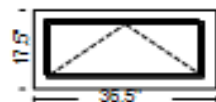
Line #	Location:	Attributes	
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65 K E BR1 Lwr4

Pella 250 Series, Awning Vent, 36.5 X 17.5, Almond

Qty

1



PK #
2073

Viewed From Exterior

1: Non-Standard Size Vent Awning

Frame Size: 36 1/2 X 17 1/2

General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included

Exterior Color / Finish: Almond

Interior Color / Finish: Almond

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude

Hardware Options: Standard, Wash Hinge Hardware, Fold-Away Crank, Almond, No Limited Opening Hardware

Screen: Full Screen, Conventional Fiberglass

Performance Information: U-Factor 0.27, SHGC 0.25, VLT 0.46, CPD PEL-N-241-00005-00001, Performance Class LC, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Not Applicable

Grille: No Grille,

Wrapping Information: User Defined Rough Opening Clearance, 3/8", 1/4", 1/4", 3/8", Perimeter Length = 108".

Rough Opening: 37" X 18.25"

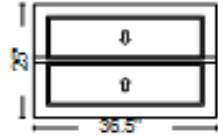
Customer Notes: Does NOT meet egress

Line #	Location:	Attributes
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70 I E BR2 Lwr5

Pella 250 Series, Double Hung, 36.5 X 25, AlmondQty

1

PK #
2073

Viewed From Exterior

1: 36.525 Double Hung, Equal**Frame Size:** 36 1/2 X 25**General Information:** Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included**Exterior Color / Finish:** Almond**Interior Color / Finish:** Almond**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware**Screen:** Full Screen, Conventional Fiberglass**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00001, Performance Class R, PG 30, Calculated Positive DP Rating 30, Calculated Negative DP Rating 30, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** User Defined Rough Opening Clearance, 1/2", 1/4", 1/4", 1/2", Perimeter Length = 123".**Rough Opening:** 37" X 26"

Customer Notes: MO hgt. 1/2" taller than left & right end units on this floor/elv

Standard Advnced LowE glass

PERFORMANCE CLASS of R does not meet specs

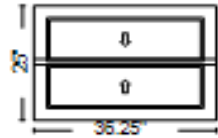
Does NOT meet egress

Line #	Location:	Attributes
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75 I E BR2 Lwr6

Pella 250 Series, Double Hung, 36.25 X 25, Almond

Qty
1



PK #
2073

Viewed From Exterior

1: 36.2525 Double Hung, Equal
Frame Size: 36 1/4 X 25
General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included
Exterior Color / Finish: Almond
Interior Color / Finish: Almond
Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude
Hardware Options: Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware
Screen: Full Screen, Conventional Fiberglass
Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00001, Performance Class R, PG 30, Calculated Positive DP Rating 30, Calculated Negative DP Rating 30, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements
Grille: No Grille,
Wrapping Information: User Defined Rough Opening Clearance, 1/2", 1/4", 1/4", 1/2", Perimeter Length = 123".

Rough Opening: 36 - 3/4" X 26"

Customer Notes: 1/4" narrower than similar units on this floor/elv

Standard Advnced LowE glass

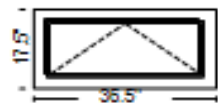
PERFORMANCE CLASS of R does not meet specs

Line #	Location:	Attributes
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80 K N BR2 Lwr1

Pella 250 Series, Awning Vent, 36.5 X 17.5, Almond

Qty
1



PK #
2073

Viewed From Exterior

1: Non-Standard Size Vent Awning
Frame Size: 36 1/2 X 17 1/2
General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included
Exterior Color / Finish: Almond
Interior Color / Finish: Almond
Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude
Hardware Options: Standard, Wash Hinge Hardware, Fold-Away Crank, Almond, No Limited Opening Hardware
Screen: Full Screen, Conventional Fiberglass
Performance Information: U-Factor 0.27, SHGC 0.25, VLT 0.46, CPD PEL-N-241-00005-00001, Performance Class LC, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08|11, Egress Not Applicable
Grille: No Grille,
Wrapping Information: User Defined Rough Opening Clearance, 3/8", 1/4", 1/4", 3/8", Perimeter Length = 108".

Rough Opening: 37" X 18.25"

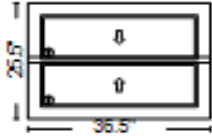
Customer Notes: Standard Advnced LowE glass

Line #	Location:	Attributes
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85 J N Bath Lwr2

Pella 250 Series, Double Hung, 36.5 X 25.5, AlmondQty

1

PK #
2073

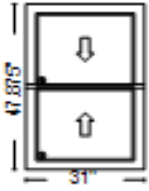
Viewed From Exterior

1: Non-Standard Size Non-Standard Size Double Hung, Equal**Frame Size:** 36 1/2 X 25 1/2**General Information:** Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included**Exterior Color / Finish:** Almond**Interior Color / Finish:** Almond**Glass:** Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude**Hardware Options:** Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware**Screen:** Full Screen, Conventional Fiberglass**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00004, Performance Class R, PG 30, Calculated Positive DP Rating 30, Calculated Negative DP Rating 30, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** Pella Recommended Clearance, Perimeter Length = 124".**Rough Opening:** 37" X 26"

Customer Notes: Added TEMPERING due to proximity to tub

Standard Advanced LowE glass

PERFORMANCE CLASS of R does not meet specs

Line #	Location:	Attributes	
90	H N Bath Lwr3	Pella 250 Series, Double Hung, 31 X 47.875, Almond	Qty 1
	 <p>PK # 2073</p> <p>Viewed From Exterior</p>	<p>1: 3147.875 Double Hung, Equal Frame Size: 31 X 47 7/8 General Information: Standard, Vinyl, Block, No Foam Insulated, 3 1/4", 3 1/4", Sill Adapter Included, Head Expander Included Exterior Color / Finish: Almond Interior Color / Finish: Almond Glass: Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Hardware Options: Cam-Action Lock, Almond, Standard Vent Stop, No Limited Opening Hardware Screen: Full Screen, Conventional Fiberglass Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.53, CPD PEL-N-211-00057-00004, Performance Class R, PG 35, Calculated Positive DP Rating 35, Calculated Negative DP Rating 35, Year Rated 08 11, Egress Does not meet typical United States egress, but may comply with local code requirements Grille: No Grille, Wrapping Information: Pella Recommended Clearance, Perimeter Length = 158".</p>	

Rough Opening: 31 - 1/2" X 48 - 3/8"

Customer Notes: Ships as two separate units. Install with units 3" apart, framing structure between. Mull covers & framing by others. Full screens.

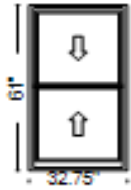
PERFORMANCE CLASS of R does not meet specs

Line #	Location:	Attributes
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100 D W K/Din 1st 1

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 32.7561 Double Hung, Equal**Frame Size:** 32 3/4 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 188".**Rough Opening:** 33 - 1/2" X 61 - 3/4"

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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105 C W K/Din 1st 2

Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, Almond**Qty**

1

PK #
2073

Viewed From Exterior

1: Traditional, 30.62549.25 Double Hung, Equal**Frame Size:** 30 5/8 X 49 1/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 160".**Rough Opening:** 31 - 1/2" X 50"

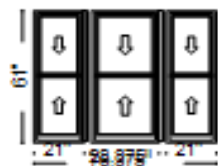
Customer Notes: this opening 1/4" wider than opening above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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110 B W LR 1st 3

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.375 X 61, AlmondQty

1

1: Traditional, Non-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard Size Non-Standard Size Double Hung, Equal****Frame Size:** 28 3/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 5/16", 5/16", 3/8", Perimeter Length = 275".**Rough Opening:** 77" X 61.75"

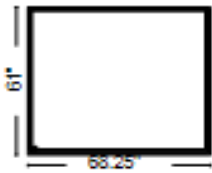
Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

this opening 1/4" narrower than opening above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZES!!! Thanks,
Nancy

Line #	Location:	Attributes		Qty
115	A W Stair 1st 4	Special Support Product, Direct Set Fixed Frame, 68.25 X 61, Almond		1
		 <p>Viewed From Exterior</p>	<p>1: 68.2561 Fixed Frame Frame Size: 68 1/4 X 61 General Information: Interior Glazed, Factory Assembled, Standard, Clad, Pine, 5", 3 11/16" Exterior Color / Finish: Painted, Standard Enduraclad, Almond Interior Color / Finish: Primed Interior Glass: Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Performance Information: U-Factor 0.28, SHGC 0.32, VLT 0.60, CPD PEL-N-18-02827-00001, Performance Class CW, PG 60, Calculated Positive DP Rating 60, Calculated Negative DP Rating 60, Year Rated 08 11 Grille: No Grille, Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 259".</p>	
	PK # 2073			

Rough Opening: 69" X 61.75"

Customer Notes: REV to FIXED DH, tempered - - so unit has a sash profile, same as other units (prior Support was frame, glass & glass stops only - - no sash) - - will cover higher cost of sash set fixed unit

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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120 B W LR 1st 5

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.125 X 61, AlmondQty

1

1: Traditional, Non-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard Size Non-Standard Size Double Hung, Equal****Frame Size:** 28 1/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 275".**Rough Opening:** 77" X 61.75"

Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

this opening 1/4" wider than opening above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

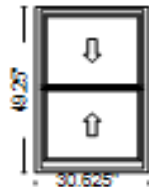
10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZES!!! Thanks, Nancy

Line #	Location:	Attributes	Qty
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125 C W K/Din 1st 6

Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, Almond

Qty
1



PK #
2073

Viewed From Exterior

1: Traditional, 30.62549.25 Double Hung, Equal

Frame Size: 30 5/8 X 49 1/4

General Information: Standard, Luxury, Clad, Pine, 5", 3 11/16"

Exterior Color / Finish: Painted, Standard Enduraclad, Almond

Interior Color / Finish: Primed Interior

Sash / Panel: Ogee, Ogee, Standard, No Sash Lugs

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm

Hardware Options: Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor

Screen: Integrated Rolscreen® Lower Sash Only

Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements

Grille: No Grille,

Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 160".

Rough Opening: 31 - 1/2" X 50"

Customer Notes: this opening 1/4" wider than opening above it on 3rd floor

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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130 D W K/Din 1st 7



PK #

2073

Viewed From Exterior

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, AlmondQty

1

1: Traditional, 32.7561 Double Hung, Equal**Frame Size:** 32 3/4 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 1/2", 3/8", 3/8", 1/2", Perimeter Length = 188".**Rough Opening:** 33 - 1/2" X 62"

Customer Notes: on same floor as 61.75" units on this elevation

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

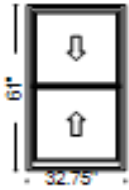
Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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200 D W K/Din 2nd 1

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 32.7561 Double Hung, Equal**Frame Size:** 32 3/4 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 188".**Rough Opening:** 33 - 1/2" X 61 - 3/4"

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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205 C W K/Din 2nd 2

Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 30.62549.25 Double Hung, Equal**Frame Size:** 30 5/8 X 49 1/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 7/16", 5/16", 5/16", 7/16", Perimeter Length = 160".**Rough Opening:** 31 - 1/4" X 50 - 1/8"

Customer Notes: this opening 1/4" narrower than 1st floor below it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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210 B W LR 2nd 3



PK #

2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.375 X 61, AlmondQty

1

1: Traditional, Non-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard Size Non-Standard Size Double Hung, Equal****Frame Size:** 28 3/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 275".**Rough Opening:** 77 - 1/4" X 61 - 3/4"

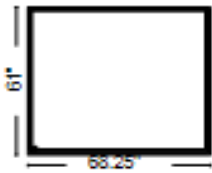
Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

this opening is 1/4" wider than opening below it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZES!!! Thanks,
Nancy

Line #	Location:	Attributes	
215	A W Stair 2nd 4	Special Support Product, Direct Set Fixed Frame, 68.25 X 61, Almond	<u>Qty</u> 1
		 <p>PK # 2073</p> <p>Viewed From Exterior</p> <p>1: 68.2561 Fixed Frame Frame Size: 68 1/4 X 61 General Information: Interior Glazed, Factory Assembled, Standard, Clad, Pine, 5", 3 11/16" Exterior Color / Finish: Painted, Standard Enduraclad, Almond Interior Color / Finish: Primed Interior Glass: Insulated Dual Tempered Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Performance Information: U-Factor 0.28, SHGC 0.32, VLT 0.60, CPD PEL-N-18-02827-00001, Performance Class CW, PG 60, Calculated Positive DP Rating 60, Calculated Negative DP Rating 60, Year Rated 08 11 Grille: No Grille, Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 259".</p>	

Rough Opening: 69" X 61.75"

Customer Notes: REV to FIXED DH, tempered - - so unit has a sash profile, same as other units (prior Support was frame, glass & glass stops only - - no sash) - - will cover higher cost of sash set fixed unit

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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220 B W LR 2nd 5



PK #

2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.125 X 61, AlmondQty

1

1: Traditional, Non-Standard SizeNon-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard SizeNon-Standard Size Double Hung, Equal****Frame Size:** 28 1/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard SizeNon-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 5/16", 5/16", 3/8", Perimeter Length = 275".**Rough Opening:** 76 - 3/4" X 61 - 3/4"

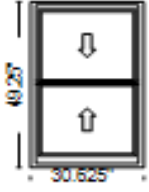
Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

this opening 1/4" narrower than unit below & above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZE!!! Thanks, Nancy

Line #	Location:	Attributes	
225	C W K/Din 2nd 6	Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, Almond	<u>Qty</u> 1
	 <p>PK # 2073</p> <p>Viewed From Exterior</p>	<p>1: Traditional, 30.62549.25 Double Hung, Equal Frame Size: 30 5/8 X 49 1/4 General Information: Standard, Luxury, Clad, Pine, 5", 3 11/16" Exterior Color / Finish: Painted, Standard Enduraclad, Almond Interior Color / Finish: Primed Interior Sash / Panel: Ogee, Ogee, Standard, No Sash Lugs Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm Hardware Options: Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor Screen: Integrated Rolscreen® Lower Sash Only Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08 11, Egress Does not meet typical United States egress, but may comply with local code requirements Grille: No Grille, Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 160".</p>	

Rough Opening: 31 - 1/2" X 50"

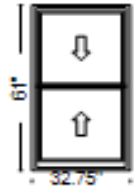
Customer Notes: this opening 1/4" wider than opening above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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230 D W K/Din 2nd 7

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, AlmondQty

1

1: Traditional, 32.7561 Double Hung, Equal**Frame Size:** 32 3/4 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, Pella Recommended Clearance, Perimeter Length = 188".**Rough Opening:** 33 - 1/2" X 61 - 3/4"

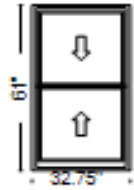
Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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300 D W K/Din 3rd 1

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, AlmondQty

1

1: Traditional, 32.7561 Double Hung, Equal**Frame Size:** 32 3/4 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 5/8", 3/8", 3/8", 5/8", Perimeter Length = 188".**Rough Opening:** 33 - 1/2" X 62 - 1/4"

Customer Notes: on same floor as 61.75" units on this elevation

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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305 C W K/Din 3rd 2

Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, AlmondQty

1



PK #

2073

Viewed From Exterior

1: Traditional, 30.62549.25 Double Hung, Equal**Frame Size:** 30 5/8 X 49 1/4**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 160".**Rough Opening:** 31 - 1/2" X 50"

Customer Notes: this opening 1/4" wider than opening above it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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310 B W LR 3rd 3

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.375 X 61, AlmondQty

1

1: Traditional, Non-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard Size Non-Standard Size Double Hung, Equal****Frame Size:** 28 3/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 3/8", 7/16", 7/16", 3/8", Perimeter Length = 275".**Rough Opening:** 77 - 1/4" X 61 - 3/4"Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

Custom Product Instructions:

***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZES!!! Thanks,
Nancy

Line #	Location:	Attributes
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315 B W LR 3rd 4

PK #
2073

Viewed From Exterior

Special Pella® Reserve, Traditional, 3-Wide Double Hung, 76.125 X 61, AlmondQty

1

1: Traditional, Non-Standard Size Double Hung, Equal**Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 1:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**2: Traditional, Non-Standard Size Non-Standard Size Double Hung, Equal****Frame Size:** 28 1/8 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Vertical Mull 2:** FactoryMull, 3" x 4 3/8" Wood, Mull Design Pressure- 20**3: Traditional, Non-Standard Size Double Hung, Equal****Frame Size:** 21 X 61**General Information:** Standard, Luxury, Clad, Pine, 5", 3 11/16"**Exterior Color / Finish:** Painted, Standard Enduraclad, Almond**Interior Color / Finish:** Primed Interior**Sash / Panel:** Ogee, Ogee, Standard, No Sash Lugs**Glass:** Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm**Hardware Options:** Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor**Screen:** Integrated Rolscreen® Lower Sash Only**Performance Information:** U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Does not meet typical United States egress, but may comply with local code requirements**Grille:** No Grille,**Wrapping Information:** 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 1/2", 7/16", 7/16", 1/2", Perimeter Length = 275".**Rough Opening:** 77" X 62"

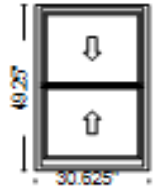
Customer Notes: **REVISED size to 3-wide unequal 10/30/20**

this opening 1/4" wider than unit below it & 1/4" taller that B unit to it's left

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

10/29/20: New size flankers & center unit - - PLEASE RUSH REPRICING GLASS FOR NEW SIZES!!! Thanks,
Nancy

Line #	Location:	Attributes	
320	C W Hall 3rd 5	Special Pella® Reserve, Traditional, Double Hung, 30.625 X 49.25, Almond	<u>Qty</u> 1
		 <p>Viewed From Exterior</p> <p>PK # 2073</p> <p>1: Traditional, 30.625x49.25 Double Hung, Equal Frame Size: 30 5/8 X 49 1/4 General Information: Standard, Luxury, Clad, Pine, 5", 3 11/16" Exterior Color / Finish: Painted, Standard Enduraclad, Almond Interior Color / Finish: Primed Interior Sash / Panel: Ogee, Ogee, Standard, No Sash Lugs Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm Hardware Options: Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor Screen: Integrated Rolscreen® Lower Sash Only Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08 11, Egress Does not meet typical United States egress, but may comply with local code requirements Grille: No Grille, Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 7/16", 5/16", 5/16", 7/16", Perimeter Length = 160".</p>	

Rough Opening: 31 - 1/4" X 50 - 1/8"

Customer Notes: this opening 1/4" narrower than those below it

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

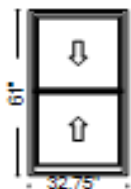
Line #	Location:	Attributes
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325 D W K/Din 3rd 6

Special Pella® Reserve, Traditional, Double Hung, 32.75 X 61, Almond

Qty

1



PK #

2073

Viewed From Exterior

1: Traditional, 32.7561 Double Hung, Equal

Frame Size: 32 3/4 X 61

General Information: Standard, Luxury, Clad, Pine, 5", 3 11/16"

Exterior Color / Finish: Painted, Standard Enduraclad, Almond

Interior Color / Finish: Primed Interior

Sash / Panel: Ogee, Ogee, Standard, No Sash Lugs

Glass: Insulated Dual Low-E Advanced Low-E Insulating Glass Argon Non High Altitude Upgrade To 3mm

Hardware Options: Cam-Action Lock, White, No Window Opening Control Device, No Limited Opening Hardware, Order Sash Lift, No Integrated Sensor

Screen: Integrated Rolscreen® Lower Sash Only

Performance Information: U-Factor 0.29, SHGC 0.28, VLT 0.52, CPD PEL-N-232-00257-00001, Performance Class CW, PG 50, Calculated Positive DP Rating 50, Calculated Negative DP Rating 50, Year Rated 08|11, Egress Meets Typical for ground floor 5.0 sqft (E1) (United States Only)

Grille: No Grille,

Wrapping Information: 6" Installation Clips, Branch Supplied, No Exterior Trim, 3 11/16", 5", Factory Applied, User Defined Rough Opening Clearance, 1/2", 3/8", 3/8", 1/2", Perimeter Length = 188".

Rough Opening: 33 - 1/2" X 62"

Customer Notes: on same floor as 61.75" units on this elevation

Custom Product Instructions: ***No NFRC or Hallmark labels will be supplied for this unit. To print an accurate acknowledgement for this line only, please choose the Proposal-Detailed report with the Exclude Performance box chosen. ***

Quote with Cardinal Low E 272 / clear glass

Line #	Location:	Attributes
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330

ALLOWAETM100006 - Sales Size

Qty

1

Customer Notes: Sales Error on Size: RTN of 189TDRC10 in its entirety, with full credit to customer

Thank You For Purchasing Pella® Products

PELLA WARRANTY:

Pella products are covered by Pella's limited warranties in effect at the time of sale. All applicable product warranties are incorporated into and become a part of this contract. Please see the warranties for complete details, taking special note of the two important notice sections regarding installation of Pella products and proper management of moisture within the wall system. Neither Pella Corporation nor the Seller will be bound by any other warranty unless specifically set out in this contract. However, Pella Corporation will not be liable for branch warranties which create obligations in addition to or obligations which are inconsistent with Pella written warranties.

Clear opening (egress) information does not take into consideration the addition of a Rolscreen [or any other accessory] to the product. You should consult your local building code to ensure your Pella products meet local egress requirements.

Per the manufacturer's limited warranty, unfinished mahogany exterior windows and doors must be finished upon receipt prior to installing and refinished annually, thereafter. Variations in wood grain, color, texture or natural characteristics are not covered under the limited warranty.

INSYNCTIVE PRODUCTS: In addition, Pella Insynctive Products are covered by the Pella Insynctive Products Software License Agreement and Pella Insynctive Products Privacy Policy in effect at the time of sale, which can be found at [Insynctive.pella.com](https://www.pella.com). By installing or using Your Insynctive Products you are acknowledging the Insynctive Software Agreement and Privacy Policy are part of the terms of sale.

Notice of Collection of Personal Information: We may collect your personal information when you interact with us. Under the California Consumer Privacy Act (CCPA), California residents have specific rights to request this information, request to delete this information, and opt out of the sharing or sale of this information to third parties. To learn more about our collection practices and your rights under the CCPA please visit our link <https://www.pella.com/california-rights-policy/> at [pella.com](https://www.pella.com).

ARBITRATION AND CLASS ACTION WAIVER ("ARBITRATION AGREEMENT")

YOU and Pella and its subsidiaries and the Pella Branded Distributor AGREE TO ARBITRATE DISPUTES ARISING OUT OF OR RELATING TO YOUR PELLA PRODUCTS (INCLUDES PELLA GOODS AND PELLA SERVICES) AND WAIVE THE RIGHT TO HAVE A COURT OR JURY DECIDE DISPUTES. YOU WAIVE ALL RIGHTS TO PROCEED AS A MEMBER OR REPRESENTATIVE OF A CLASS ACTION, INCLUDING CLASS ARBITRATION, REGARDING DISPUTES ARISING OUT OF OR RELATING TO YOUR PELLA PRODUCTS. You may opt out of this Arbitration Agreement by providing notice to Pella no later than ninety (90) calendar days from the date You purchased or otherwise took ownership of Your Pella Goods. To opt out, You must send notice by e-mail to pellawebsupport@pella.com, with the subject line: "Arbitration Opt Out" or by calling (877) 473-5527. Opting out of the Arbitration Agreement will not affect the coverage provided by any applicable limited warranty pertaining to Your Pella Products. For complete information, including the full terms and conditions of this Arbitration Agreement, which are incorporated herein by reference, please visit www.pella.com/arbitration or e-mail to pellawebsupport@pella.com, with the subject line: "Arbitration Details" or call (877) 473-5527. D'ARBITRAGE ET RENONCIATION AU RECOURS COLLECTIF ("convention d'arbitrage") EN FRANÇAIS SEE PELLA.COM/ARBITRATION. DE ARBITRAJE Y RENUNCIA COLECTIVA ("acuerdo de arbitraje") EN ESPAÑOL VER PELLA.COM/ARBITRATION.

Seller shall not be held liable for failure or delay in the performance of its obligations under this Agreement, if such performance is hindered or delayed by the occurrence of an act or event beyond the Seller's reasonable control (force majeure event), including but not limited to earthquakes, unusually severe weather and other Acts of God, fire, strikes and labor unrest, epidemics, riots, war, civil unrest, and government interventions. Seller shall give timely notice of a force majeure event and take such reasonable action to mitigate the impacts of such an event.

Product Performance Information:

U-Factor, Solar Heat Gain Coefficient (SHGC), and Visible Light Transmittance (VLT) are certified by the National Fenestration Rating Council (NFRC).

For more information regarding the finishing, maintenance, service and warranty of all Pella® products, visit the Pella® website at www.pella.com

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any products and does not warrant the suitability of any product for any specific use.

Design Pressure (DP), Performance Class, and Performance Grade (PG) are certified by a third party organization, in many cases the Window and Door Manufacturers Association (WDMA). The certification requires the performance of at least one product of the product line to be tested in accordance with the applicable performance standards and verified by an independent party. The certification indicates that the product(s) of the product line passed the applicable tests. The certification does not apply to mulled and/or product combinations unless noted. Actual product results will vary and change over the products life.

For more performance information along with information on Florida Product Approval System (FPAS) Number and Texas Dept. of Insurance (TDI) number go to www.pella.com/performance.

Pella products are covered by Pella's limited warranties in effect at the time of sale. All applicable product warranties are incorporated into and become a part of this contract. Please see the warranties for complete details, taking special note of the two important notice sections regarding installation of Pella products and proper management of moisture within the wall system. Neither Pella Corporation nor PWD, LLC ("Pella Windows and Doors") will be bound by any other warranty unless specifically set out in this contract. However, Pella Corporation will not be liable for branch warranties which create obligations in addition to or obligations which are inconsistent with Pella written warranties.

Clear opening (egress) information does not take into consideration the addition of a Rolscreen [or any other accessory] to the product. You should consult your local building code to ensure your Pella products meet local egress requirements.

Per the manufacturer's limited warranty, unfinished mahogany exterior windows and doors must be finished upon receipt prior to installing and refinished annually, thereafter. Variations in wood grain, color, texture or natural characteristics are not covered under the limited warranty.

GENERAL TERMS AND CONDITIONS: ACCEPTANCE: This order is subject to acceptance by an authorized agent of PWD, LLC. PRICING: All quote pricing is valid for a period of 30 days, at which time an adjustment may be made for product offering changes or transportation costs. CHANGES: Product manufactured or in process of manufacturing in accordance with the specifications, as outlined herein, cannot be returned or cancelled. Additional materials or services will be billed at the price prevailing at the time of order. INSPECTION: Buyer should carefully check material upon delivery and report any claim for product shortages or damages within 3 days. TERMS: Payment required with order unless upon approved credit. Net 30 Days on approved credit. Accounts not paid within terms are subject to finance charge of 1 ½% per month which is an annual percentage rate of 18%. LIENS: Claim of Lien is automatically filed on delinquent jobs as required by law. Waivers of Lien (partial, full or conditional) are furnished upon request after payment. PERFORMANCE: Seller shall not be liable for any consequences of delay regardless of cause. INSTALLATION: Products purchased from and installed by seller under the "Retail" program are covered by a two-year limited installation warranty. With the exception of the "Retail" program, seller shall not be liable to buyer for any damages or problems resulting from installation of Pella products. In the event that buyer has been referred to an independent contractor, including a Certified Pella Contractor, buyer assumes full responsibility for all installation matters, including the selection of the contractor. WARRANTY: Pella products are covered by Pella's limited warranties in effect at the time of sale. All applicable product warranties are incorporated into and become a part of this contract. Please see the warranties for complete details. Neither Pella Corporation nor PWD, LLC will be bound by any other warranty.

See shops 206374.28, page 3 amendment to shops dated 10/07/20, Masonry Opening schedule dated 10/30/20, showing all clearances between frame and MO as well as above detailed information to confirm all sizing and attributes. New shops will not be generated, per customer.

Order Checklist

PWD, LLC

Our #1 Priority is Your Satisfaction!

Pella products are made to your specifications, carefully review the details of this contract as we have a NO Return Policy.

Initial below ALL items that have been verified

_____ Brand: _____	_____ Brand: _____
_____ Brand: _____	_____ Brand: _____
_____ Exterior Color: _____	_____ Grilles: (Exterior/Interior) _____
_____ Interior Stain/Finish: _____	_____ Glazing/Glass: _____
_____ Blinds/Shades: _____	_____ Wall Condition: _____

Check below ALL items that have been verified/reviewed

Other Product Attributes:

[] Reviewed Sizes on Contract _____ [] Window Hardware Color _____

For more information regarding the finishing, maintenance, service and warranty of all Pella® products, visit the Pella® website at www.pella.com

- Window Screens _____ Door Hardware/Key Cylinder _____
- Door Screens _____ Trim/Casing/Mull Covers _____
- Hinging/Sliding (exterior) _____ Tape/Foam/Caulk/Coil/Etc _____
- Handing (exterior) _____ Line Items Initialed _____

Other Items Special to this order:

- Item #1 _____ Item #3 _____
- Item #2 _____ Item #4 _____

Other Information:

- Customer Satisfaction! _____ Product Warranty Reviewed _____
- No Return Policy _____ I Have Received Interior Finish Disclaimer _____
- Delivery Date & Special Instructions _____ Sales & Service Contact Information Reviewed _____
- Delivery Confirmation Process & Expectations Reviewed _____ Service Contact Information #866-647-0570 _____
- Delivery Cancellation Fee \$150 if order rejected at job site _____ Accessory Hold Items Reviewed & Date Set _____
- Reschedule Fee \$75 if Cancelled within 24 hours of Scheduled Delivery _____ Other _____

I hereby authorize Pella Corporation, its affiliates and/or subsidiaries to use, reproduce, and/or publish photographs and/or video that may pertain to me and my project, including materials described below, without compensation. I understand that this material may be used in various communications (e.g. Website, e-newsletters, promotional materials, etc).

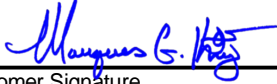
Consequently, the Corporation may publish materials, photographs, and/or make reference to the project in a manner that the Corporation or project sponsor deems appropriate.

Comments: _____

Thank You!!!

Marques King

Customer Name (Please print)



Customer Signature


Novemeber 6, 2020

Date

Credit Card Approval Signature

Nancy L Zagone

Pella Sales Rep Name (Please print)



Pella Sales Rep Signature

October 30, 2020

Date

Order Totals

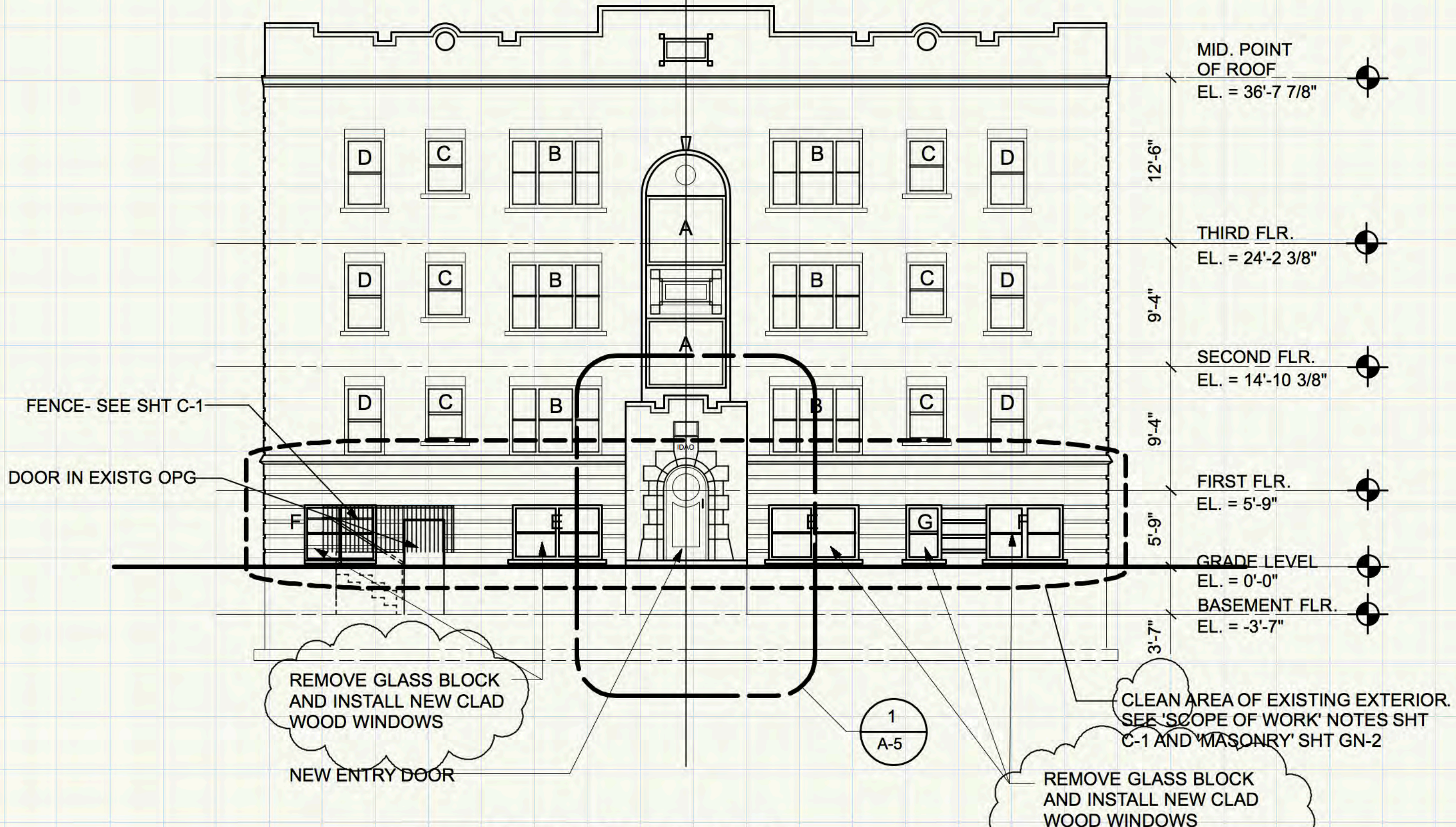
Taxable Subtotal	\$0.00
Sales Tax @ 6%	\$0.00
Non-taxable Subtotal	\$0.00
Total	\$0.00
Deposit Received	\$0.00
Amount Due	\$0.00

Please print, sign & date above, to indicate you have read all notes and supporting documentation provided (referenced on page 39), and agree to have us proceed with this new order as shown. West Construction's original PO3325 dated 5/29/20 remains the contract of record. Net 60 day terms will begin with delivery of Pella order 189TDRC10A delivering to the jobsite.

Line #	Type/Elv/Room/Floor/Opening #	Windowset Name	Operation/Venting	Qty.	Exterior Material Type	Wood Type	Exterior Paint Grade	Exterior Color	Interior Finish/Color	Glazing Type	Insulated Type	Glass Strength	Insulated Glass Option	Low-E Glass Type	Gas Filled	U-Factor	SHGC	VLT	Performance Class	Performance Grade	Jamb Extended Wall Depth	Exterior Sash Profile	Interior Sash Profile	Screen Option	Hardware Type	Hardware Finish
5	E W K/Din Lwr 1	Pella Reserve Traditional Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
10	E W LR Lwr 2	Pella Reserve Traditional Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.53	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
15	Foyer N/S	Pella Reserve Traditional Casement Fixed	Fixed	2	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.27	0.28	0.55	CW	50	3-11/16"	Ogee	Ogee			White
20	E W LR Lwr 3	Pella Reserve Traditional Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.53	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
25	G W Hall Lwr 4	Pella Reserve Traditional Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.53	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
30	F W K/Din Lwr 5	Pella Reserve Traditional Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.53	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
35	F S BR3 Lwr 1	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	35				Full Screen	Cam-Action Lock	Almond
40	K S BR3 Lwr 2	Pella 250 Series Awning	Awning	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.25	0.46	LC	35				Full Screen	Wash-Hinge	Almond
45	K S BR2 Lwr 3	253 Series Awning	Awning	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.25	0.46	LC	35				Full Screen	Wash-Hinge	Almond
50	I E Bath Lwr 1	Pella 250 Series Fixed Casement	Fixed	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.30	0.57	CW	50				Full Screen		Almond
55	K E BR1 Lwr 2	Pella 250 Series Awning	Awning	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.25	0.46	LC	35				Full Screen	Wash-Hinge	Almond
60	I E BR1 Lwr 3	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	30				Full Screen	Cam-Action Lock	Almond
65	K E BR1 Lwr 4	Pella 250 Series Awning	Awning	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.25	0.46	LC	35				Full Screen	Wash-Hinge	Almond
70	I E BR2 Lwr 5	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	30				Full Screen	Cam-Action Lock	Almond
75	I E BR2 Lwr 6	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	30				Full Screen	Cam-Action Lock	Almond
80	K N BR2 Lwr 1	Pella 250 Series Awning	Awning	1	Vinyl			Almond	Almond	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.25	0.46	LC	35				Full Screen	Wash-Hinge	Almond
85	J N Bath Lwr 2	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	30				Full Screen	Cam-Action Lock	Almond
90	G N Bath Lwr 3	Pella 250 Series Double-Hung	Double-Hung	1	Vinyl			Almond	Almond	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	R	35				Full Screen	Cam-Action Lock	Almond
100	D W K/Din 1st 1	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
105	C W K/Din 1st 2	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
110	B W LR 1st 3	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.62	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
115	A W Stair 1st 4	Support Product Traditional Rectangle	Fixed Frame	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass *	Argon	0.28	0.32	0.60	CW	60	3-11/16"	Ogee	Ogee			White
120	B W LR 1st 5	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
125	C W K/Din 1st 6	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
130	D W K/Din 1st 7	Support Product Traditional Rectangle	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
200	D W K/Din 2nd 1	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White

205	C W K/Din 2nd 2	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
210	B W LR 2nd 3	Pella Reserve Double-Hung Support Product	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
215	A W Stair 2nd 4	Traditional Rectangle	Fixed Frame	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass *	Argon	0.28	0.32	0.60	CW	60	3-11/16"	Ogee	Ogee			White
220	B W LR 2nd 5	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
225	C W K/Din 2nd 6	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
230	D W K/Din 2nd 7	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
300	D W K/Din 3rd 1	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
305	C W K/Din 3rd 2	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
310	B W LR 3rd 3	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
315	B W LR 3rd 4	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
320	C W Hall 3rd 5	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White
325	D W K/Din 3rd 6	Pella Reserve Double-Hung	Double-Hung	1	Clad	Pine	Standard Endurclad	Almond	Primed	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass *	Argon	0.29	0.28	0.52	CW	50	3-11/16"	Ogee	Ogee	Integrated Rolscreen Lower Sash Only	Cam-Action Lock	White

* On Pella Reserve units, glass is Cardinal Low-E 272/clear glass (ratings shows in chart are for Pella standard Advanced Low-E -- product has NOT been tested or rated with Cardinal Low-E 272/clear glass !!) (Pella's standard Advanced Low-E glass on 250 Series fiberglass units.)



1
A-3

WEST ELEVATION

SCALE: 1/8"=1'-0"

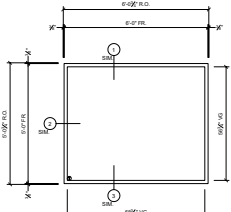
1
A-5

REMOVE GLASS BLOCK AND INSTALL NEW CLAD WOOD WINDOWS

REMOVE GLASS BLOCK AND INSTALL NEW CLAD WOOD WINDOWS

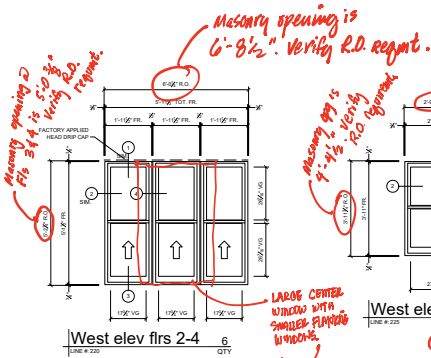
NEW ENTRY DOOR

CLEAN AREA OF EXISTING EXTERIOR. SEE 'SCOPE OF WORK' NOTES SHT C-1 AND 'MASONRY' SHT GN-2



West elev starwell 2
LINE # 213 QTY

A



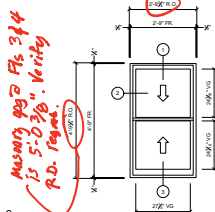
West elev firs 2-4 6
LINE # 220 QTY

B



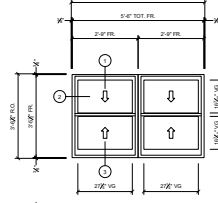
West elev firs 2-4 6
LINE # 225 QTY

C



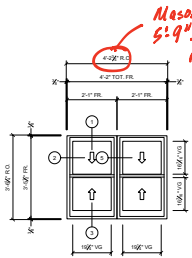
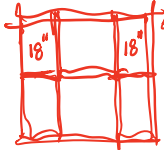
West elev firs 2-4 6
LINE # 232 QTY

D



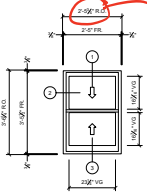
West elev grd level 2
LINE # 233 QTY

E



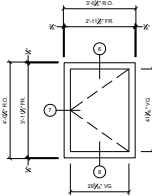
West elev grd level 3
LINE # 240 QTY

F



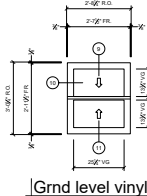
West elev grd level 2
LINE # 245 QTY

G



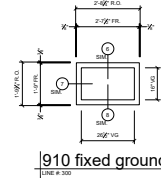
grd egress grown 5
LINE # 250 QTY

H



Grd level vinyl 3
LINE # 255 QTY

I



910 fixed ground lvl 2
LINE # 260 QTY

J

NOTE FOR CONTRACTOR: ARE THESE A PART OF THIS SCOPE?
NOT ON WEST ELEVATION.

INSTALLATION SHOP DRAWING FOR

MARBOROUGH APARTMENTS BUILDING RENOVATIONS

LOCATION: 910 MARLBOROUGH ST., DETROIT, MI

ARCHITECT: EDWARDS GROUP INTERNATIONAL, INC.

DATE	DESCRIPTION	BY	CHECKED
02-07	ISSUED FOR SHOP DRAWING		

EDWARDS GROUP INTERNATIONAL, INC.
206374.14

SPECIFICATIONS													NOTE: CUSTOM ATTRIBUTES (IF ANY) WILL BE NOTED UNDER THE ELEVATION LABEL.																	
Line #	Quote No.	UNIT ID	Windward Products Traditional Rectangle	Operation / Venting	Exterior Material Type	Wood Type	Exterior Paint Grade	Exterior Color	Interior Finish	Gazing Type	Insulated Type	Glass Strength	Insulated Glass Options	Low-E Glass Type	Gas Filled	U-Factor	SHGC	WLT	Performance Class	PG	U-Value Extended Wall Depth	Exterior Sash / Panel Profile	Interior Sash / Panel Profile	Hardware Finish	Screen Option	Screen Exterior Panel Grade	Screen Color	Interior Color	Hardware Type	
215	10628705	West elev above	Architect Berwin(R) Reserve Traditional Single-Hung	Fixed Flame	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Tempered	Low-E	Advanced Low-E Insulating Glass	Argon	0.28	0.32	0.60	CW	60	3 11/16"									
220	10628705	West elev B/s 2-4	Architect Berwin(R) Reserve Traditional Single-Hung	Single Hung	Clad	Pine	Standard Endurast	Brown	Black Stain	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	Matte Black	Half Screen	Standard Endurast	Brown			
220	10628705	West elev B/s 2-4	Architect Berwin(R) Reserve Traditional Single-Hung	Single Hung	Clad	Pine	Standard Endurast	Brown	Black Stain	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	Matte Black	Half Screen	Standard Endurast	Brown			
220	10628705	West elev B/s 2-4	Architect Berwin(R) Reserve Traditional Single-Hung	Single Hung	Clad	Pine	Standard Endurast	Brown	Black Stain	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	Matte Black	Half Screen	Standard Endurast	Brown			
225	10628705	West elev B/s 2-4	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
230	10628705	West elev B/s 2-4	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
235	10628705	West elev grid level	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
235	10628705	West elev grid level	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
240	10628705	West elev grid level	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
240	10628705	West elev grid level	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
245	10628705	West elev grid level	Architect Berwin(R) Reserve Traditional Double-Hung	Double Hung	Clad	Pine	Standard Endurast	Brown	Prefinished White Paint	Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.29	0.28	0.53	CW	50	3 11/16"	Open	Open	White	Full Screen	Standard Endurast	Brown			
290	10628705	9th fl approx green	Panel(R) 250 Series Casement	Left	Vinyl			Tan		Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.26	0.25	0.46	LC	35				White	Full Screen			White	Wash Hinge Hardware	
295	10628705	Grid level vinyl	Panel(R) 250 Series Double-Hung	Double Hung	Vinyl			Tan		Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.28	0.53	R	35				White	Full Screen			White		
300	10628705	9th fl ground lvl	Panel(R) 250 Series Fixed Casement	Fixed	Vinyl			Tan		Insulated	Dual	Annealed	Low-E	Advanced Low-E Insulating Glass	Argon	0.27	0.30	0.57	LC	35								White		

ARCHITECTURAL
SUPPORT SERVICES

D E P A R T M E N T

Architectural Support Services Administration
Pine, Oregon

1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"
1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"

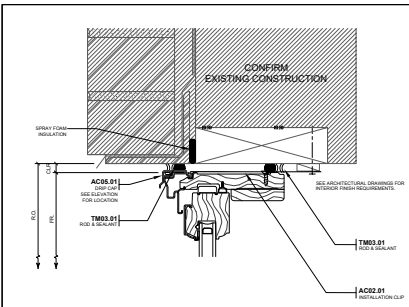
INSTALLATION SHOP DRAWING FOR

MARLBOROUGH APARTMENTS BUILDING RENOVATIONS

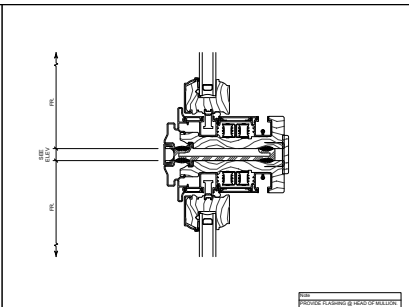
LOCATION: 910 MARLBOROUGH ST., DETROIT, MI

ARCHITECT: EDWARDS GROUP INTERNATIONAL, INC.

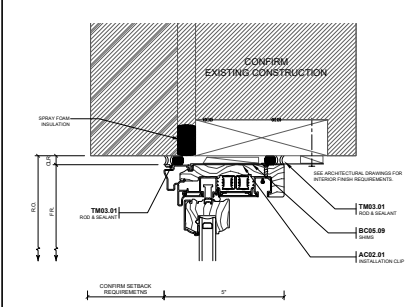
Revision: 2-1-19 Drawn by: sds Checked by: ds Project No: 206374.14	SHEET: 03 of 07
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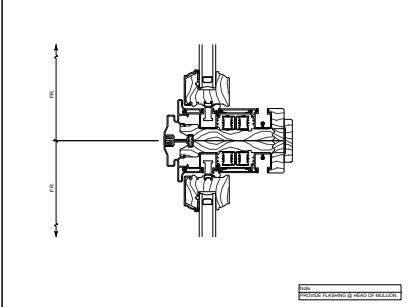
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SEE ARCH. DRWG. A-10



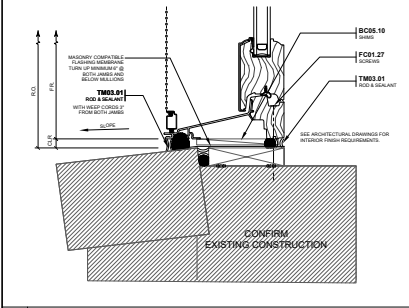
4 FACTORY MULLION
SEE ARCH. DRWG.



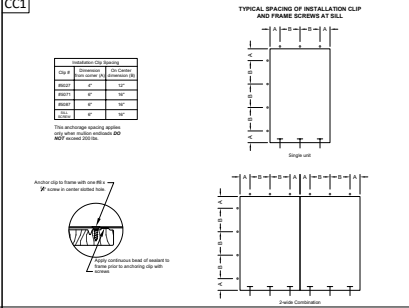
2 JAMB
SEE ARCH. DRWG. A-10



5 FACTORY MULLION
SEE ARCH. DRWG.



3 SILL
SEE ARCH. DRWG. A-10



CLAD CLIP INSTALLATION TYPICAL DETAILS
TYPICAL DETAILS APPLY UNLESS OTHERWISE SPECIFIED

DETAIL KEYNOTES

AC - ATTACHMENT COMPONENTS

AC08.01 ARCHITECTURAL DRAWINGS FOR WINDOW FRAME REQUIREMENTS. WINDOW TO BE ATTACHED TO EXISTING CONSTRUCTION SHALL BE ATTACHED TO EXISTING CONSTRUCTION. WINDOW TO BE ATTACHED TO NEW CONSTRUCTION SHALL BE ATTACHED TO NEW CONSTRUCTION. WINDOW TO BE ATTACHED TO EXISTING CONSTRUCTION SHALL BE ATTACHED TO EXISTING CONSTRUCTION. WINDOW TO BE ATTACHED TO NEW CONSTRUCTION SHALL BE ATTACHED TO NEW CONSTRUCTION.

BC - BUILDING COMPONENTS (BY OTHERS)

BC08.09 GASKET. GASKET TO BE USED AS SHOWN. WINDOW TO BE ATTACHED TO EXISTING CONSTRUCTION SHALL BE ATTACHED TO EXISTING CONSTRUCTION. WINDOW TO BE ATTACHED TO NEW CONSTRUCTION SHALL BE ATTACHED TO NEW CONSTRUCTION.

FC - FASTENING COMPONENTS

FC01.27 GASKET. GASKET TO BE USED AS SHOWN. WINDOW TO BE ATTACHED TO EXISTING CONSTRUCTION SHALL BE ATTACHED TO EXISTING CONSTRUCTION. WINDOW TO BE ATTACHED TO NEW CONSTRUCTION SHALL BE ATTACHED TO NEW CONSTRUCTION.

TM - THERMAL AND MOISTURE PROTECTION

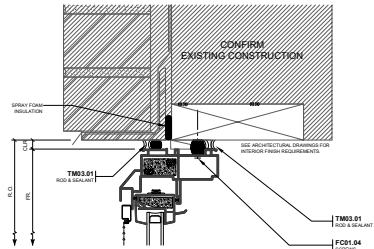
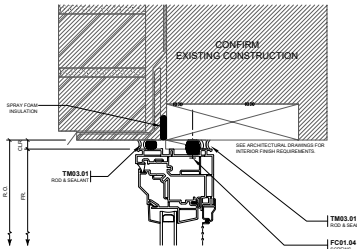
TM03.01 WINDOW FRAME SEALANT. WINDOW FRAME SEALANT TO BE USED AS SHOWN. WINDOW TO BE ATTACHED TO EXISTING CONSTRUCTION SHALL BE ATTACHED TO EXISTING CONSTRUCTION. WINDOW TO BE ATTACHED TO NEW CONSTRUCTION SHALL BE ATTACHED TO NEW CONSTRUCTION.

VERIFY EXISTING CONSTRUCTION

VERIFY ALL EXISTING CONDITIONS FOR WINDOW SILL & BUILDING STABILITY OF EXISTING STRUCTURE. VERIFY ALL EXISTING CONDITIONS FOR WINDOW SILL & BUILDING STABILITY OF EXISTING STRUCTURE. VERIFY ALL EXISTING CONDITIONS FOR WINDOW SILL & BUILDING STABILITY OF EXISTING STRUCTURE.

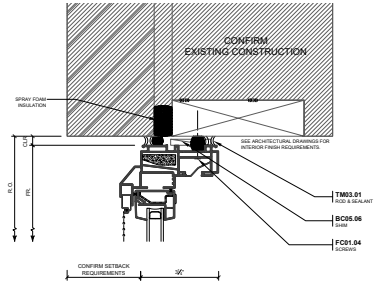
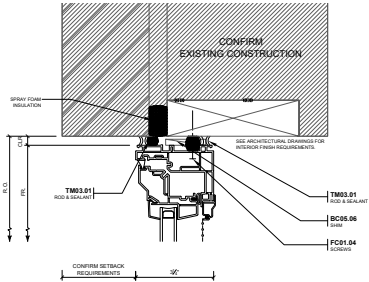
INSTALLATION SHOP DRAWING FOR
MARBOROUGH APARTMENTS BUILDING RENOVATIONS
 LOCATION: 910 MARLBOROUGH ST., DETROIT, MI
 ARCHITECT: EDWARDS GROUP INTERNATIONAL, INC.

DATE: 04-07



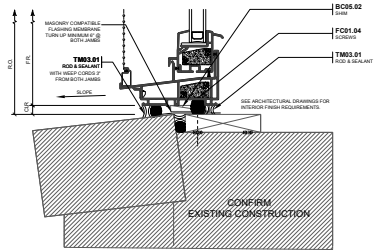
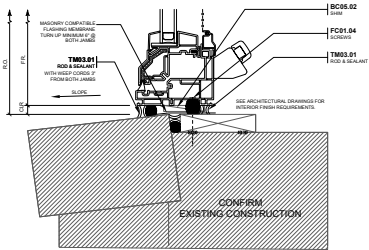
6 HEAD
SEE ARCH. DETAIL A-10

9 HEAD
SEE ARCH. DETAIL A-10



7 JAMB
SEE ARCH. DETAIL A-10

10 JAMB
SEE ARCH. DETAIL A-10



8 SILL
SEE ARCH. DETAIL A-10

11 SILL
SEE ARCH. DETAIL A-10

DETAIL KEYNOTES	
BC:	BUILDING COMPONENTS (BY OTHERS)
BC08.02	FOAM INSULATION (BY OTHERS) - PERFORM INSULATION AS SHOWN FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS.
FC:	FASTENING COMPONENTS
FC01.04	INSULATION FASTENERS (BY OTHERS) - PERFORM FASTENERS AS SHOWN FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS.
TM:	THERMAL AND MOISTURE PROTECTION
TM03.01	WATER RESISTANT BARRIER AND SEALANT
VERIFY EXISTING CONSTRUCTION	
VERIFY ALL EXISTING CONSTRUCTION AND MATERIALS AS SHOWN FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WALL, WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS. VERIFY WITH ARCHITECT FOR WINDOW AND DOOR HEADS.	

DATE	NO.	BY	CHKD.	APP.
11/19	01	JL	JK	JK
11/19	02	JL	JK	JK
11/19	03	JL	JK	JK
11/19	04	JL	JK	JK
11/19	05	JL	JK	JK
11/19	06	JL	JK	JK
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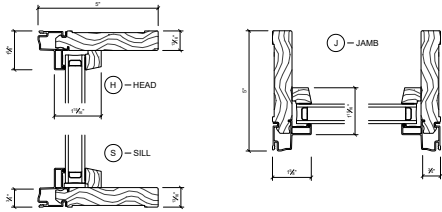
INSTALLATION SHOP DRAWING FOR

MARLBOROUGH APARTMENTS BUILDING RENOVATIONS

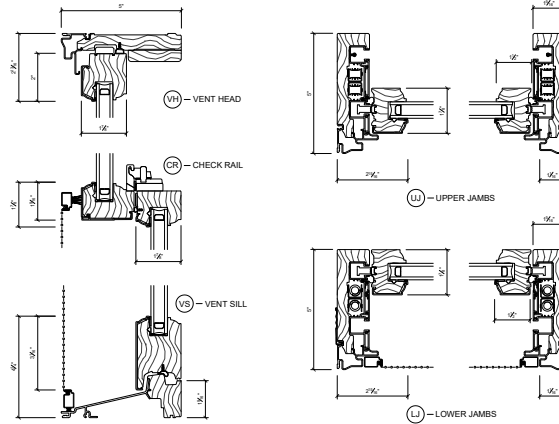
LOCATION: 910 MARLBOROUGH ST., DETROIT, MI
ARCHITECT: EDWARDS GROUP INTERNATIONAL, INC.

REVISED: 2-1-19
DRAWN BY: JLB
CHECKED BY: JLB
PROJECT NO.: 206374.14
DATE: 05 of 07

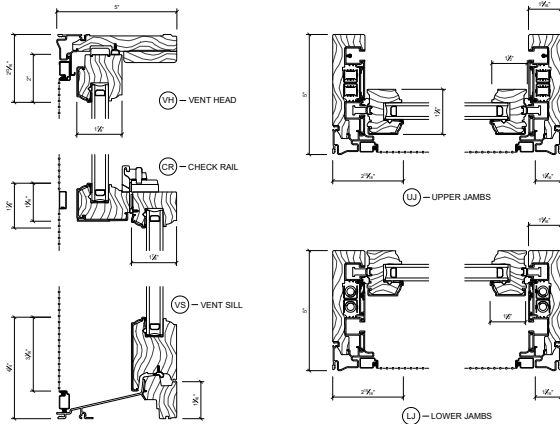
SUPPORT PRODUCT FIXED FRAME CLAD / WOOD



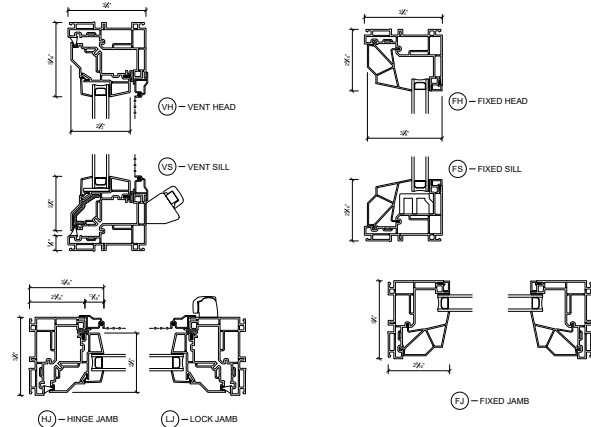
ARCHITECT SERIES SINGLE HUNG CLAD / WOOD



ARCHITECT SERIES DOUBLE HUNG CLAD / WOOD



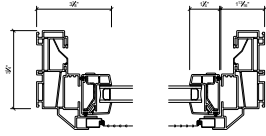
PELLA 250 SERIES CASEMENT VINYL



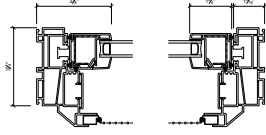
 PELLA SUPPORT SERVICES	
1/2"	3/4"
1/2"	3/4"
1/2"	3/4"
1/2"	3/4"
1/2"	3/4"
1/2"	3/4"
1/2"	3/4"

INSTALLATION SHOP DRAWING FOR
MARBOROUGH APARTMENTS BUILDING RENOVATIONS
 LOCATION: 910 MARLBOROUGH ST., DETROIT, MI
 ARCHITECT: EDWARDS GROUP INTERNATIONAL, INC.
 06 of 07

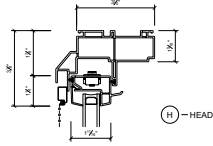
PELLA 250 SERIES DOUBLE HUNG VINYL



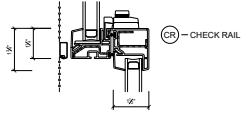
(UJ) — UPPER JAMBS



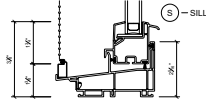
(LJ) — LOWER JAMBS



(H) — HEAD



(CR) — CHECK RAIL



(S) — SILL

INSTALLATION SHOP DRAWING FOR

MARBOROUGH APARTMENTS BUILDING RENOVATIONS

LOCATION: 910 MARLBOROUGH ST., DETROIT, MI

ARCHITECT: EDWARDS GROUP INTERNATIONAL INC.

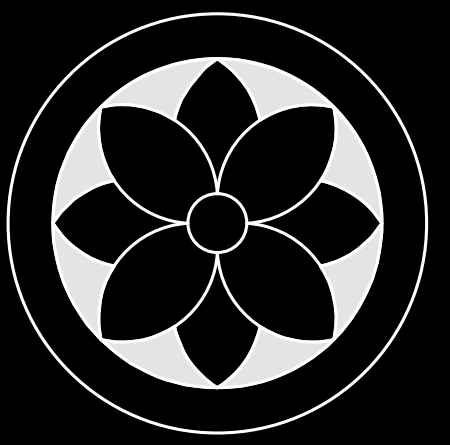
REVISED: 2-1-19
 DRAWN BY: SDB
 CHECKED BY: SDB
 PROJECT NO:
 206374.14

SHEET
 07 OF 07

DATE	BY	REVISION
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11/15/18	SDB	ISSUE FOR PERMIT
11/15/18	SDB	ISSUE FOR PERMIT
11/15/18	SDB	ISSUE FOR PERMIT
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EDWARDS GROUP INTERNATIONAL, INC.
 SUPPORT SERVICES
 DEPARTMENT
 36000 Woodward Avenue, Suite 1000, Detroit, MI 48224
 313.963.8800
 www.edwardsinc.com



BUILDING OWNER:

SHELBORNE DEVELOPMENT
8445 E. JEFFERSON
DETROIT, MI 48214
(313) 458-9243

NO. TITLE

C-1	SITE PLAN / GEN. NOTES
GN-1	ABBREVIATIONS AND LEGEND
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
AD-1	EXISTING PLANS
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E-1	BASEMENT AND FIRST FLOOR ELECTRICAL
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E-3	ELECTRICAL SPECS. AND RISERS
E-4	ROOF PLAN ELECTRICAL

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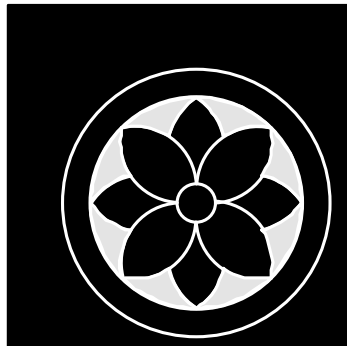
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MARLBOROUGH APARTMENTS

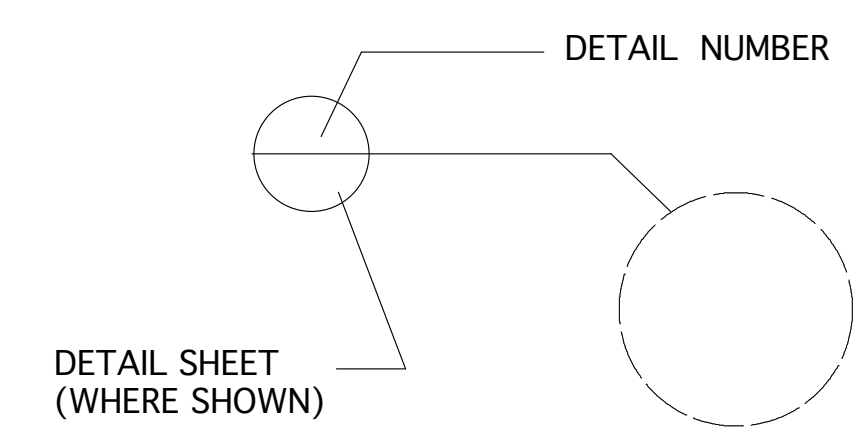
910 MARLBOROUGH STREET



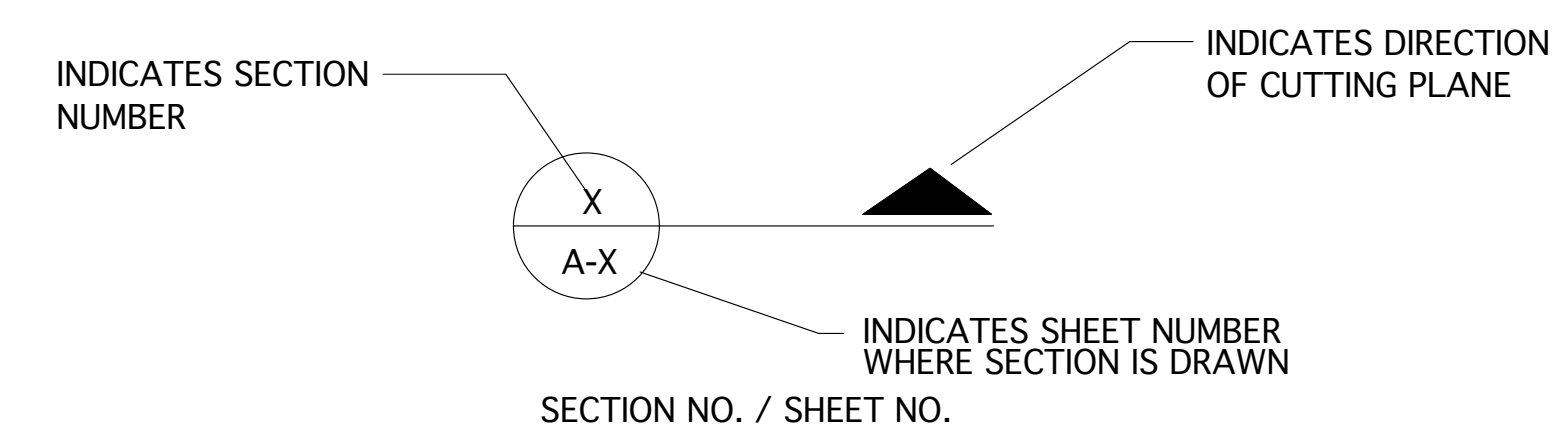
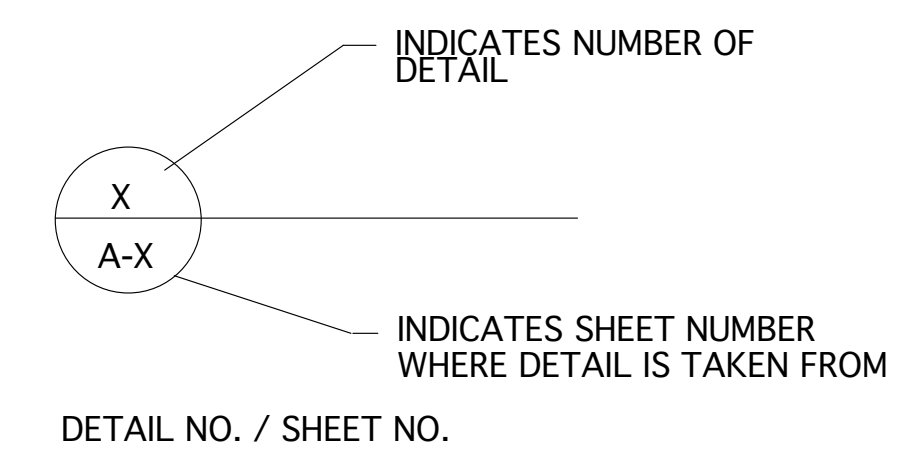
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ARCHITECTURAL GRAPHIC SYMBOLS

SYMBOL	DESCRIPTION
	ROOM NUMBER
	DOOR NUMBER
	WINDOW NUMBER
	EQUIPMENT NUMBER
	FLOOR ELEVATION OR WORK POINT REFERENCE
	ELEVATION/SECTION



PLAN / DETAILS.



ABBREVIATIONS

ACP	ACOUSTICAL PANEL	F	FIRE EXTINGUISHER	MO	MASONRY OPENING	SECT	SECTION
ADJ	ADJUSTABLE	FD	FLOOR DRAIN	MATL	MATERIAL	SHT	SHEET
AFF	ABOVE FINISH FLOOR	FLUOR	FLUORESCENT	MAX	MAXIMUM	SIM	SIMILAR
ARCH	ARCHITECTURAL	FT	FEET	MECH	MECHANICAL		
BF	BARRIER FREE	FTG	FOOTING	MTL	METAL	SPEC	SPECIFICATION
BLKG	BLOCKING	FRM	FRAME	MIN	MINIMUM	SO	SQUARE
BRD	BOARD	FUR	FURRING	MISC	MISCELLANEOUS	SQ FT	SQUARE FOOT
BOT	BOTTOM	FIN	FINISH	MTR	MORTAR	STD	STANDARD
		FIN FL	FINISHED FLOOR	MTD	MOUNTED	STL	STEEL
				MULL	MULLION		
CPT	CARPET	GA	GAUZE	NOM	NOMINAL	SAN	SANITARY DRAIN
CLG	CEILING	GALV	GALVANIZED	NIC	NOT IN CONTRACT	STOR	STORAGE
CLG DIFF	CEILING DIFFUSER	GL	GLASS	NTS	NOT TO SCALE	SUR	SURFACE
CLG HGT	CEILING HEIGHT	GR	GRADE	NO	NUMBER	SUSP	SUSPENDED
CEM	CEMENT	GWB	GYPSUM WALLBOARD	NRC	NOISE REDUCTION COEFFICIENT	SATC	SUSPENDED ACOUSTICAL
CTR	CENTER	HAZ	HAZARD	OFF	OFFICE	TA	TOILET ACCESSORIES
CLR	CLEAR OR CLEARANCE	HGT	HEIGHT	OPNG	OPENING	T GL	TEMPERED GLASS
CONC	CONCRETE	HDW	HARDWARE			THRES	THRESHOLD
CONSTR	CONSTRUCTION	HVAC	HEATING, VENTILATING, & AIR CONDITIONING			T&G	TONGUE & GROOVE
CONT	CONTINUOUS	HM	HOLLOW METAL			TYP	TYPICAL
C.J.	CONTROL JOINT	HW	HOT WATER			THK	THICK(NESS)
CW	COLD (POTABLE) WATER	IN	INCHES	OD	OUTSIDE DIAMETER	UR	URINAL
CMU	CONCRETE MASONRY UNIT	ID	INSIDE DIAMETER	OA	OVERALL	U.N.O.	UNLESS NOTED OTHERWISE
CT	CERAMIC TILE	INSUL	INSULATION	O.C	ON CENTER	V	VENT
		INT.	INTERIOR	PTD	PAINTED	VERT	VERTICAL
DF	DRINKING FOUNTAIN	JT	JOINT	PNL	PANEL	VCT	VINYL COMPOSITION TILE
DIA	DIAMETER	KD	KILN DRIED	PTN	PARTITION	VB	VINYL BASE
DR	DOWN			PWD	PLYWOOD		
DN	DRAWING			PT	PRESSURE TREAT		
DWG	DISH WASHER	LAM	LAMINATED	QT	QUARRY TILE	W/	WITH
D.W.		LG	LENGTH			W/O	WITHOUT
		LVR	LOUVER	RD	ROOF DRAIN	WD	WOOD
		LAV	LAVATORY	REC	RECESSED	WC	WATER CLOSET
EA	EACH			REF	REFERENCE	WP	WATERPROOFING
EHW	ELECTRIC WALL HEATER			REQD	REQUIRED	WPMBR	WATERPROOF MEMBRANE
EL	ELEVATION			REV	REVISION	WB	WOOD BASE
EQ	EQUAL			R	RISER		
EXH	EXHAUST			RFG	ROOFING		
EXIST	EXISTING			RM	ROOM		
EXPAN	EXPANSION			RO	ROUGH OPENING		
EXP	EXPOSED						
EXT	EXTERIOR						
EIS	EXTERIOR INSULATION SYSTEM						

MATERIAL LEGEND

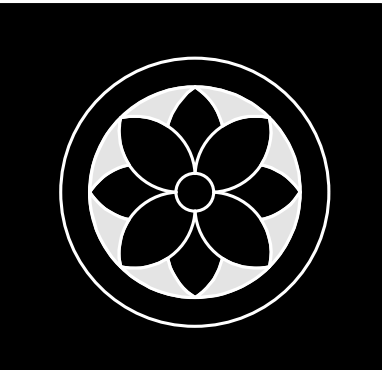
	EARTH		PLYWOOD
	CONCRETE		BLANKET INSULATION
	ACOUSTICAL CEILING TILE		RIGID INSULATION
	QUARRY TILE		SHIM
	GYPSUM BOARD PARTITION		ROUGH WOOD: CONTINUOUS
	CONCRETE MASONRY UNITS (C.M.U.)		FINISHED WOOD
	FACE BRICK		

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Abbreviations and Legend

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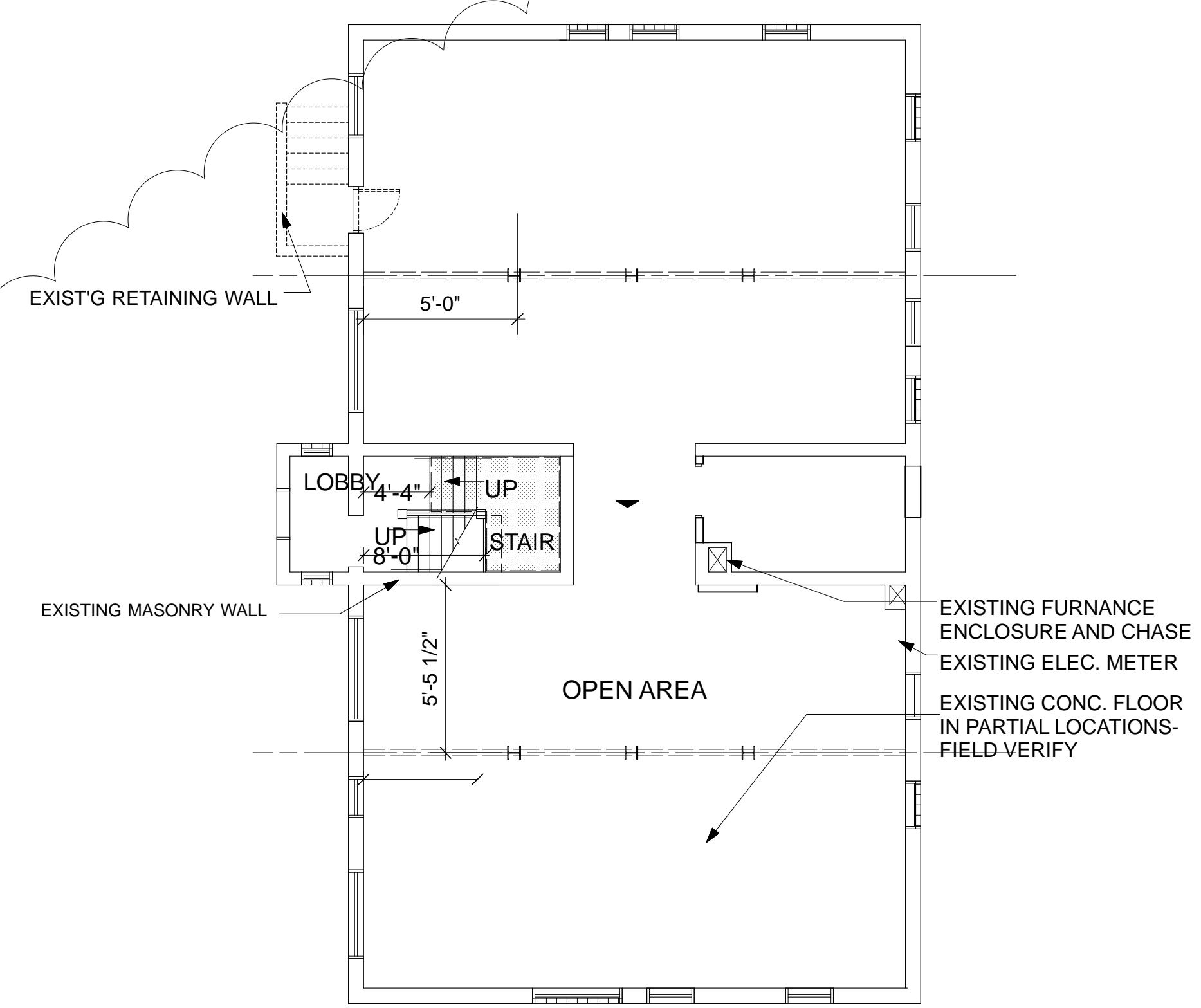
Existing Floor Plans

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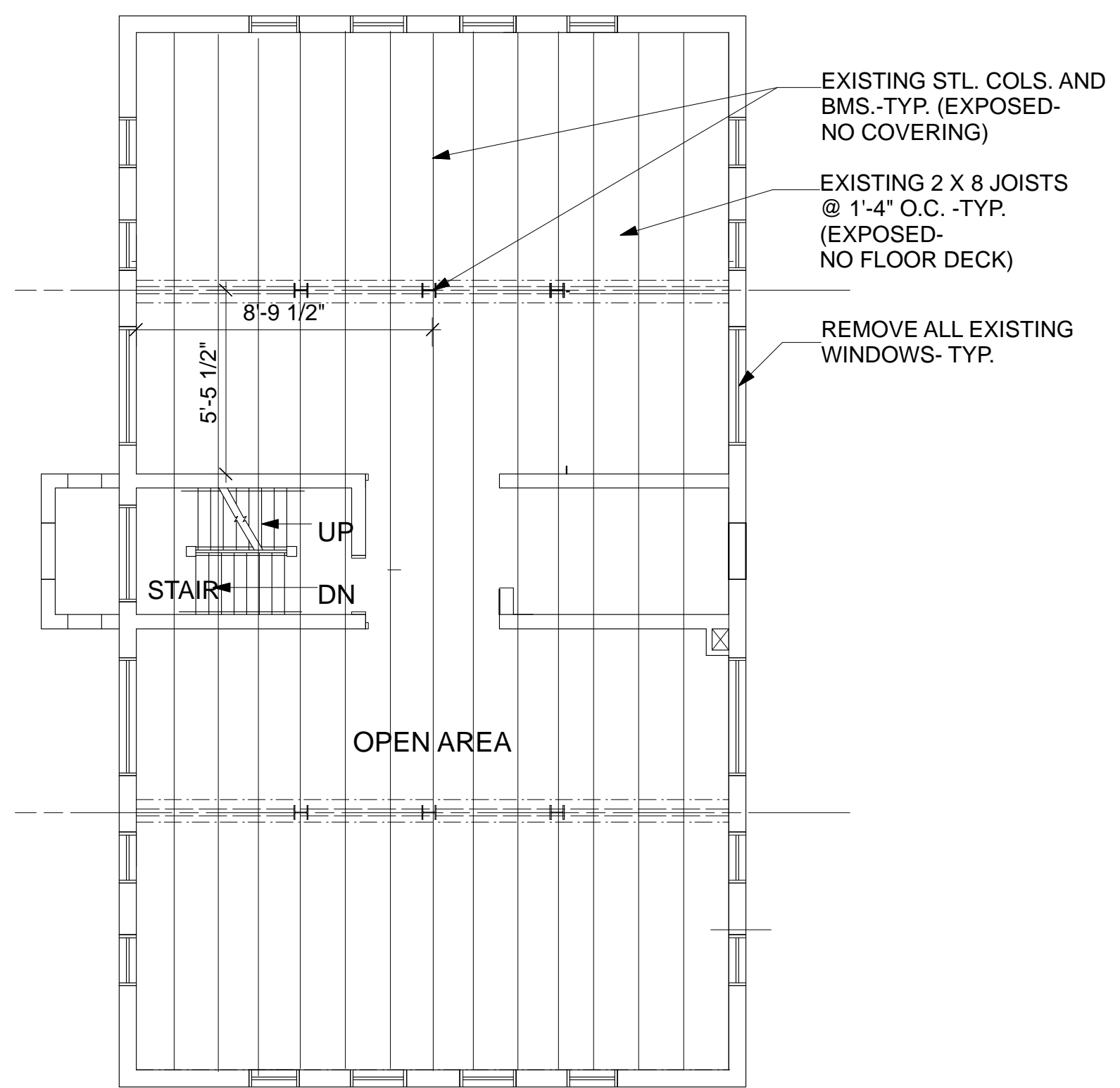
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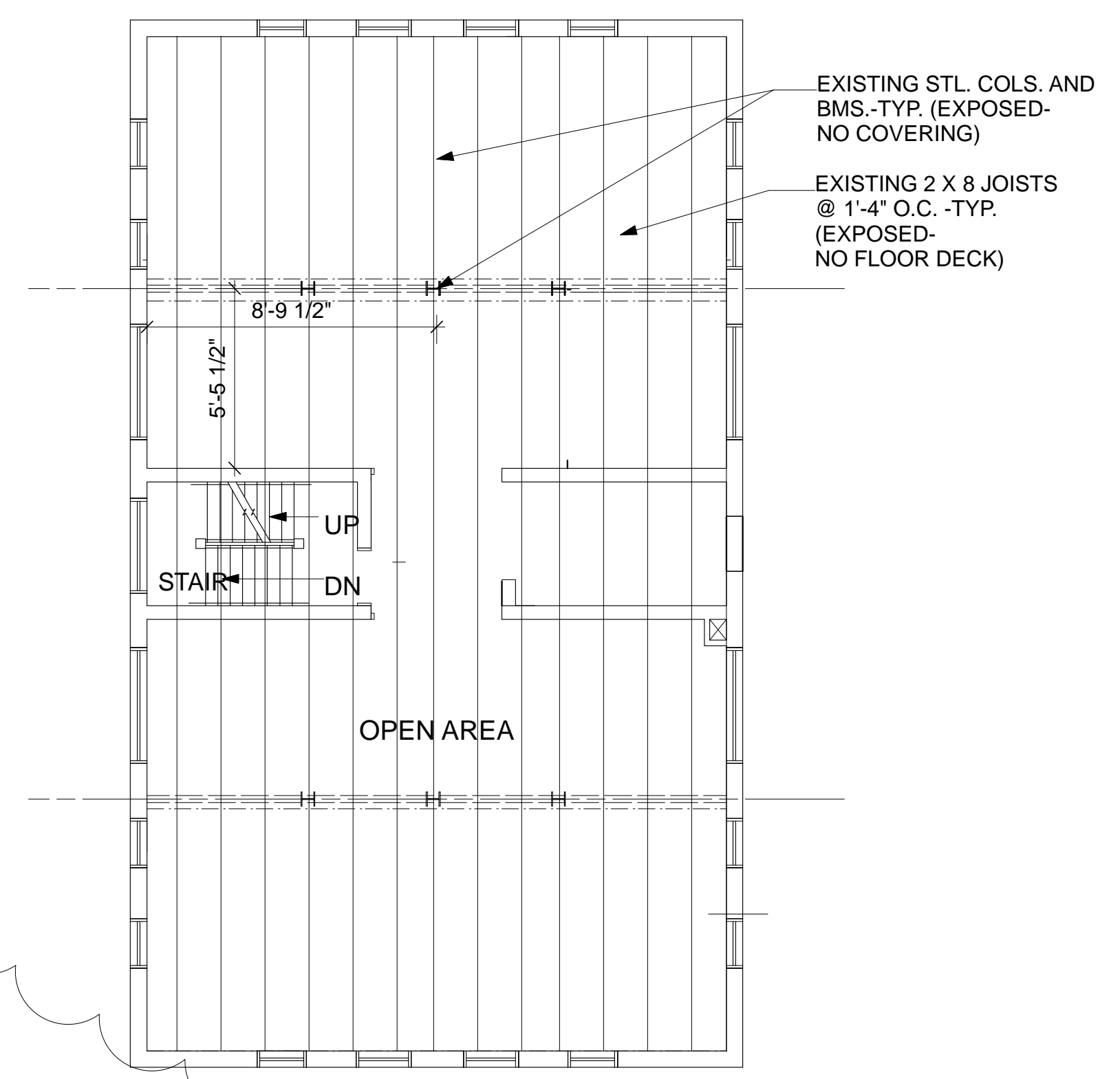
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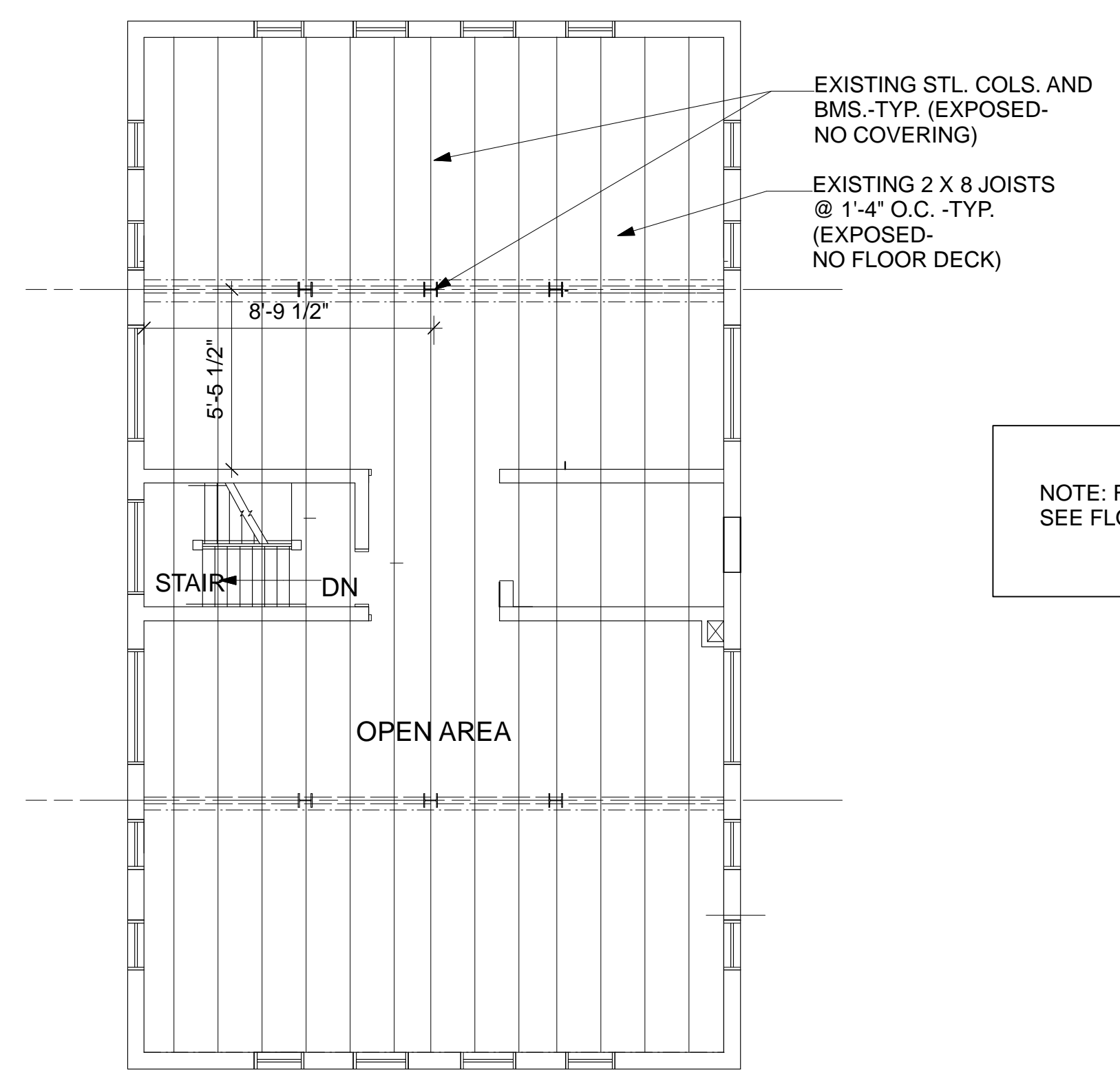
BASEMENT EXISTING PLAN
 SCALE: 1/8"=1'-0"



FIRST FLOOR EXISTING PLAN
 SCALE: 1/8"=1'-0"



SECOND FLOOR EXISTING PLAN
 SCALE: 1/8"=1'-0"

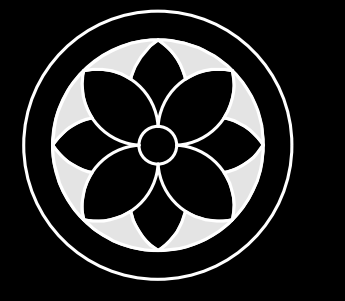


THIRD FLOOR EXISTING PLAN
 SCALE: 1/8"=1'-0"

NOTE: FOR EXISTING WALLS ON FLOORS 1, 2, AND 3
 SEE FLOOR PLANS

LEGEND

- EXISTING WALL
- EXIST'G BM AND JOISTS
- EXISTING WALL TO BE DEMOLISHED



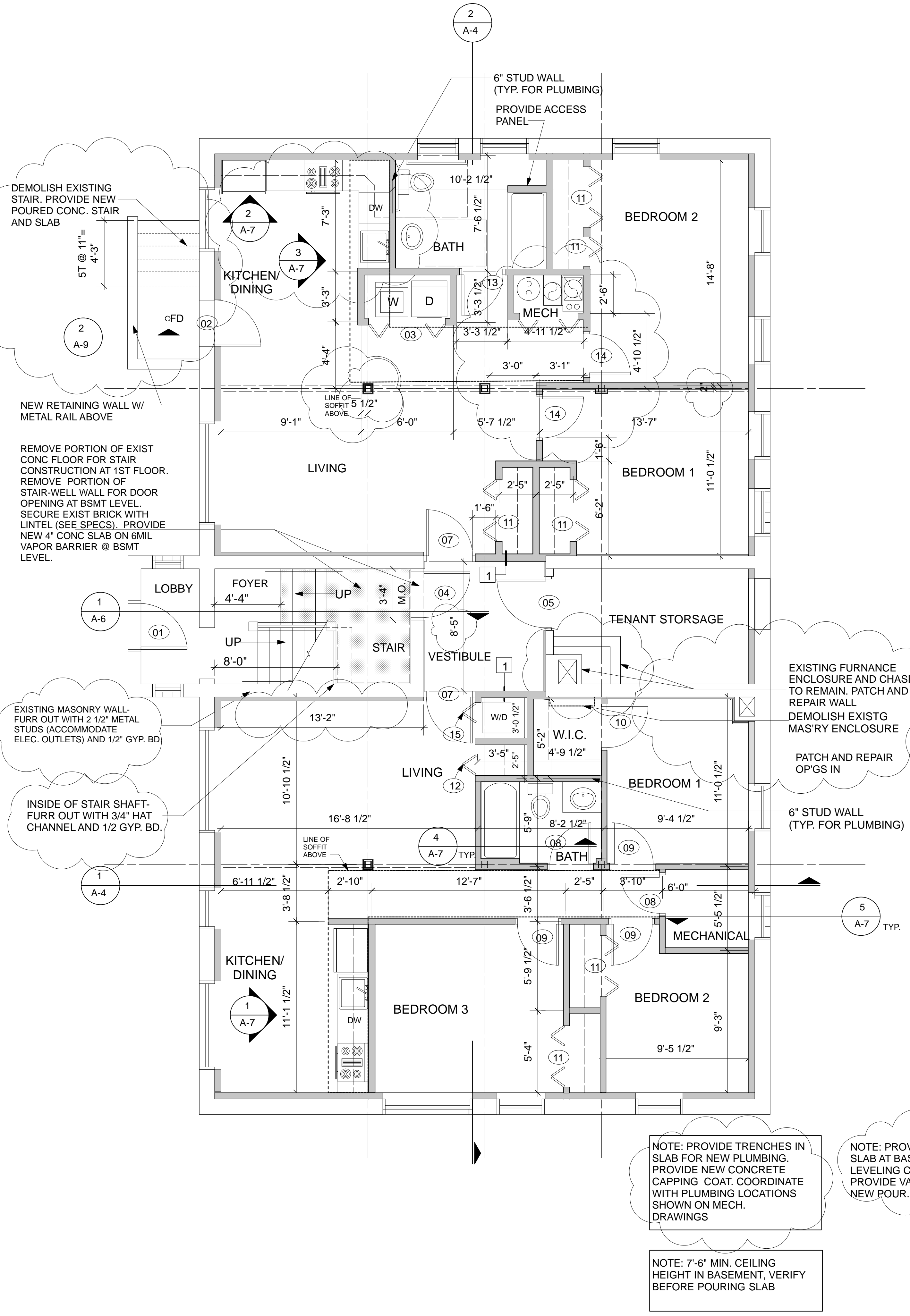
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 Basement and First Floor Plan
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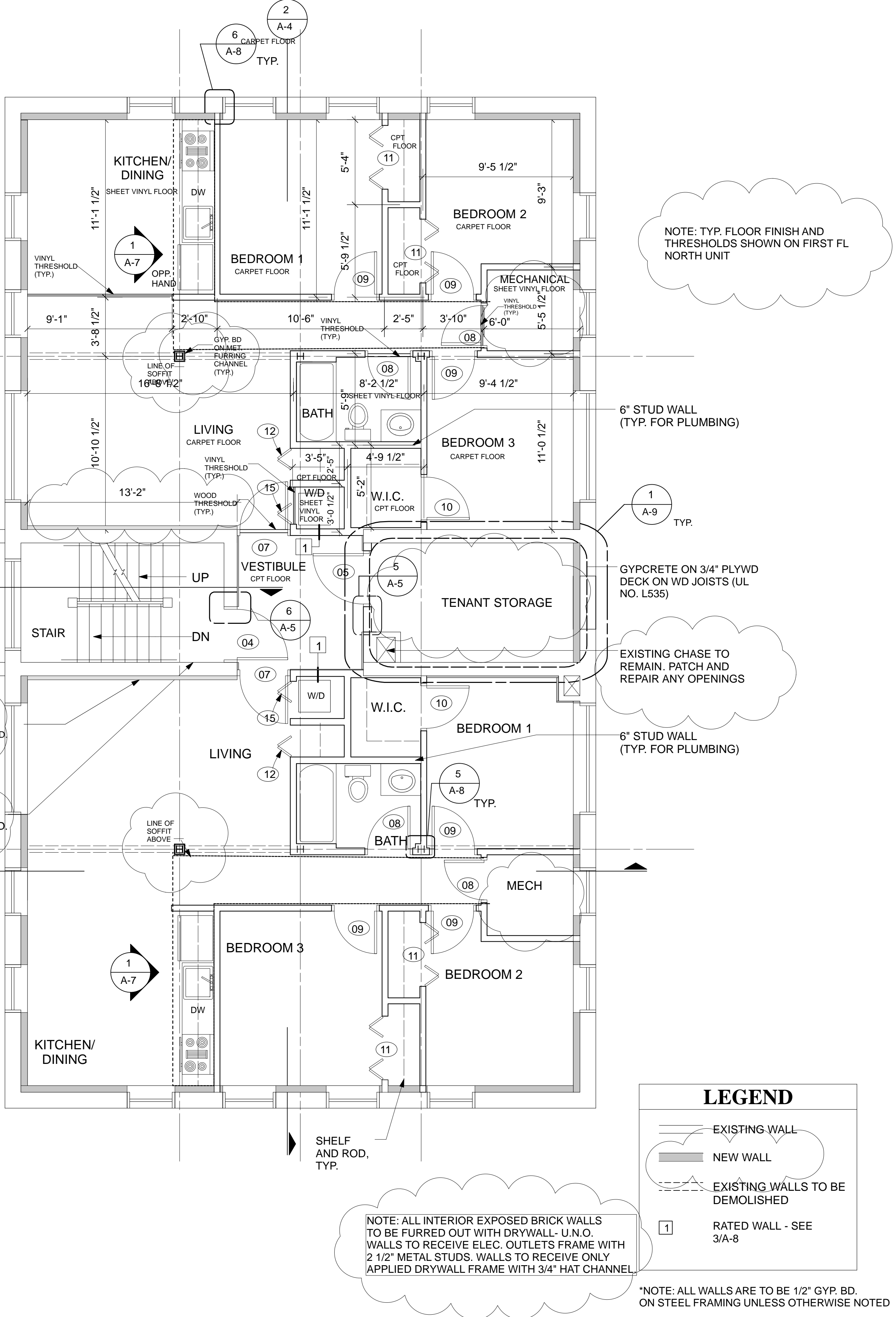
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BASEMENT PLAN
 SCALE: 1/4"=1'-0"



FIRST FLOOR PLAN
 SCALE: 1/4"=1'-0"

LEGEND

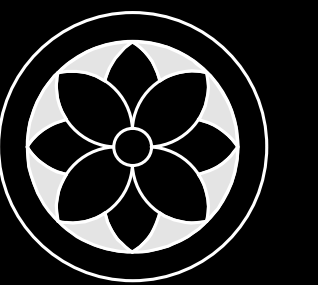
- EXISTING WALL
- NEW WALL
- EXISTING WALLS TO BE DEMOLISHED
- RATED WALL - SEE 3/A-8

*NOTE: ALL WALLS ARE TO BE 1/2" GYP. BD. ON STEEL FRAMING UNLESS OTHERWISE NOTED

*SEE SHT. A-8 FOR WALL TYPE CONSTRUCTION

*NOTE: ALL INTERIOR UNIT WALLS SHALL EXTEND TO THE UNDERSIDE OF STRUCTURE OR CEILING ABOVE.

*FOR TYP DOOR PLACEMENT SEE SHEET A8



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Second and Third Floor Plan
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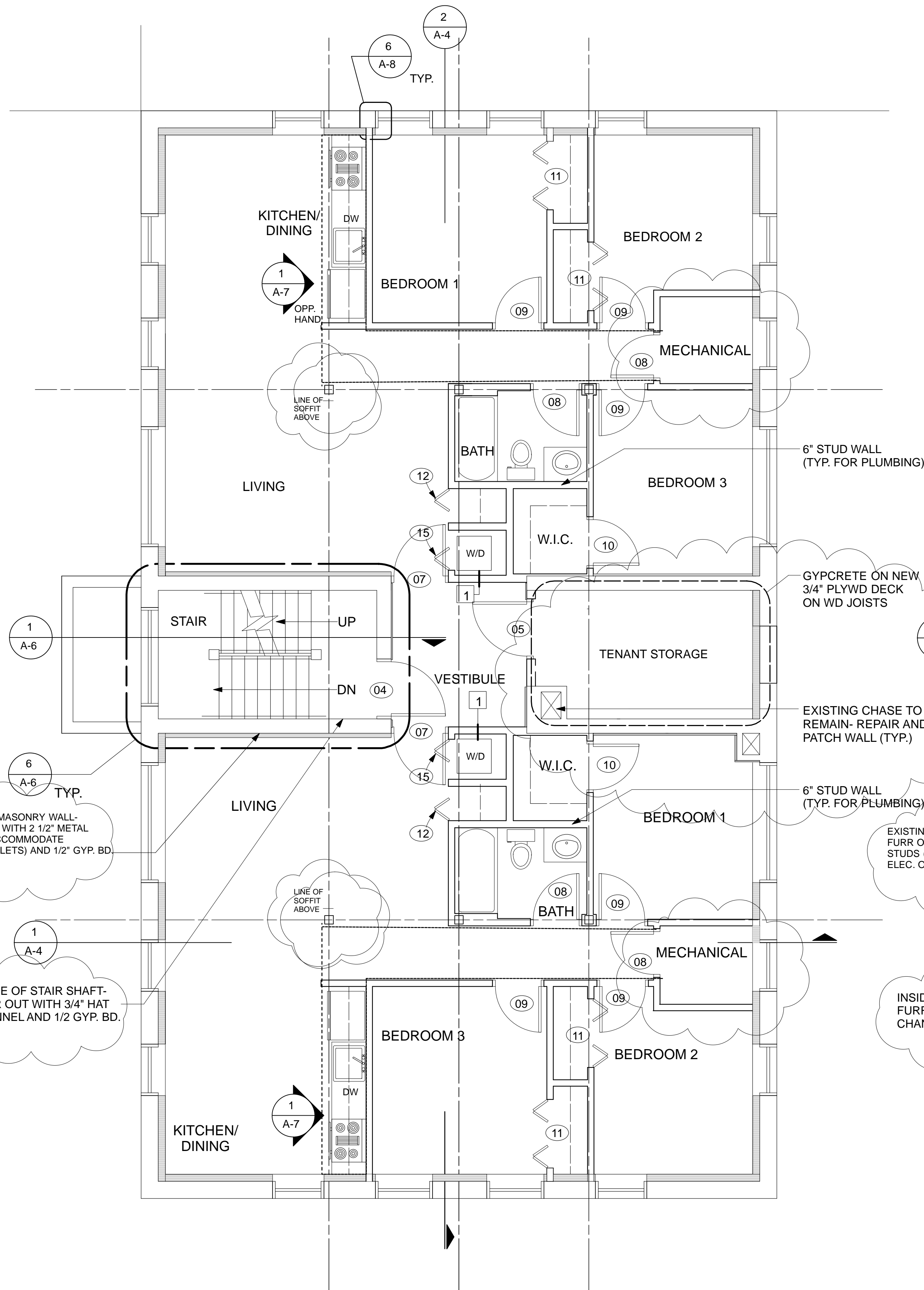


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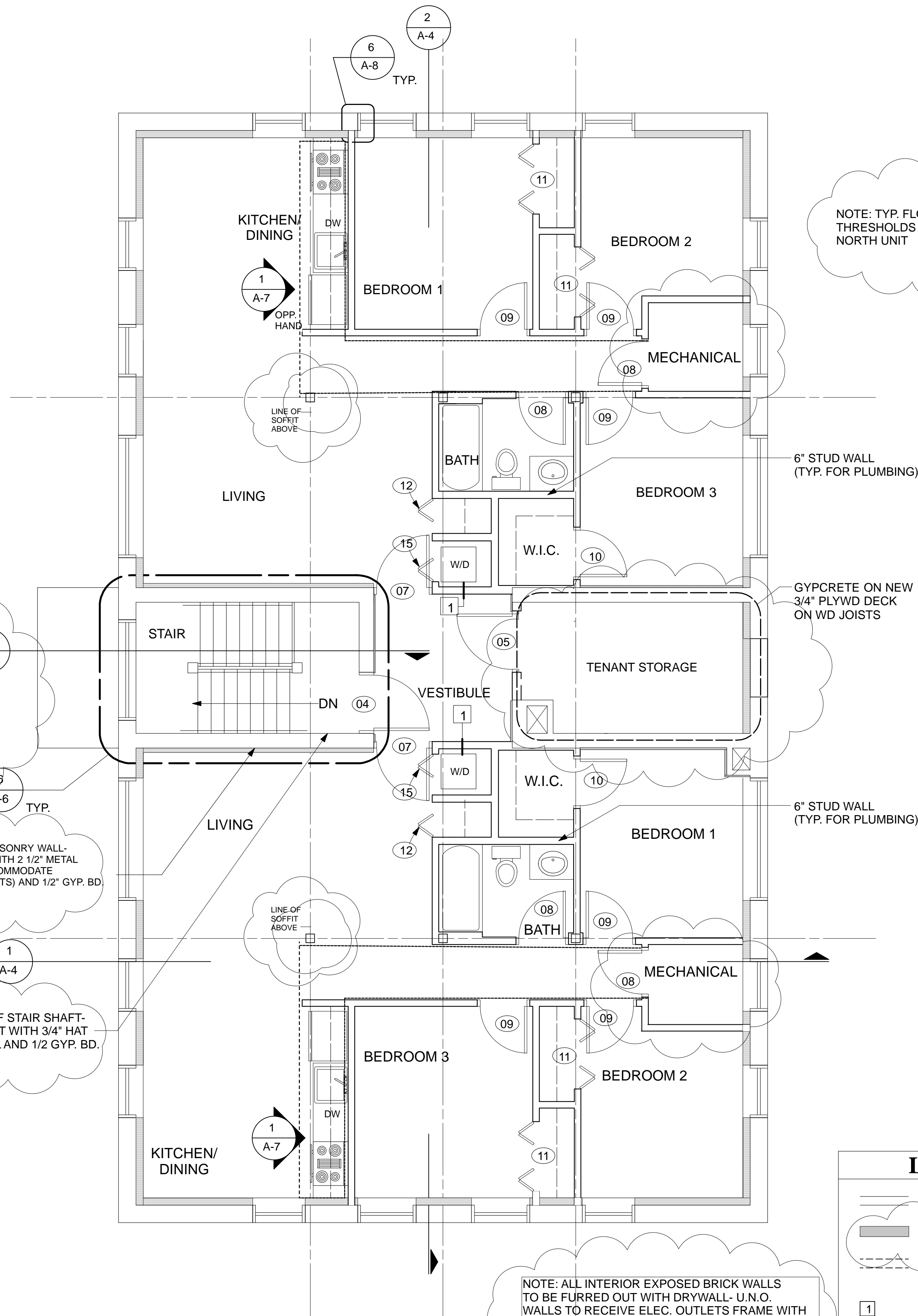
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A-2



SECOND FLOOR PLAN
 SCALE: 1/4"=1'-0"



THIRD FLOOR PLAN
 SCALE: 1/4"=1'-0"

NOTE: TYP. FLOOR FINISH AND THRESHOLDS SHOWN ON FIRST FL NORTH UNIT

NOTE: ALL INTERIOR EXPOSED BRICK WALLS TO BE FURRED OUT WITH DRYWALL- U.N.O. WALLS TO RECEIVE ELEC. OUTLETS FRAME WITH 2 1/2" METAL STUDS. WALLS TO RECEIVE ONLY APPLIED DRYWALL FRAME WITH 3/4" HAT CHANNEL.

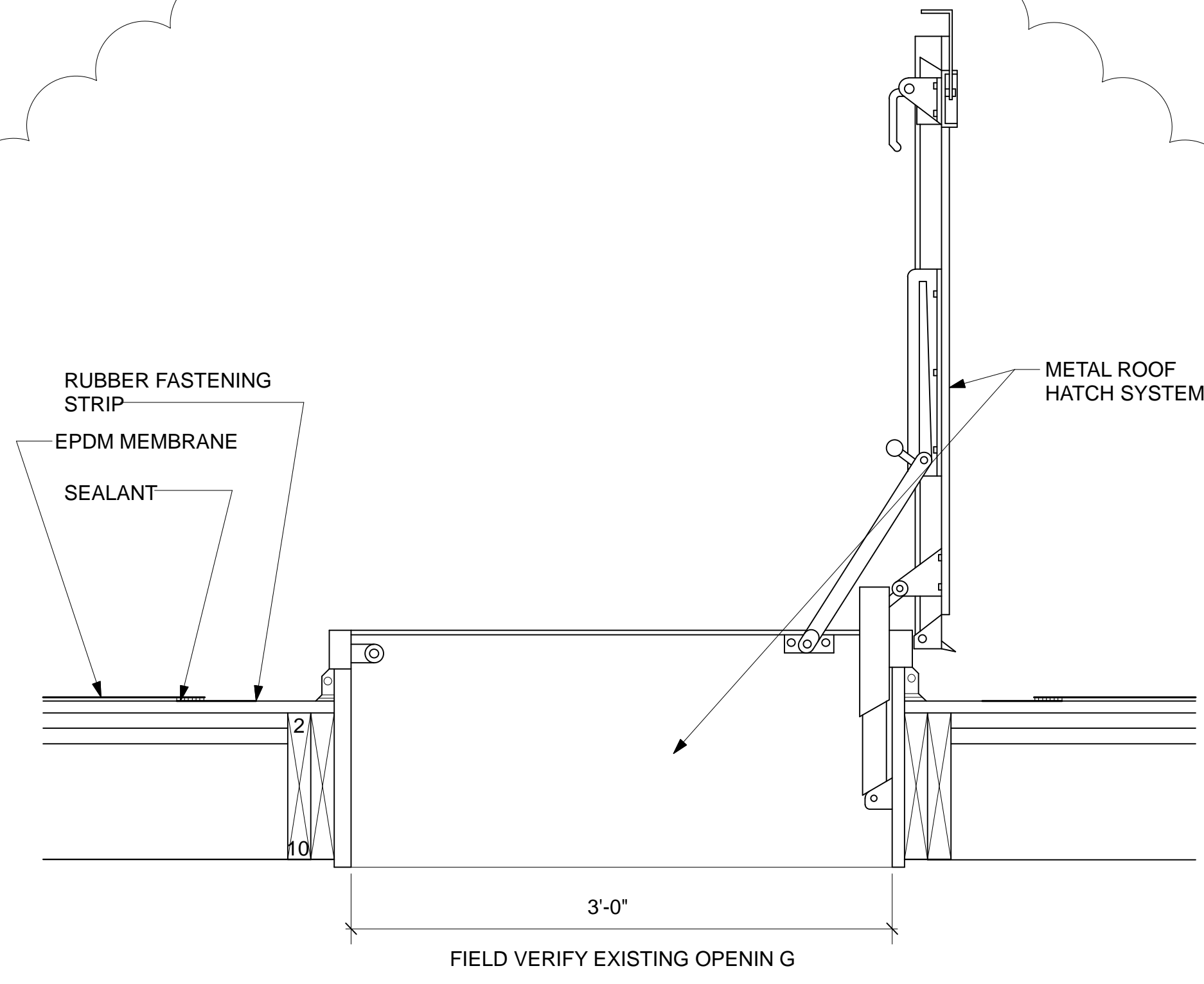
LEGEND

- EXISTING WALL
- NEW WALL
- EXISTING WALLS TO BE DEMOLISHED
- RATED WALL - SEE 3/A-8

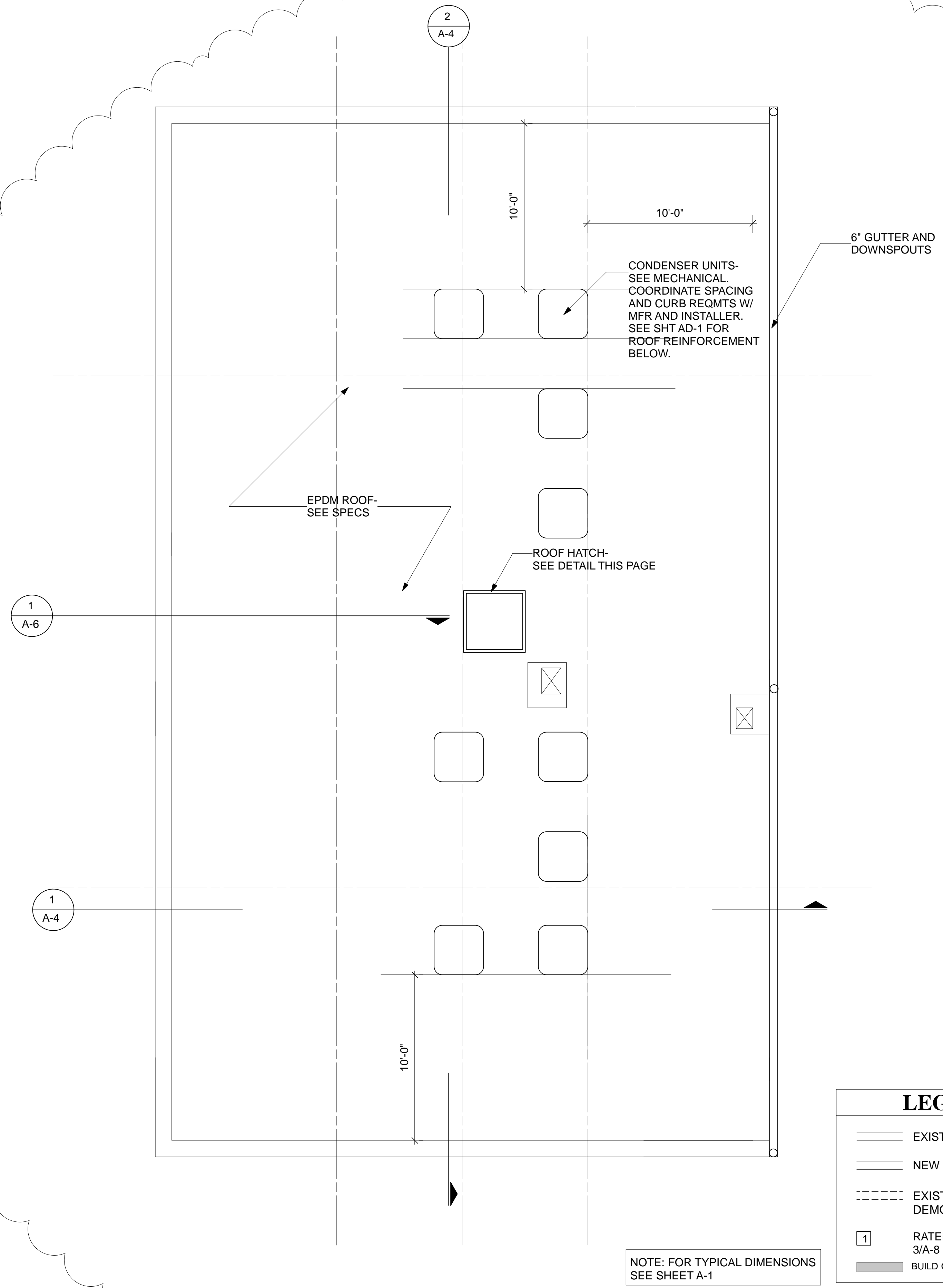
*NOTE: ALL WALLS ARE TO BE 1/2" GYP. BD. ON STEEL FRAMING UNLESS OTHERWISE NOTED

*SEE SHT. A-x FOR WALL TYPE CONSTRUCTION
 *NOTE: ALL INTERIOR UNIT WALLS SHALL EXTEND TO THE UNDERSIDE OF STRUCTURE OR CEILING ABOVE.

*FOR TYP DOOR PLACEMENT SEE SHEET A-2



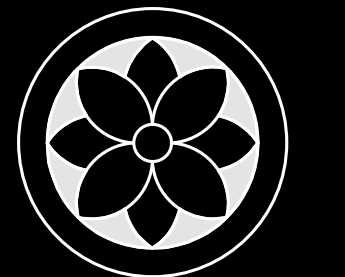
1 ROOF HATCH
SCALE: 1/4"=1'-0"



NOTE: FOR TYPICAL DIMENSIONS
SEE SHEET A-1

LEGEND	
	EXISTING WALL
	NEW WALL
	EXISTING WALLS TO BE DEMOLISHED
	RATED WALL - SEE 3/A-8
	BUILD OUT EXISTG EXT. WALL

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



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Roof Plan

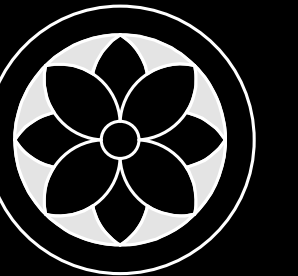
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Sections

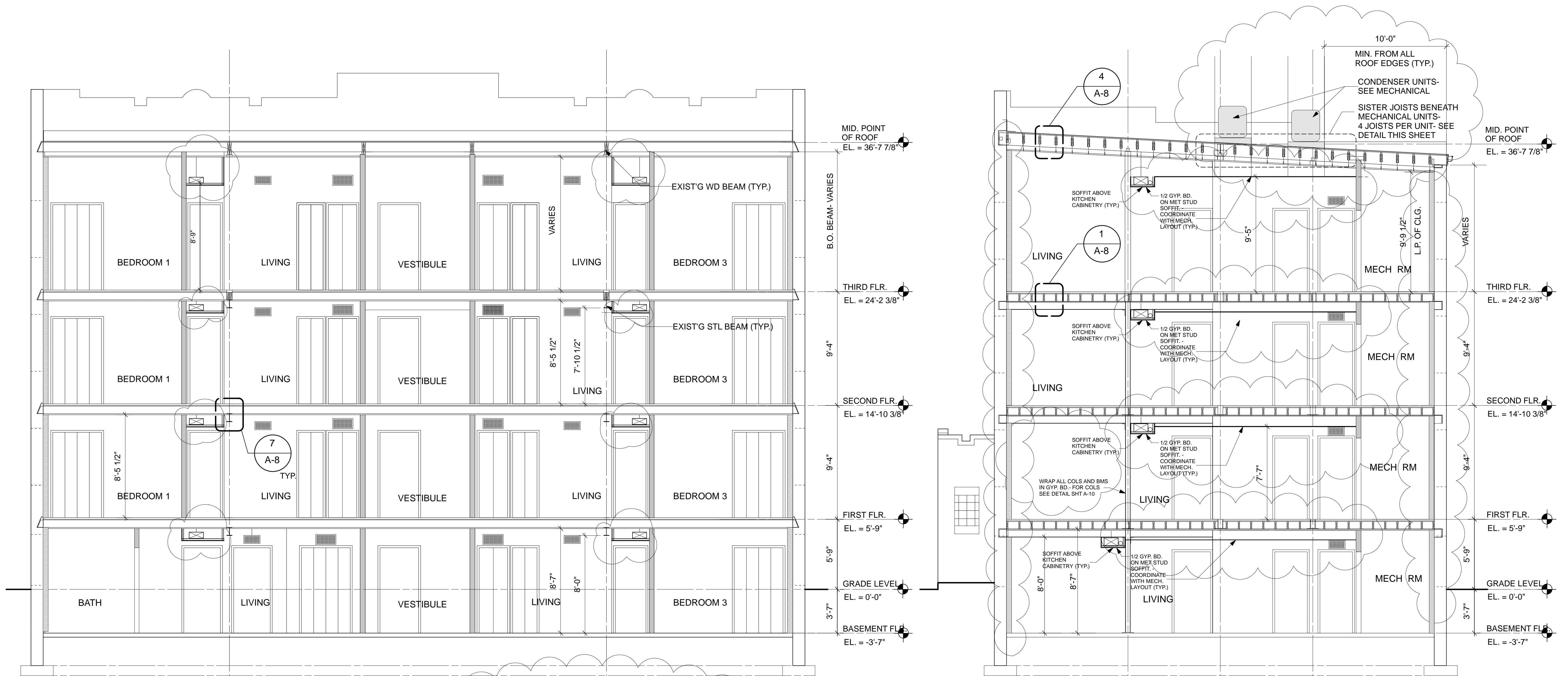
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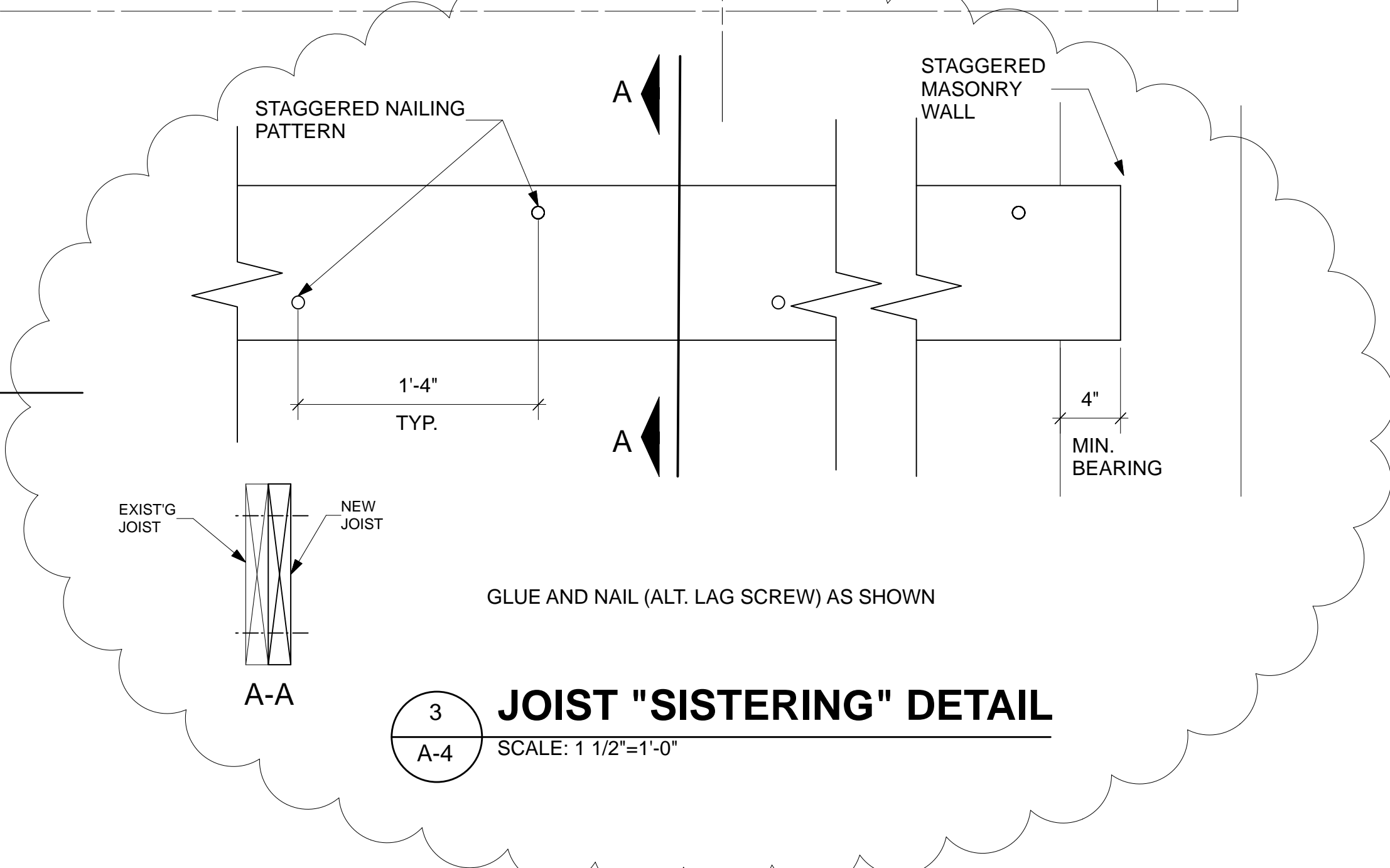
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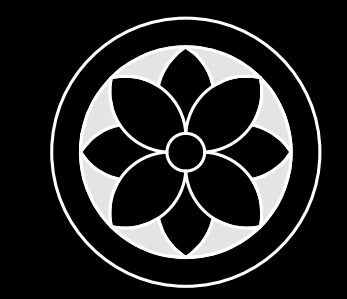


2 SECTION
 A-1 SCALE: 1/4"=1'-0"

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



3 JOIST "SISTERING" DETAIL
 A-4 SCALE: 1 1/2"=1'-0"



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Enlarged Elevation

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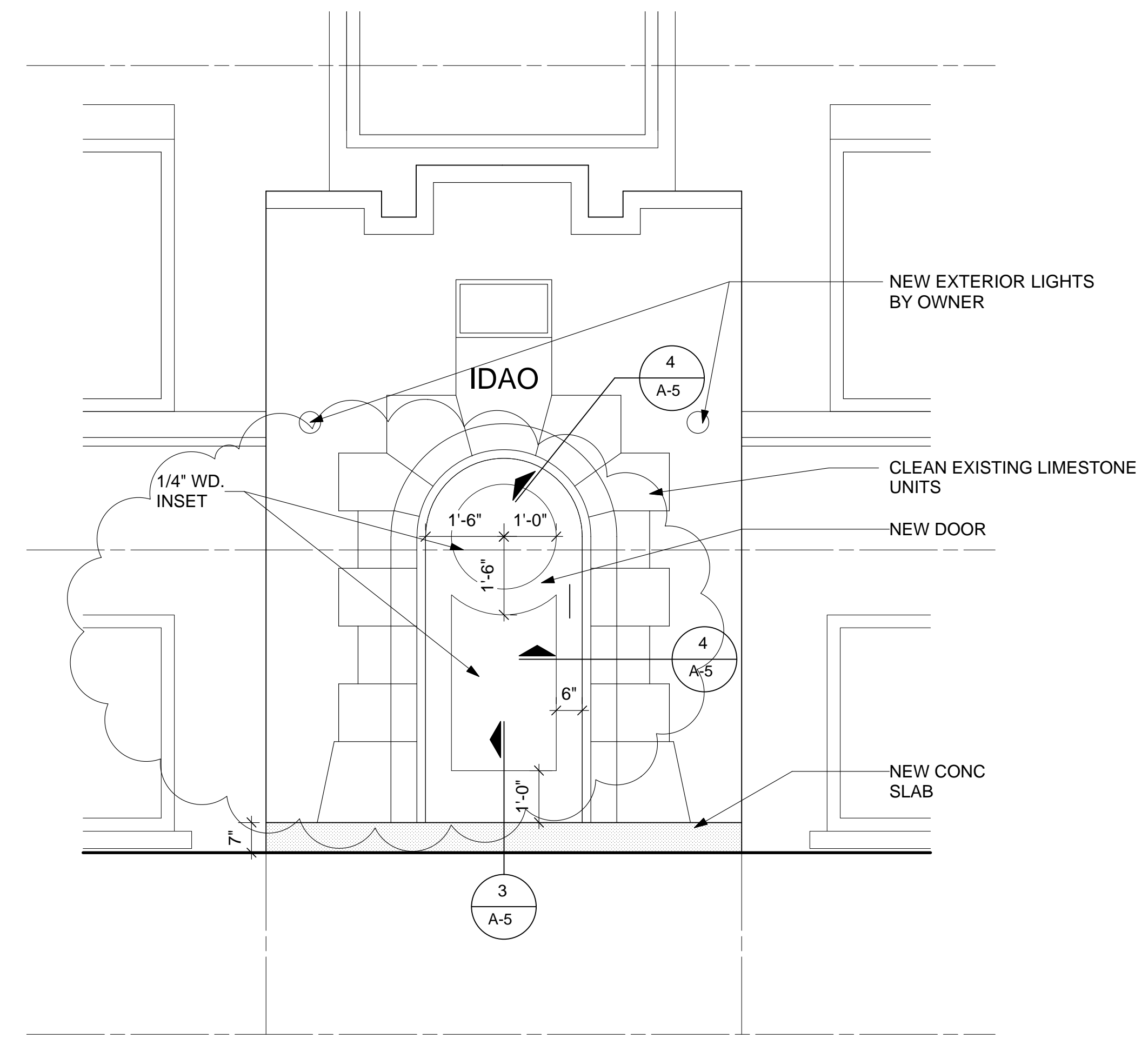
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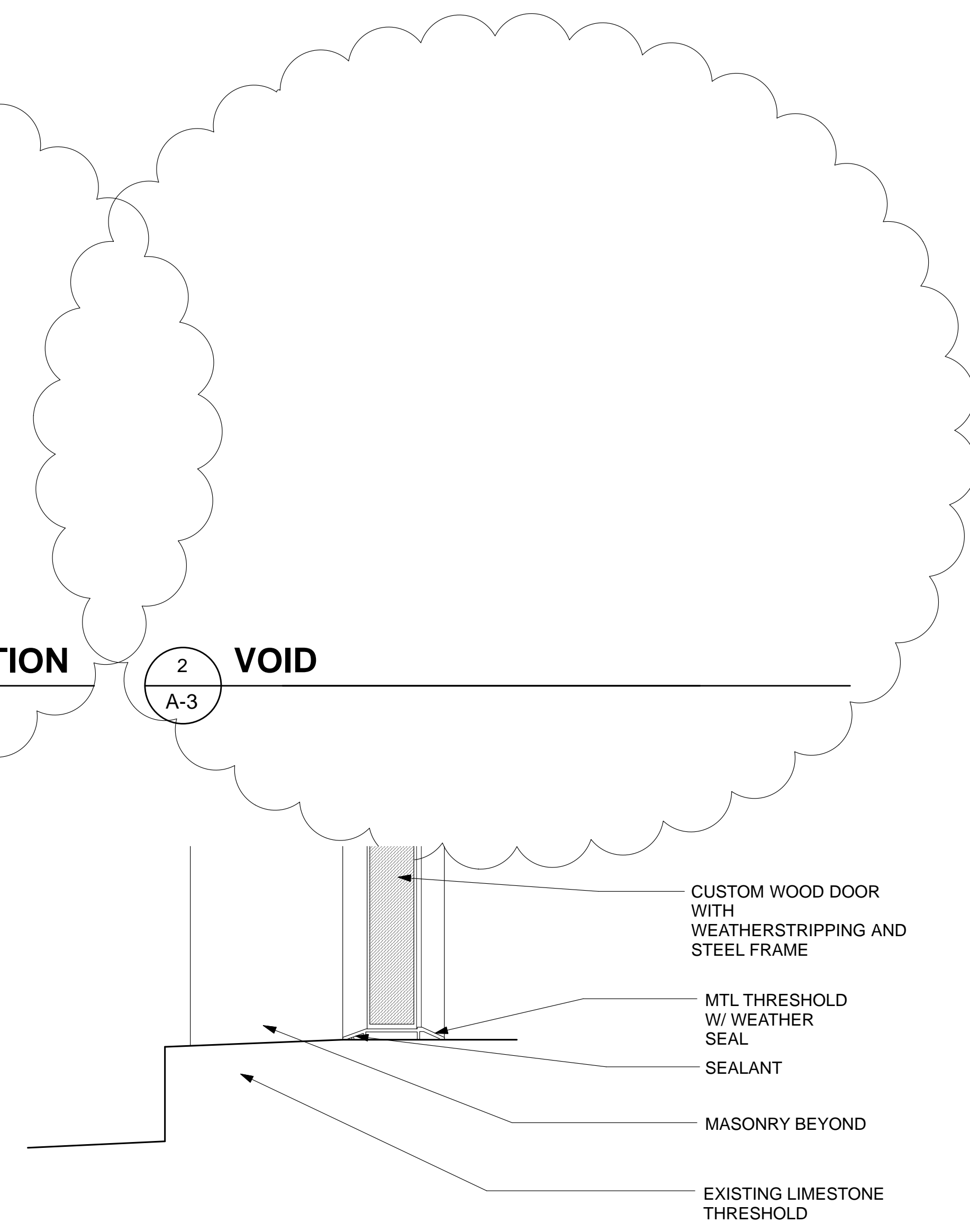
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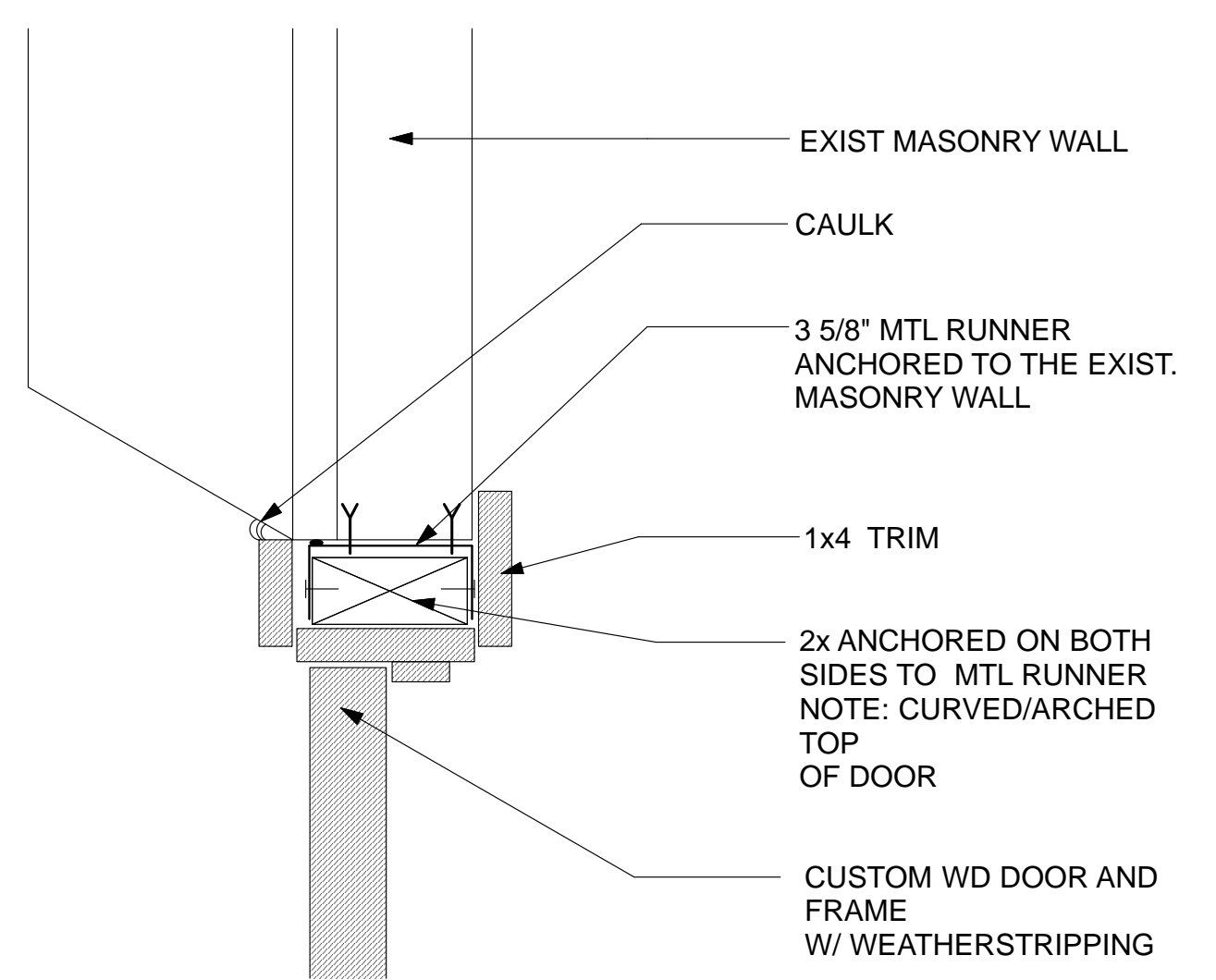
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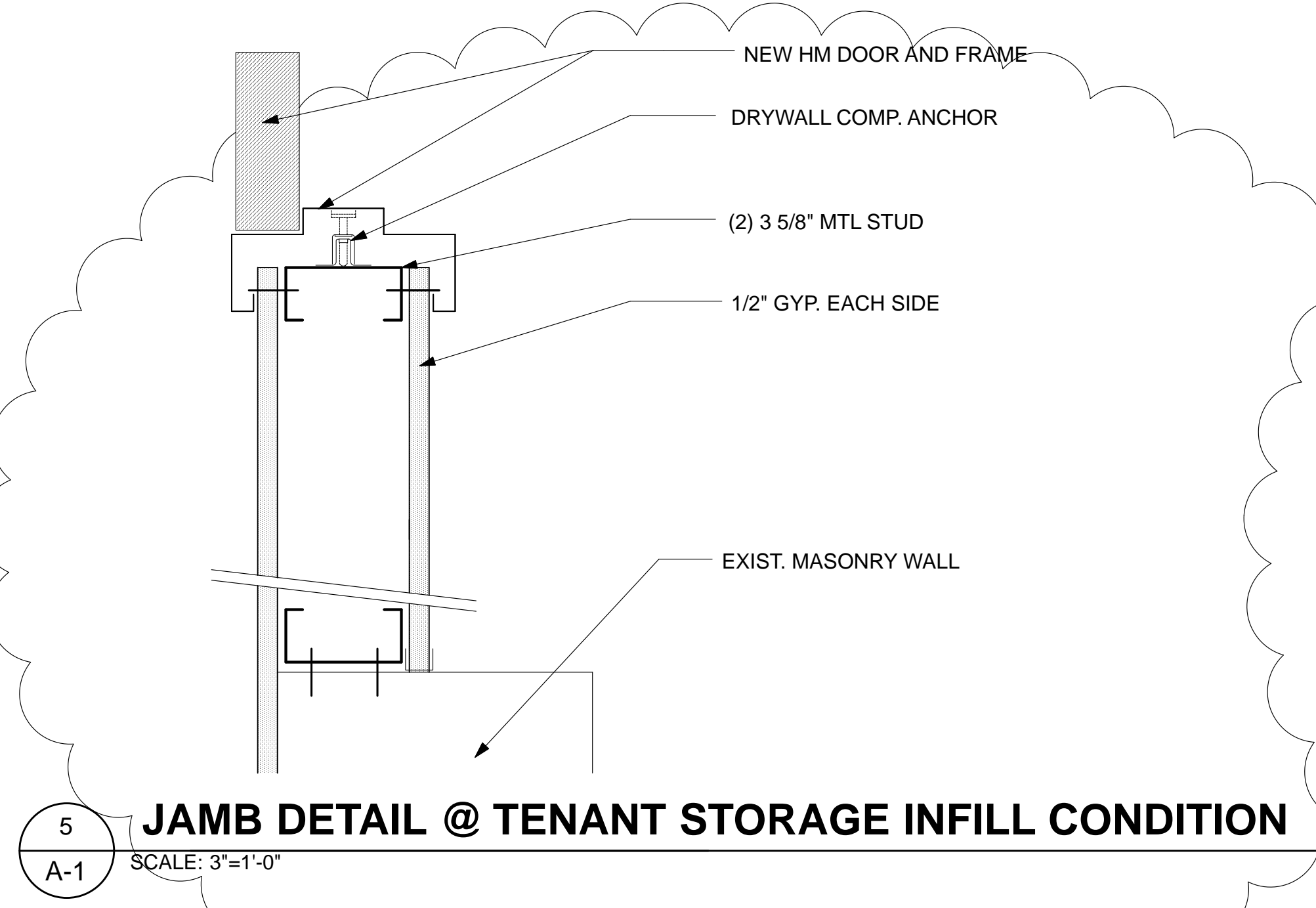
1 ENLARGED ELEVATION
SCALE: 1/2"=1'-0"



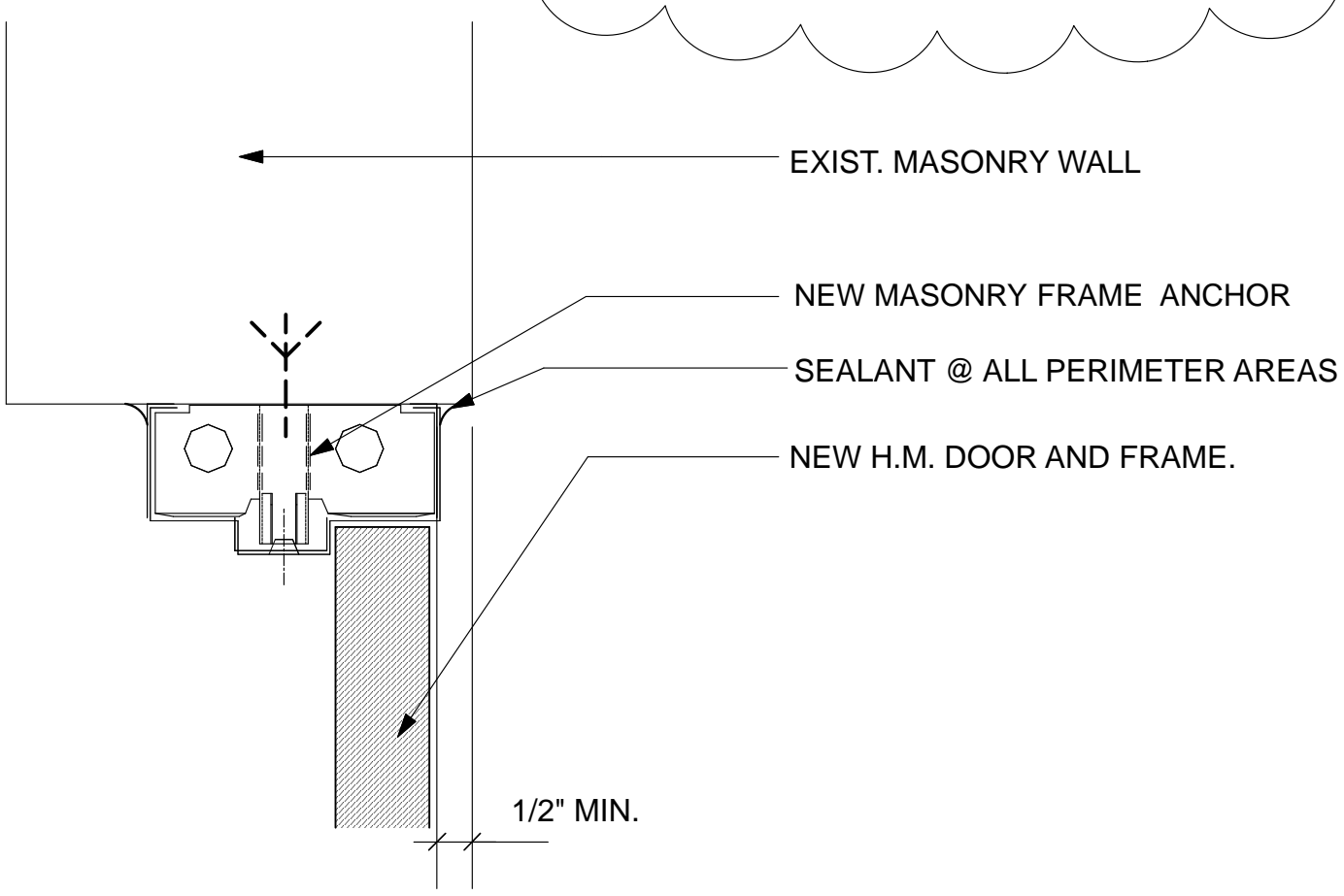
3 BUILDING ENTRY DOOR THRESHOLD DETAIL
SCALE: 3"=1'-0"



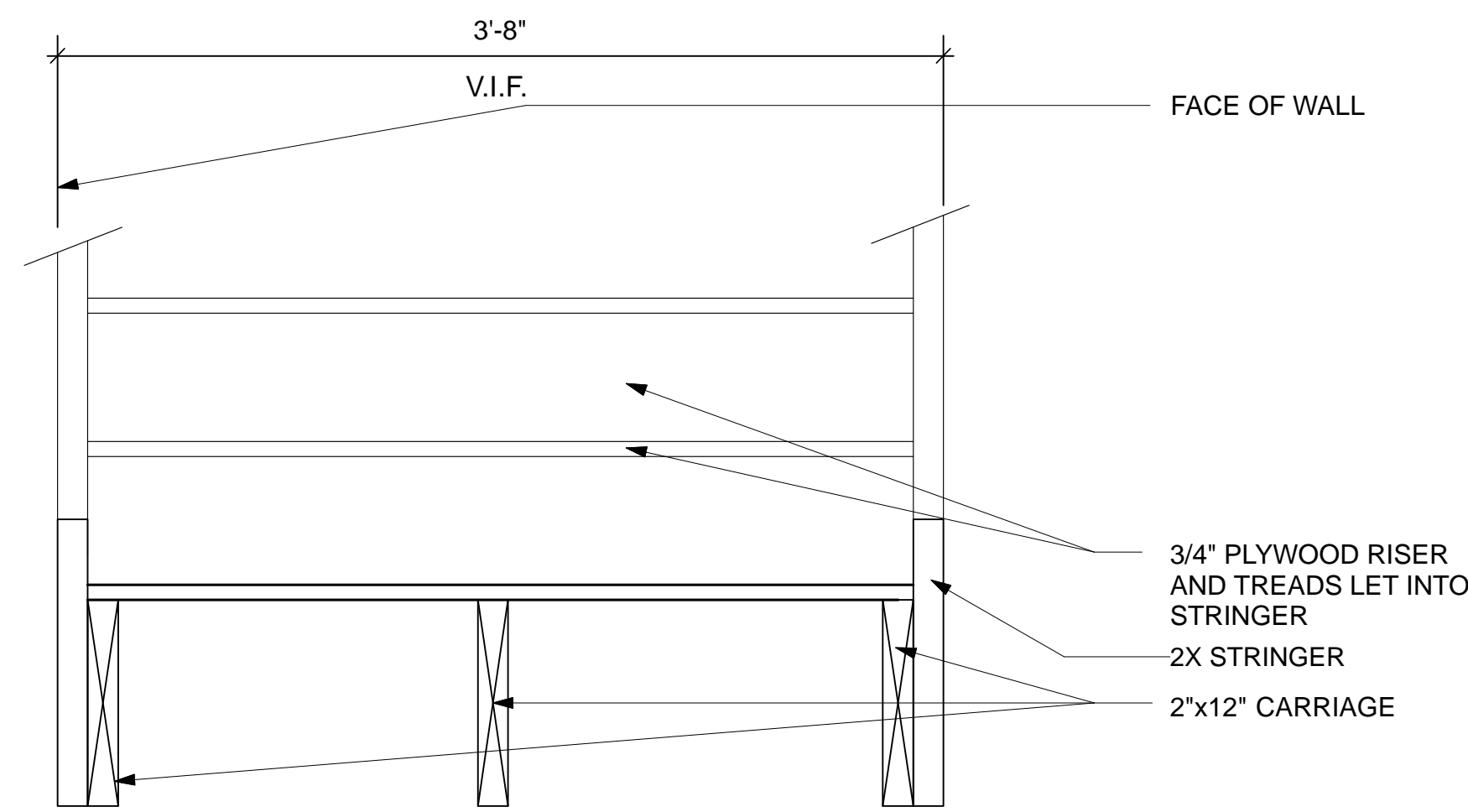
4 BUILDING ENTRY DOOR JAMB DETAIL
SCALE: 3"=1'-0"



5 JAMB DETAIL @ TENANT STORAGE INFILL CONDITION
SCALE: 3"=1'-0"

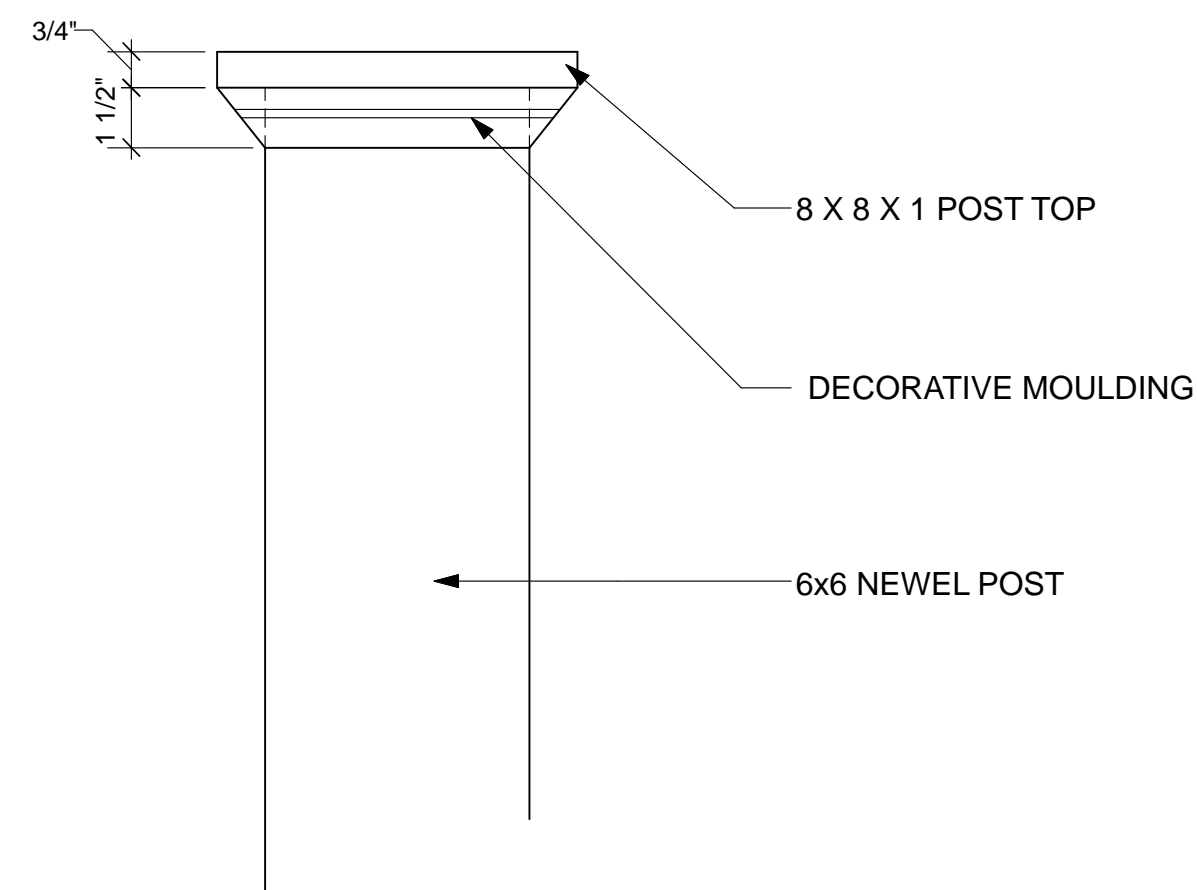


6 JAMB DETAIL
SCALE: 3"=1'-0"



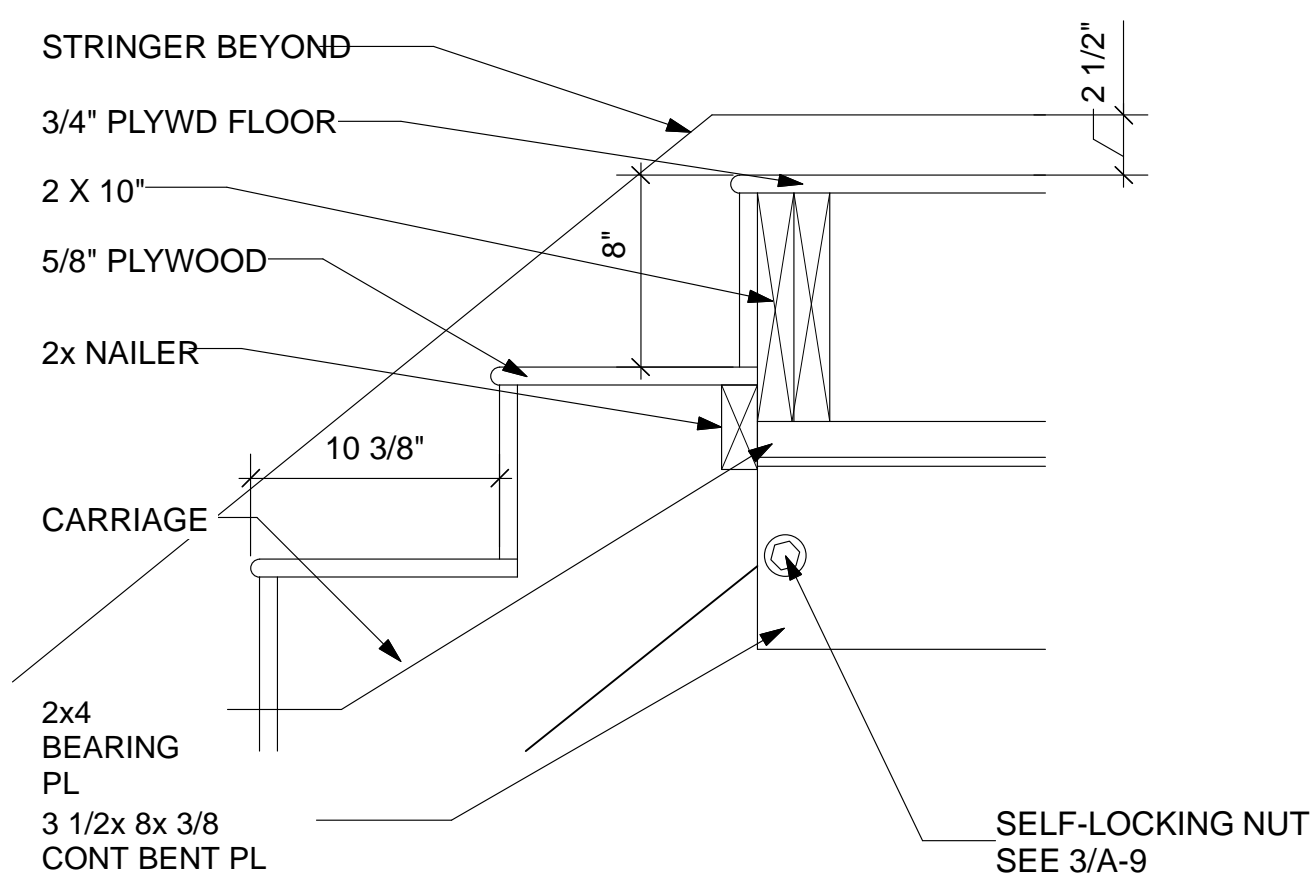
2 STAIR CROSS-SECTION DETAIL

2
A-6 SCALE: 1 1/2"=1'-0"



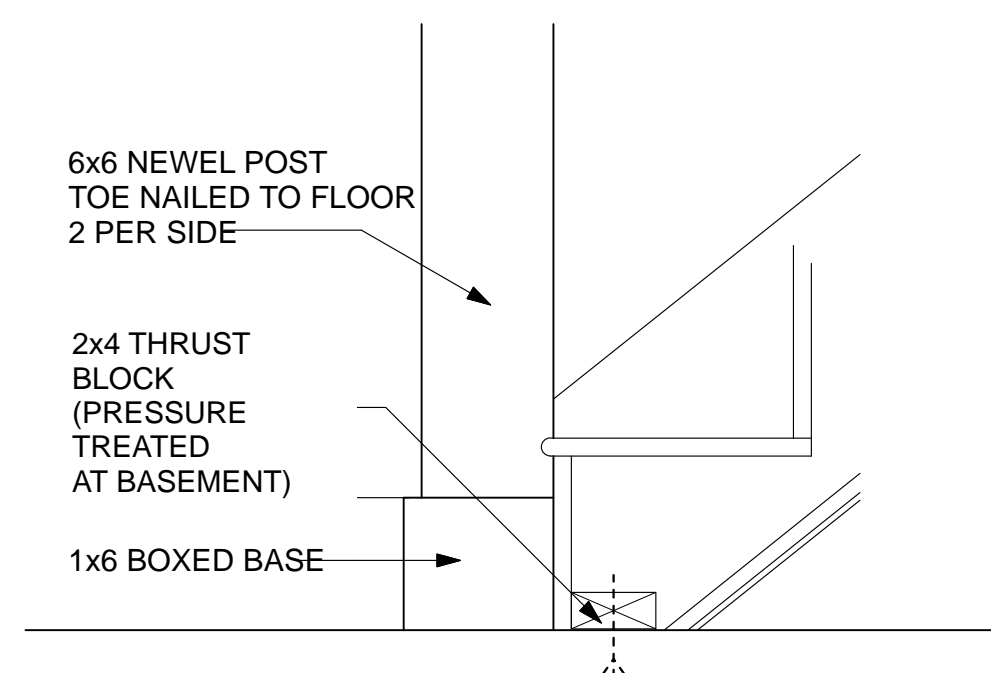
3 NEWEL POST TOP DETAIL

3
A-6 SCALE: 3"=1'-0"



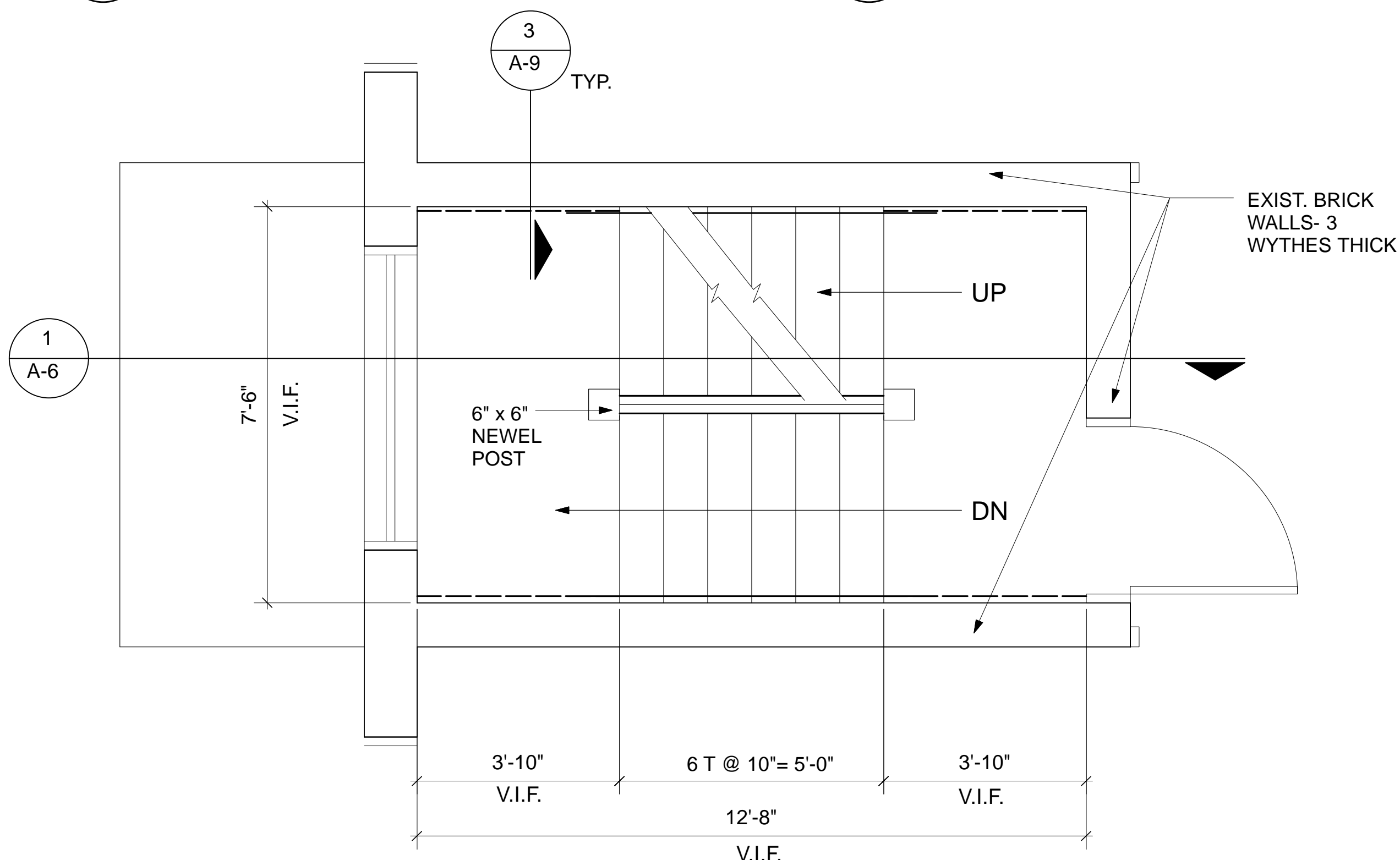
4 STAIR SECTION DETAIL

4
A-6 SCALE: 1 1/2"=1'-0"



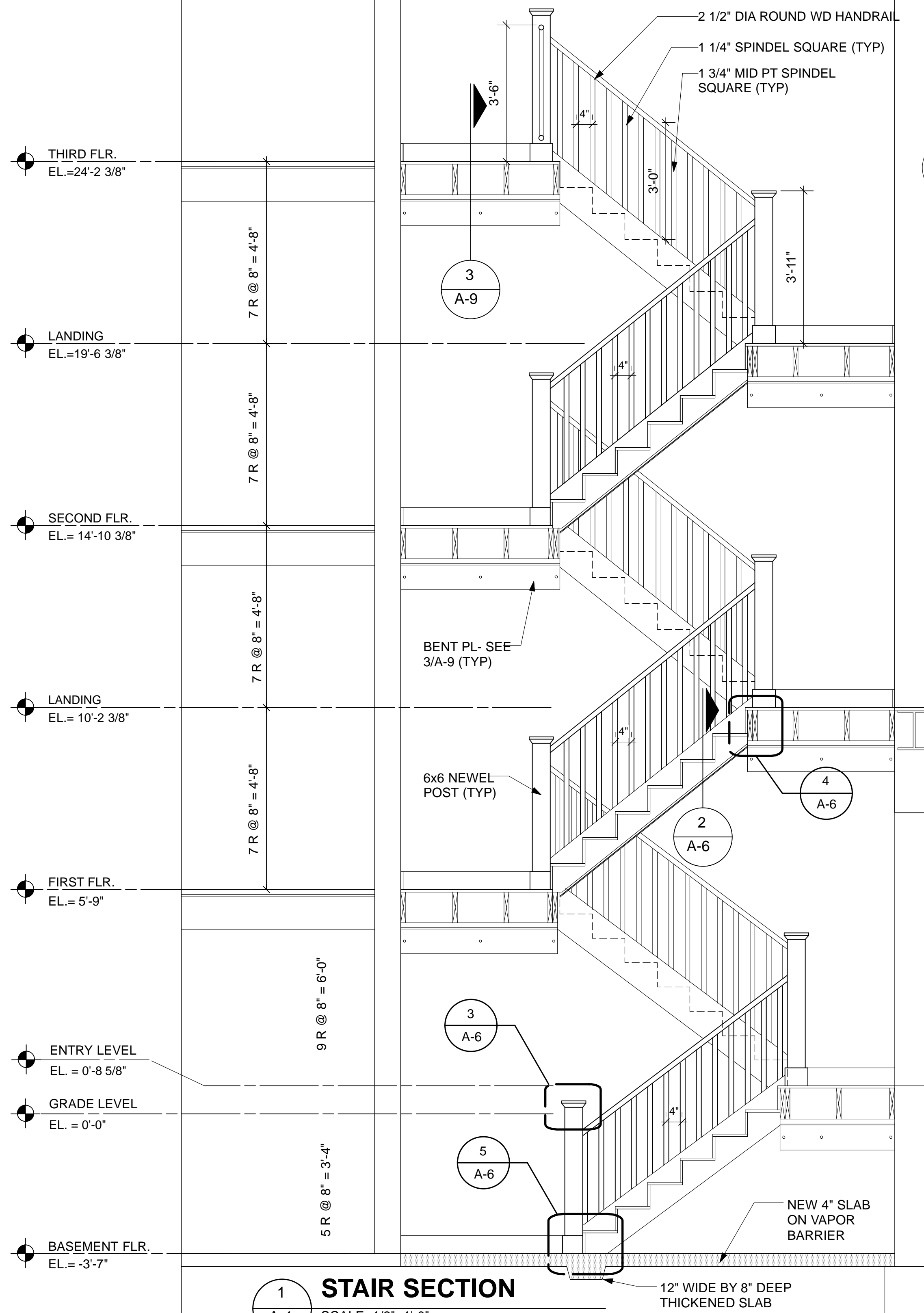
5 STAIR SECTION DETAIL

5
A-6 SCALE: 1 1/2"=1'-0"



6 ENLARGED STAIR PLAN-TYPICAL

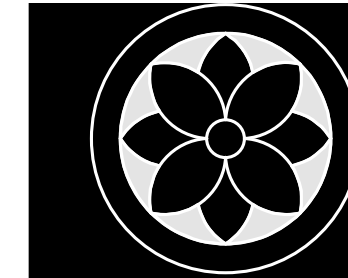
6
A-2 SCALE: 1/2"=1'-0"



1 STAIR SECTION

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

NOTE: FIELD VERIFY STAIR CONDITIONS TO DETERMINE SCOPE OF REPAIR AND ADDITION OF RAILINGS ALONG EXISTING STAIR



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Stair Sections and Details

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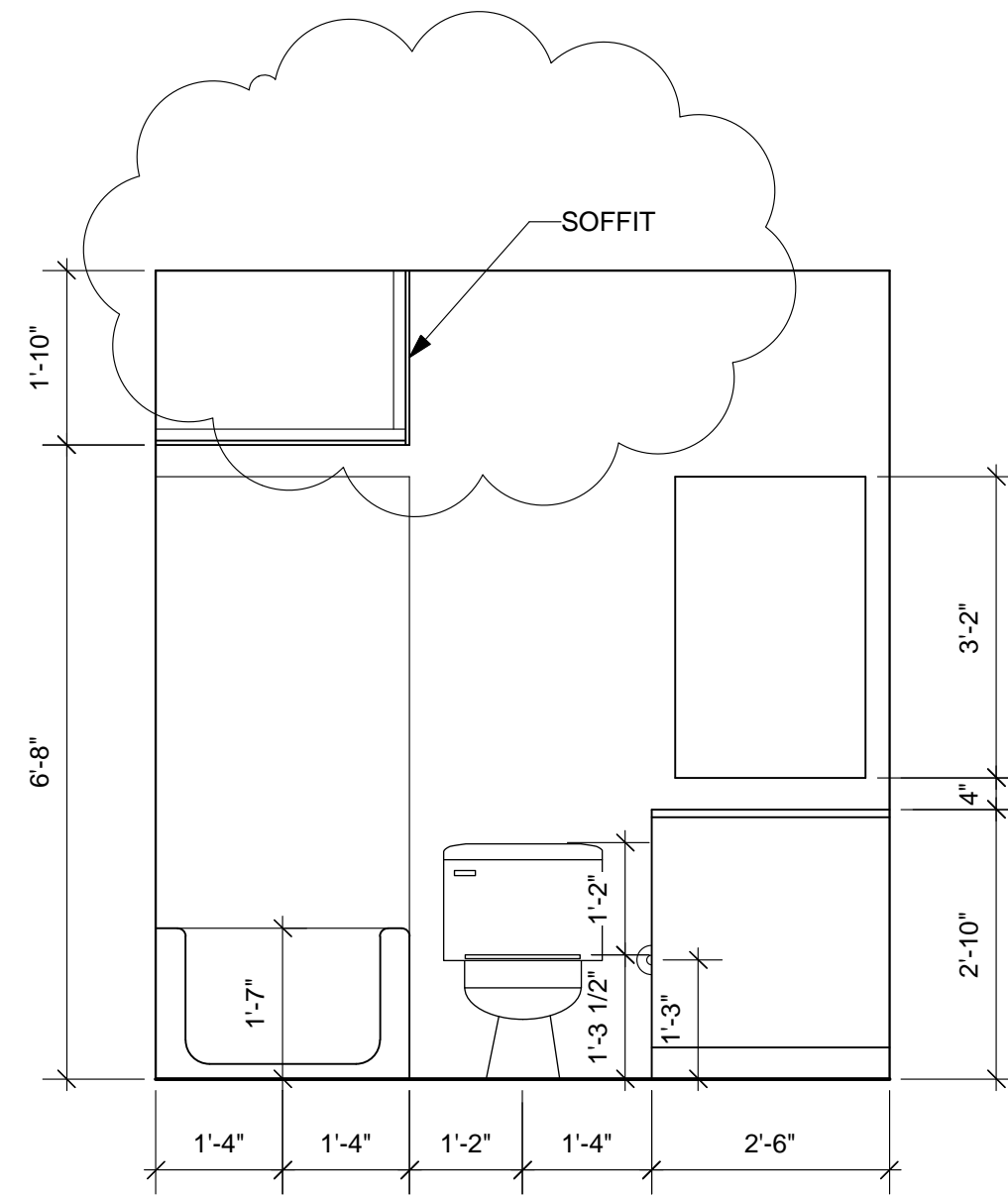
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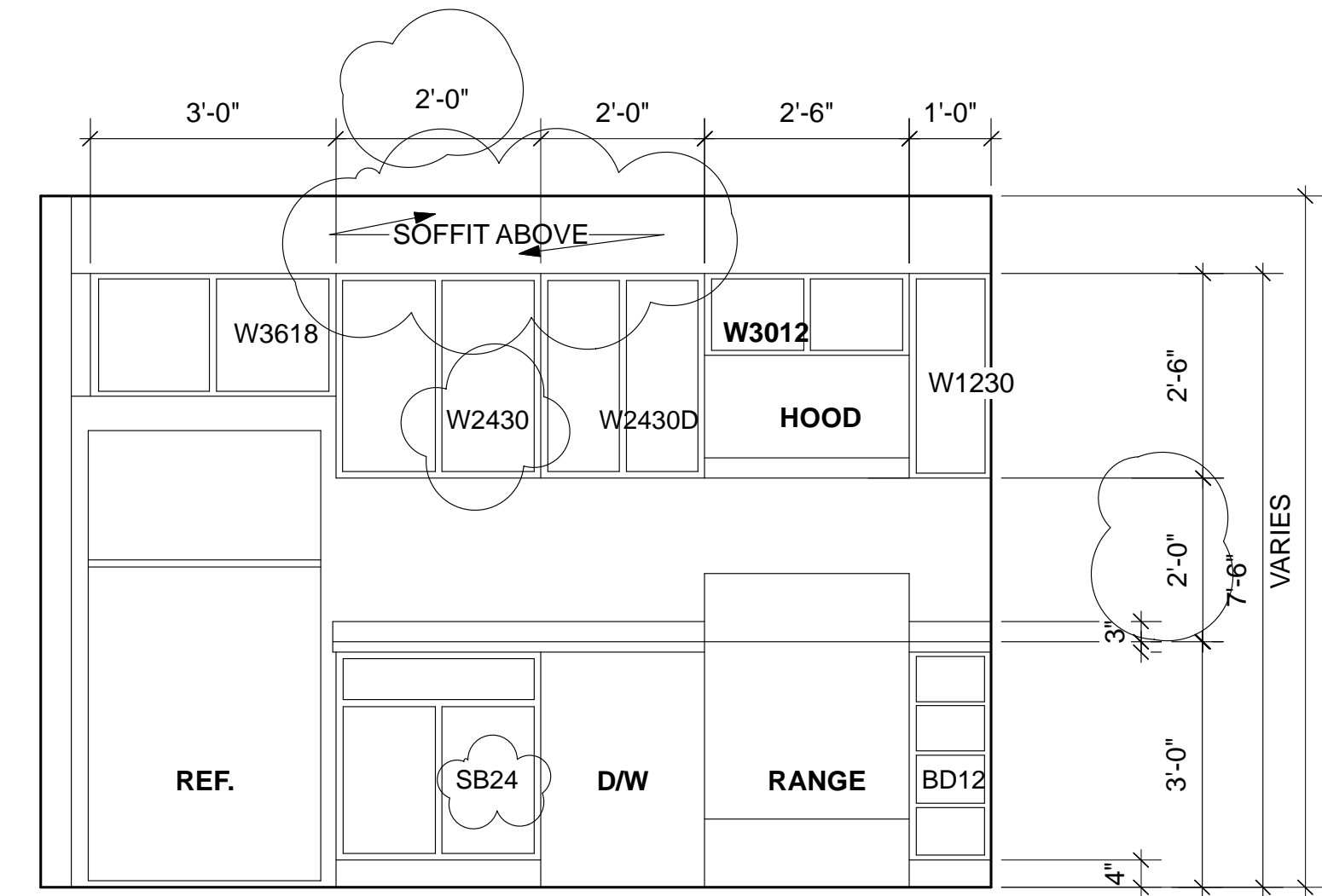
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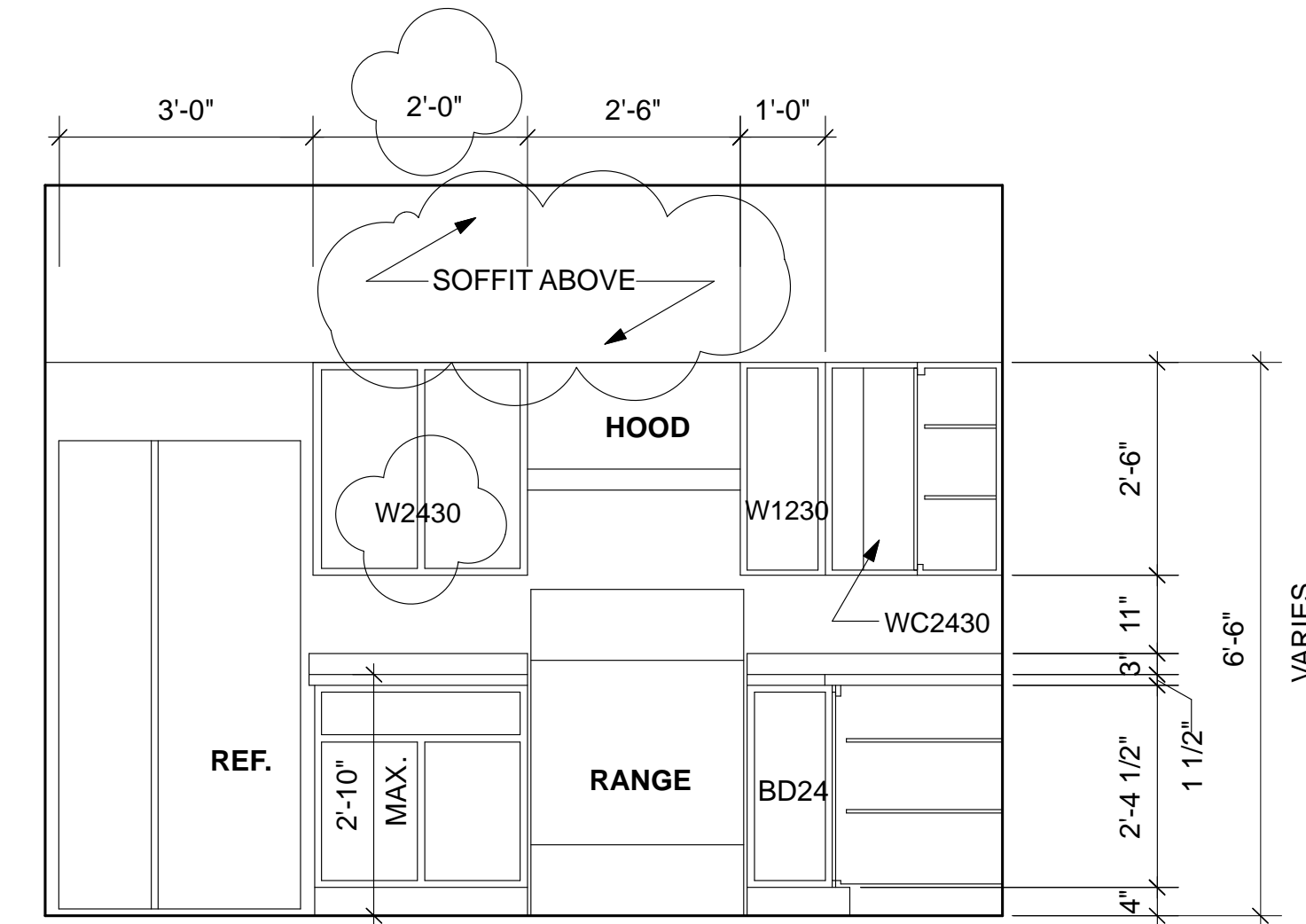
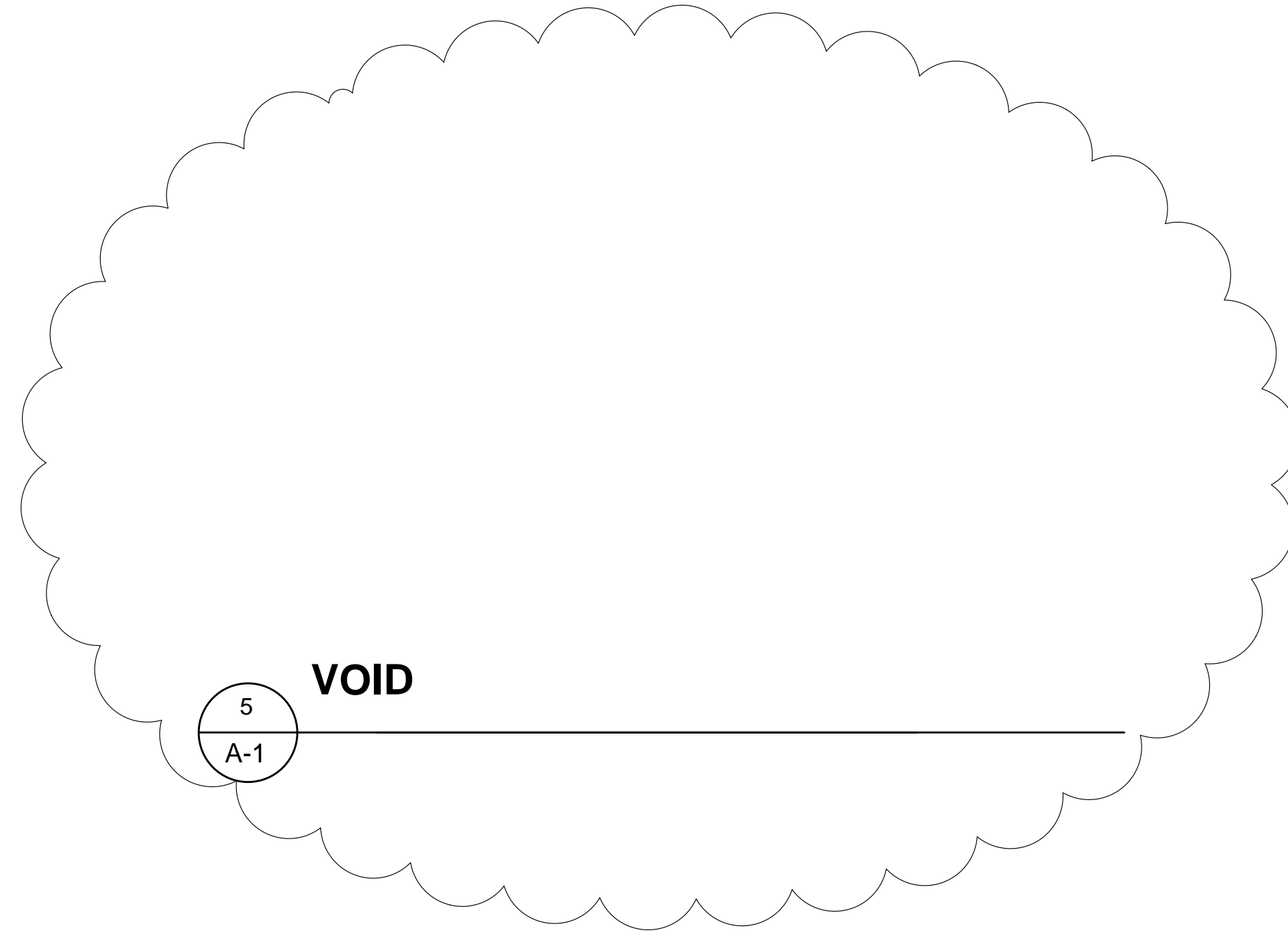
NOTE:
ALL CABINETS #S SHOWN ARE MERILLAT



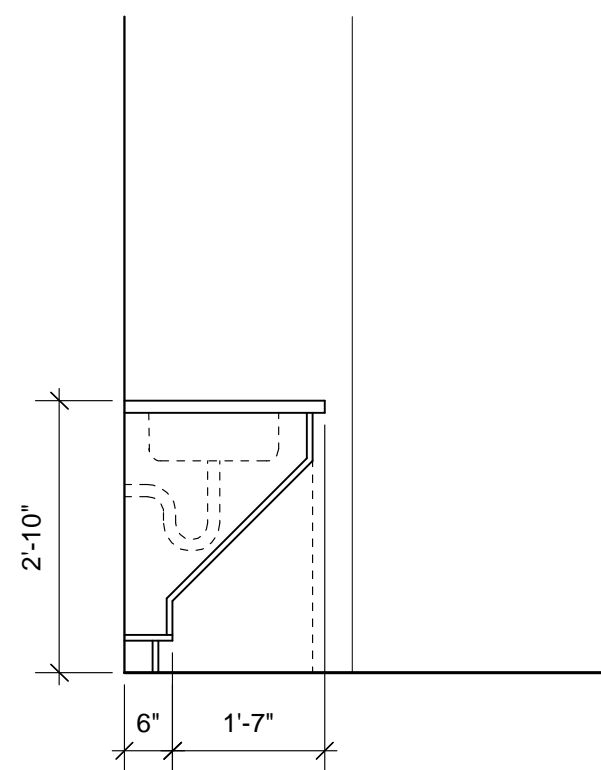
4 BATHROOM ELEVATION
A-1 SCALE: 1/2"=1'-0"



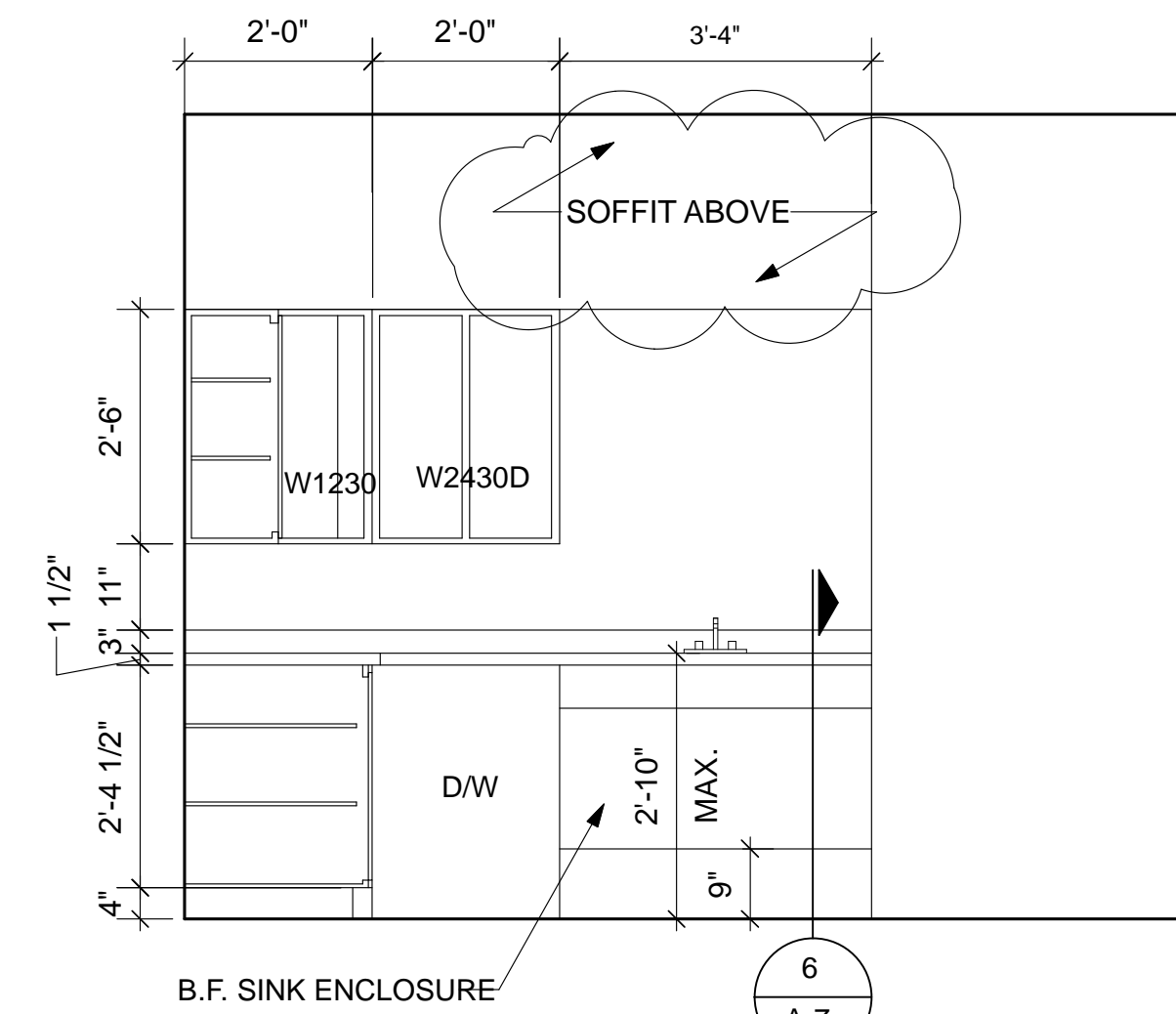
1 TYPICAL KITCHEN ELEVATION
A-1 SCALE: 1/2"=1'-0"



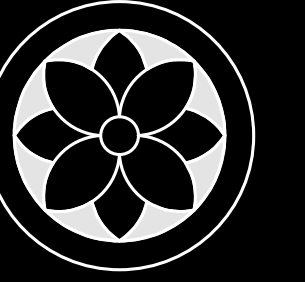
2 KITCHEN ELEVATION
A-1 SCALE: 1/2"=1'-0"



6 BARRIER FREE SINK SECTION
A-7 SCALE: 1/2"=1'-0"



3 KITCHEN ELEVATION
A-1 SCALE: 1/2"=1'-0"



MARLBOROUGH APARTMENTS
910 Marlborough Street
Detroit, Michigan
SHELBORNE DEVELOPMENT

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Interior Elevations

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BULLETIN 1

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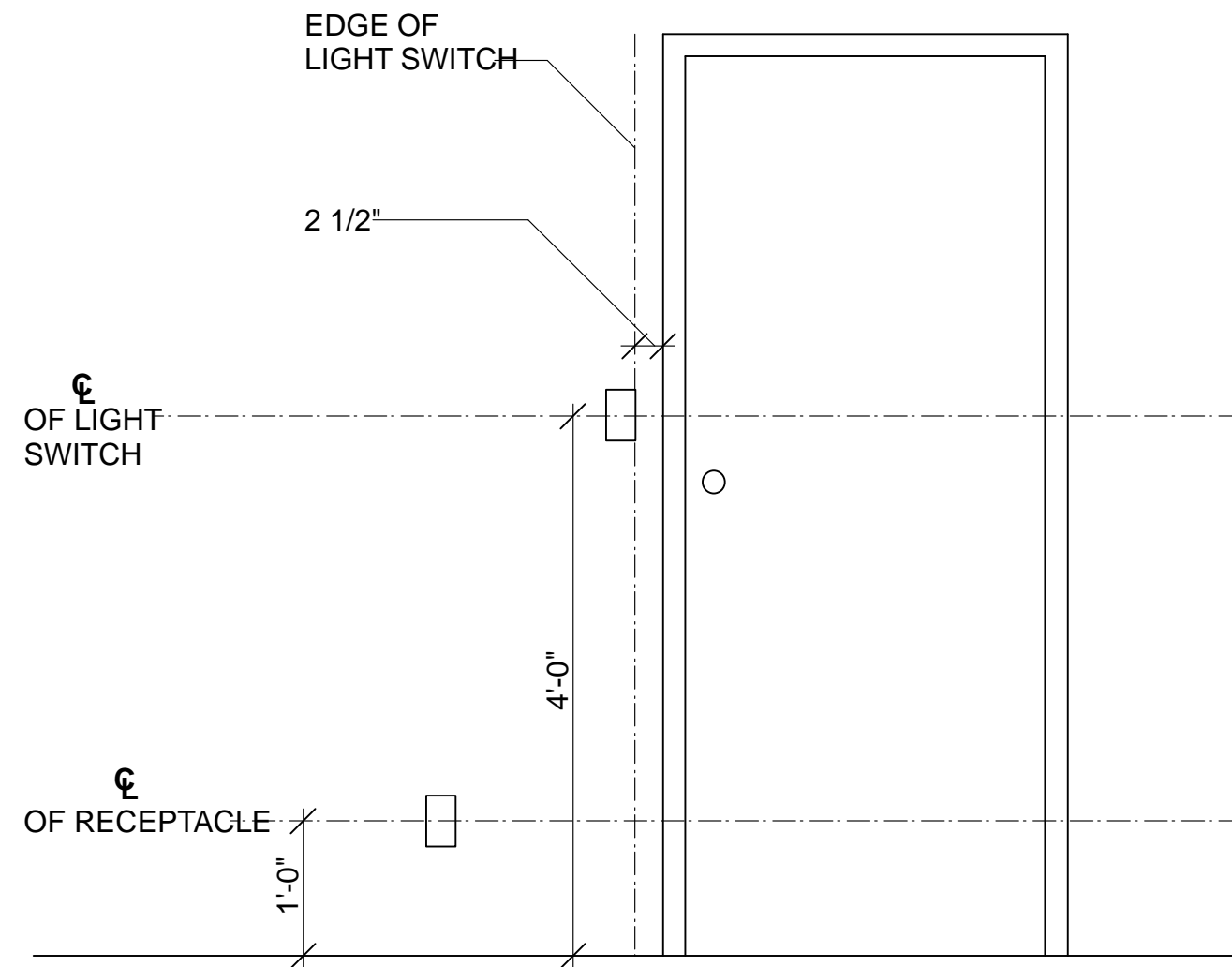


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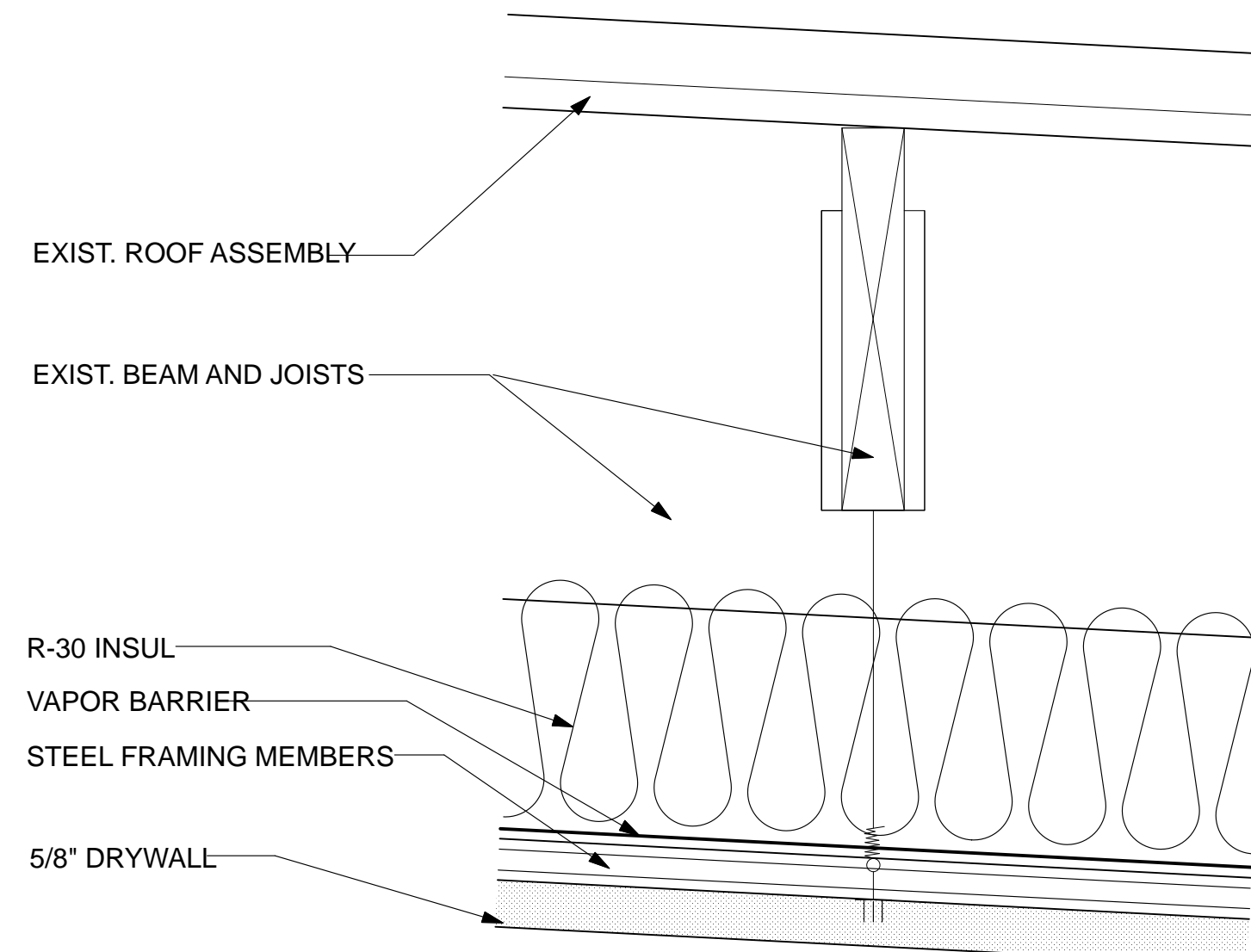
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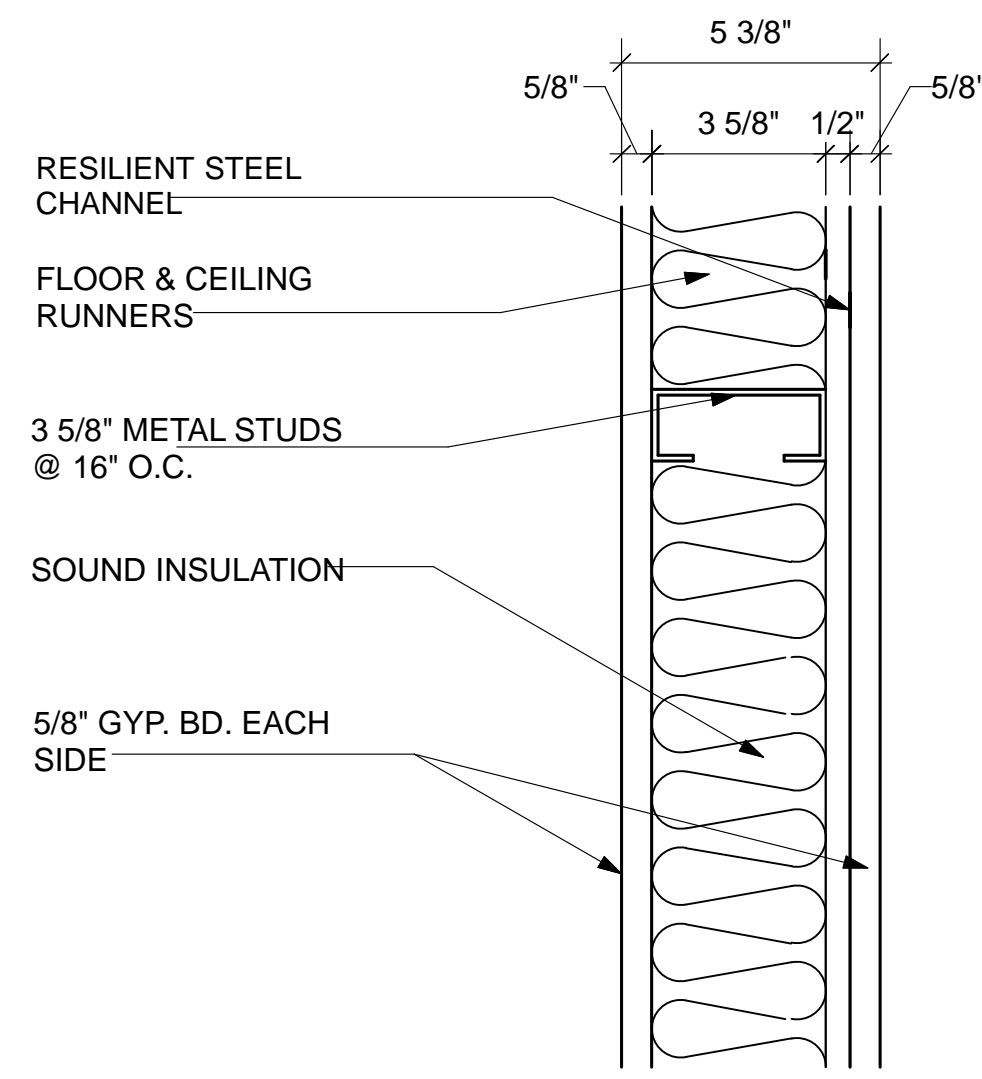
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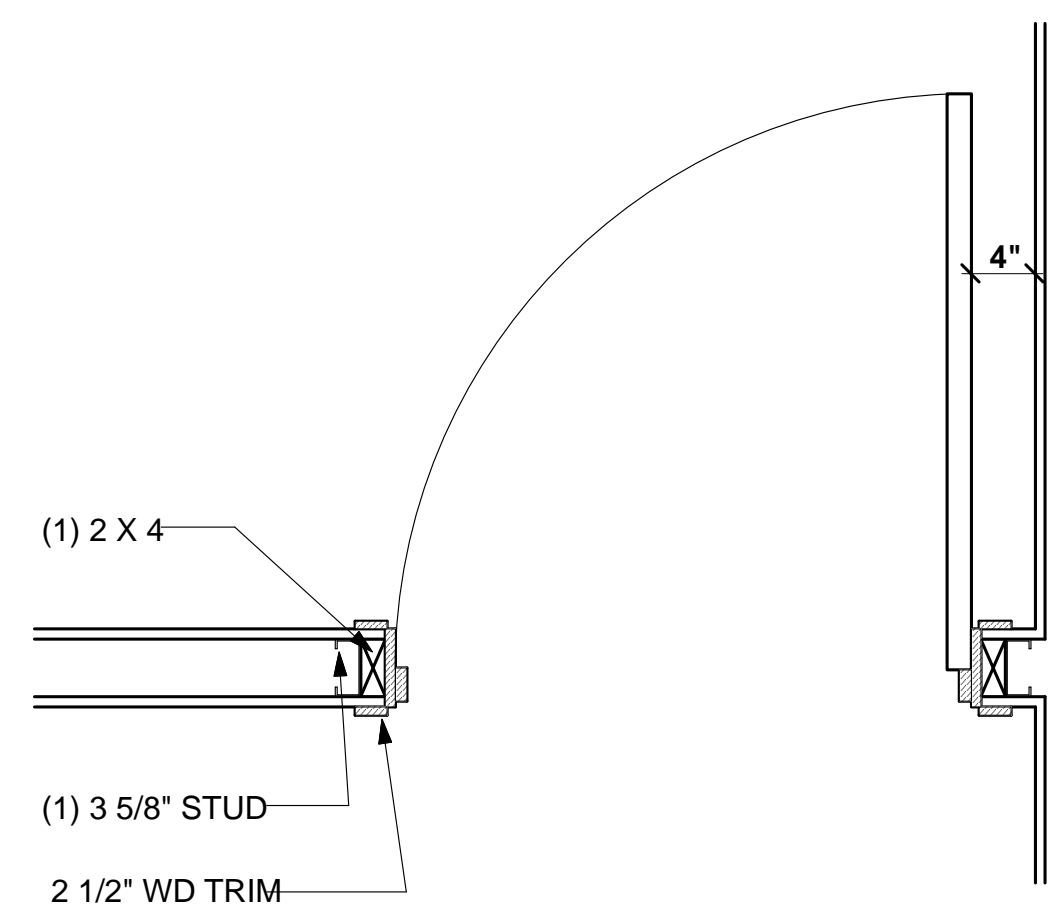
9 TYP. ELECTRICAL LOCATIONS
SCALE: 3/4"=1'-0"



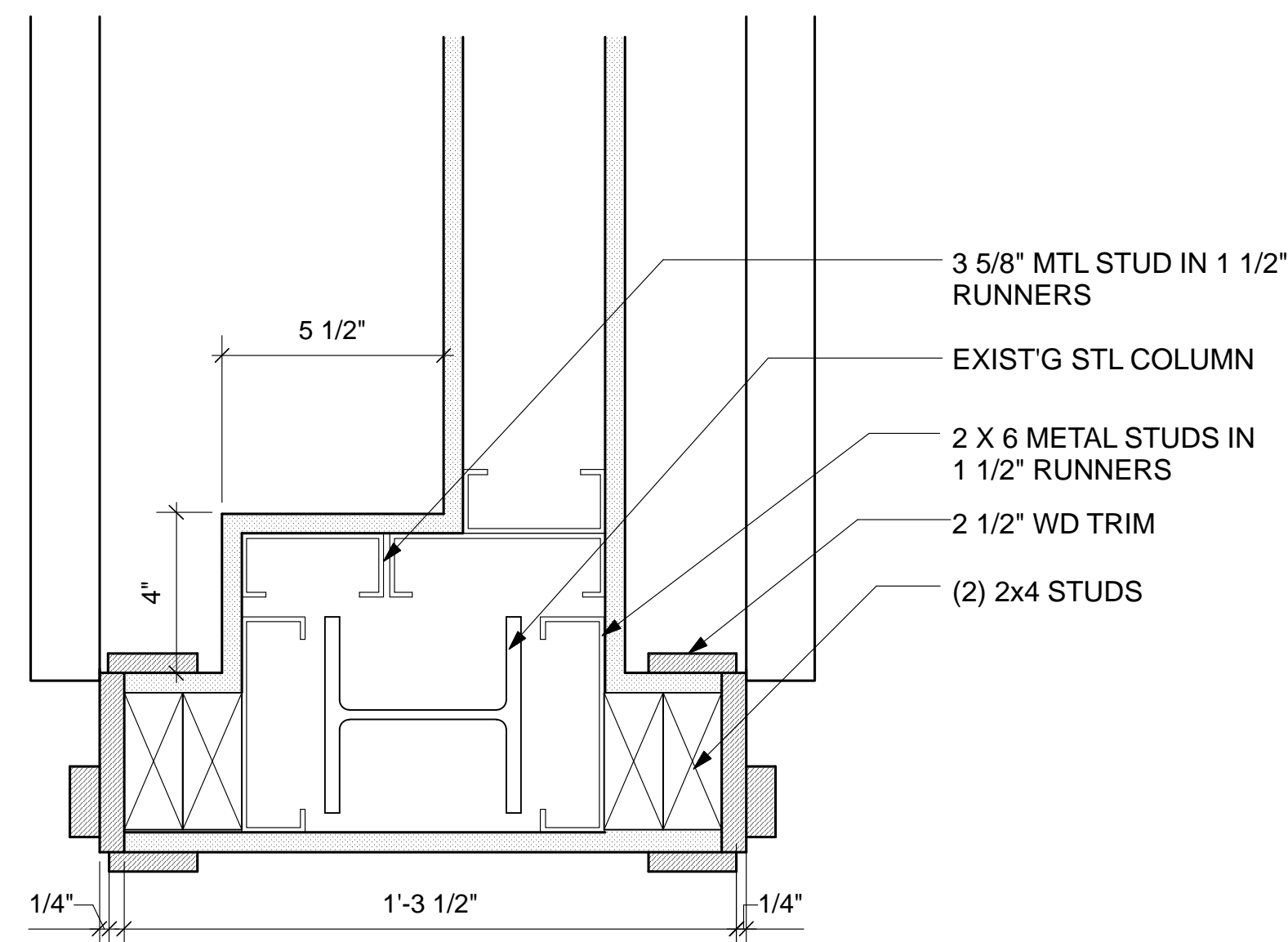
4 THIRD FLOOR CLG. DETAIL
SCALE: 3"=1'-0"



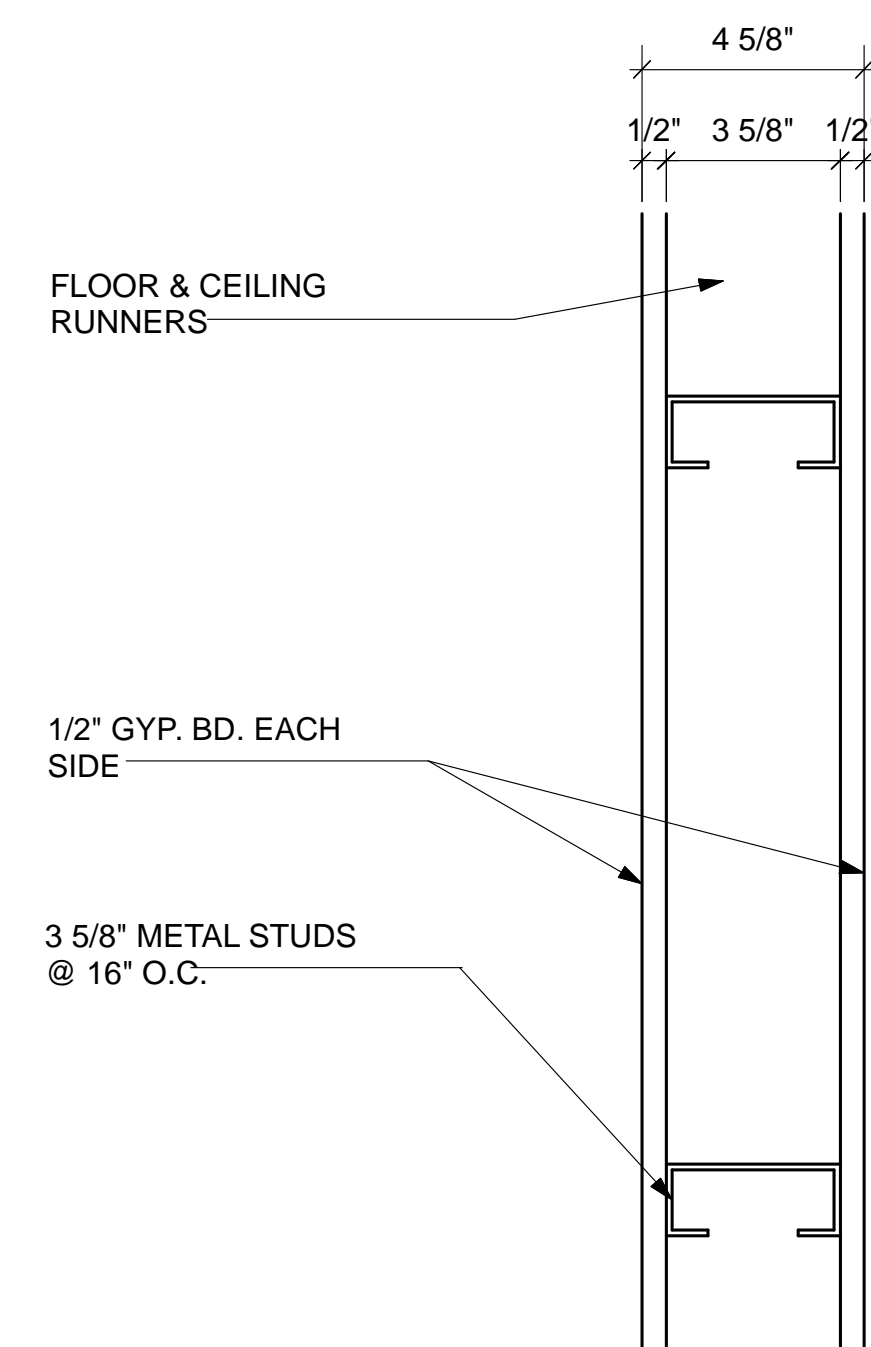
3 UNIT SEPARATION WALL @ CORR.
SCALE: 3"=1'-0"
1 HOUR WALL PER UL# U423



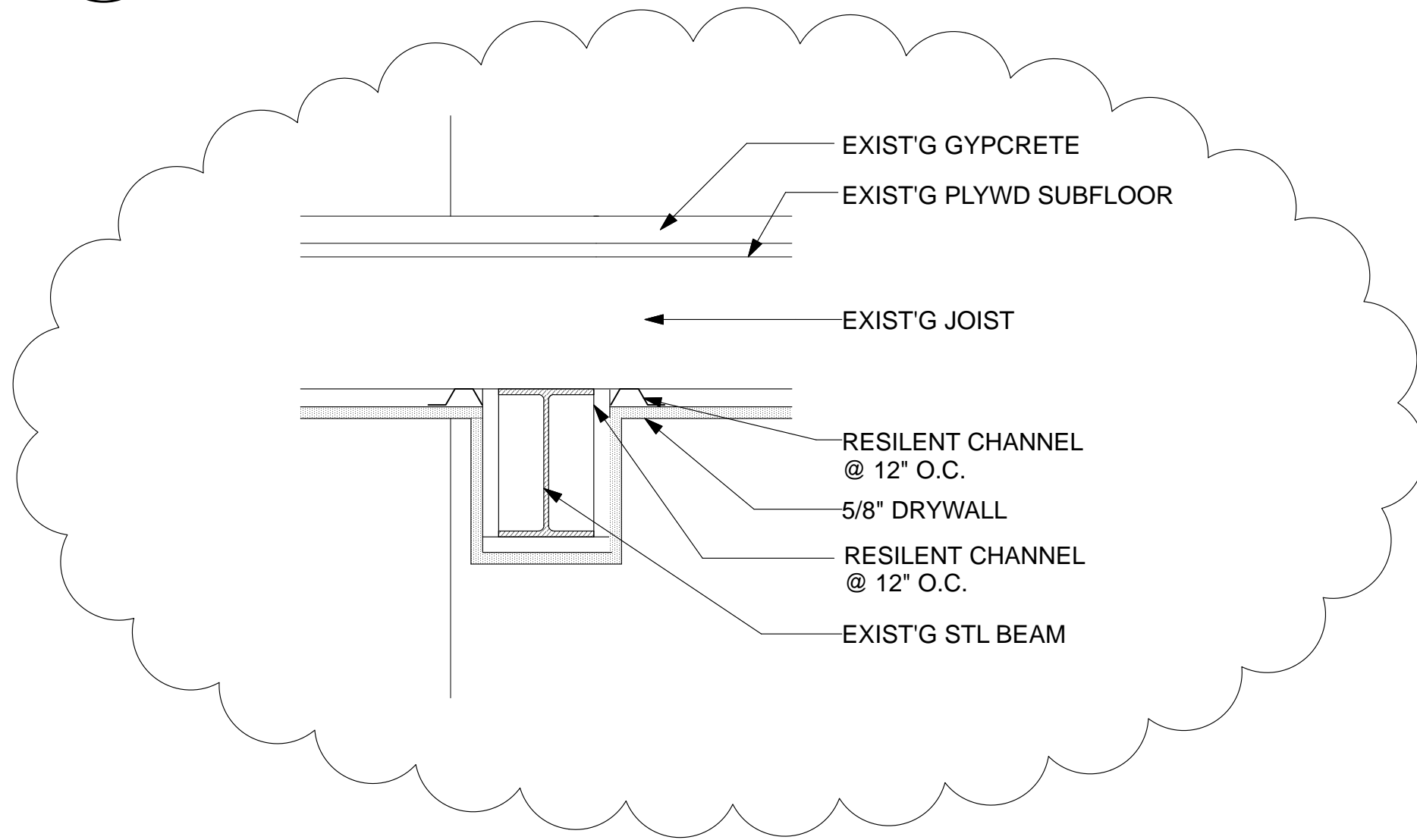
8 TYP. DOOR PLACEMENT
SCALE: 1"=1'-0"



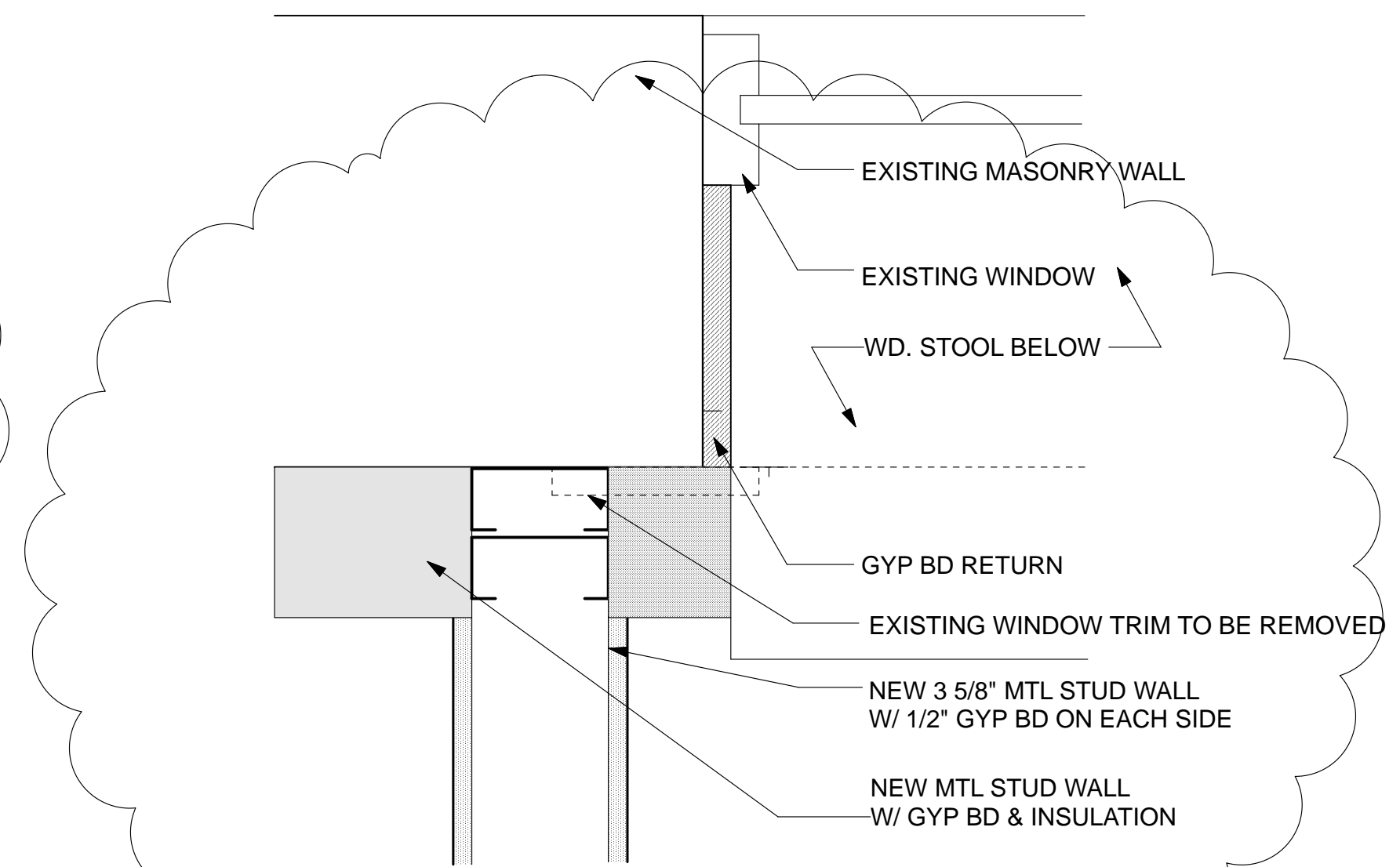
5 COLUMN ENCLOSURE DETAIL
SCALE: 3"=1'-0"



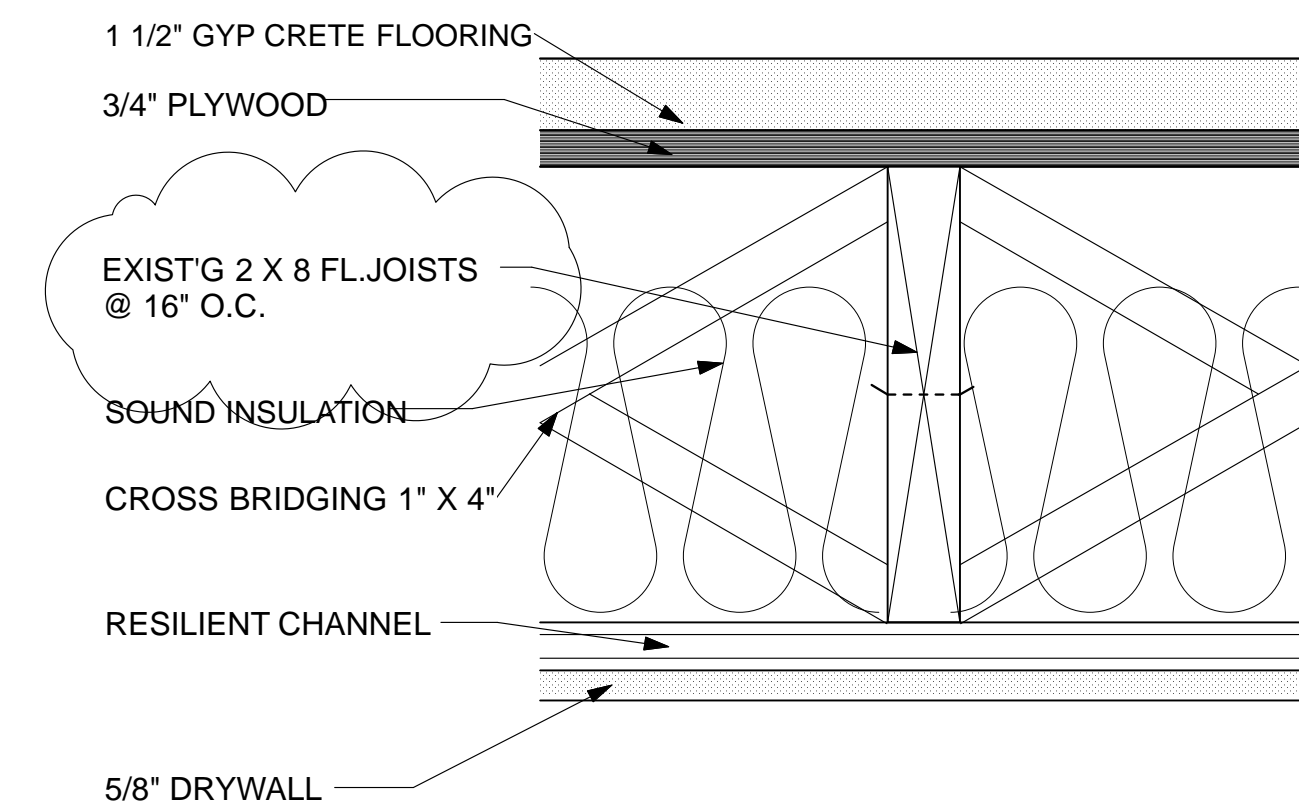
2 TYP. WALL
SCALE: 3"=1'-0"



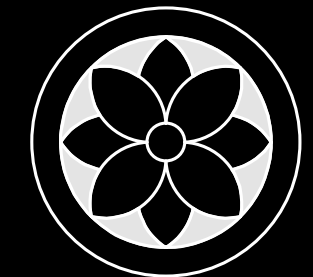
7 TYP. BM ENCLOSURE IN FIRE RATED FLOOR
SCALE: 1 1/2"=1'-0"



6 ENLARGED FLOOR PLAN DETAIL
SCALE: 3"=1'-0"



1 UL# L535 - 1 HR. FLOOR
SCALE: 3"=1'-0"
* 1/2 HOUR SEPARATION REQUIRED



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Misc. Details

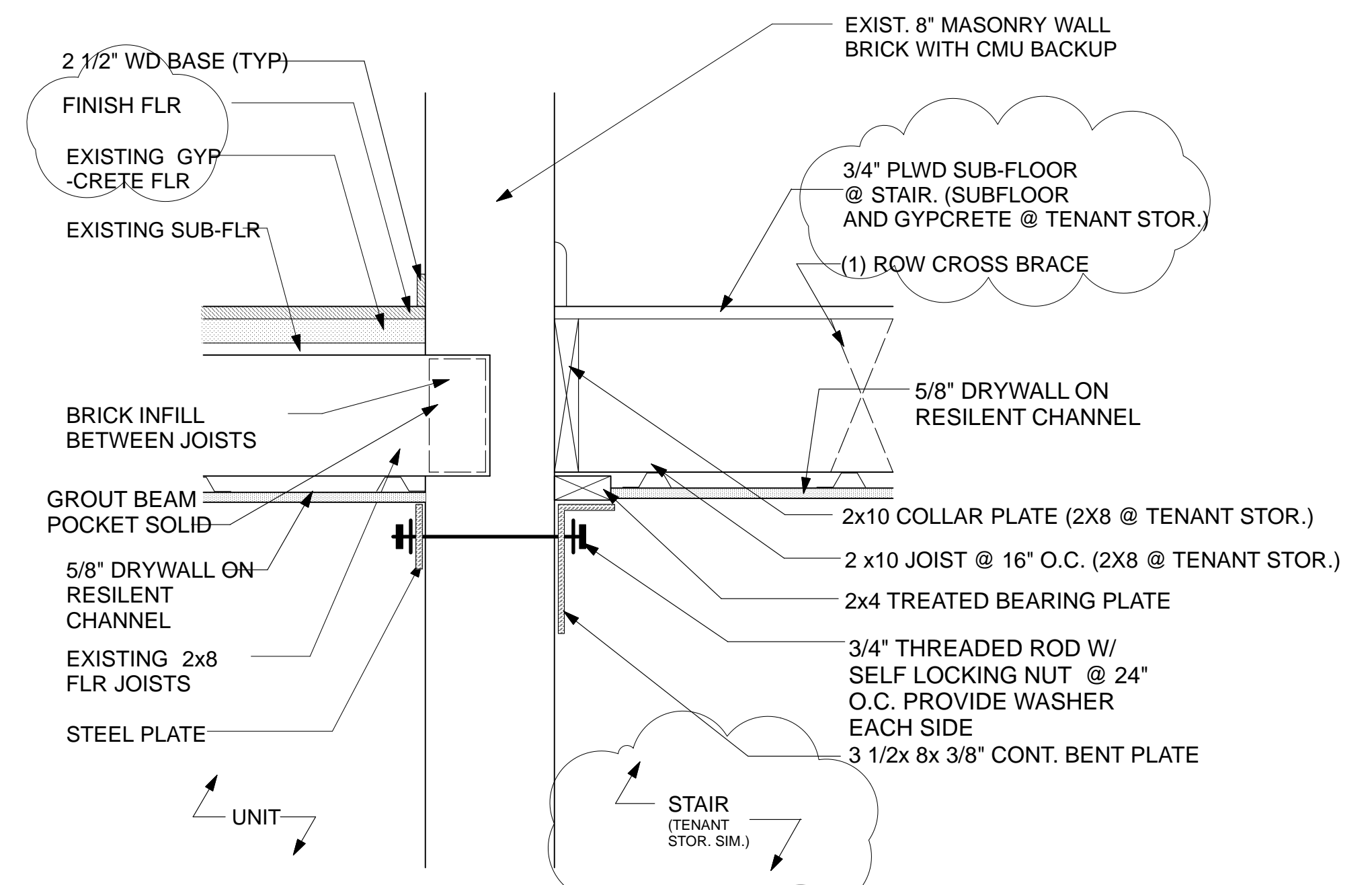
Issued For:
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BULLETIN 1 12.20.18

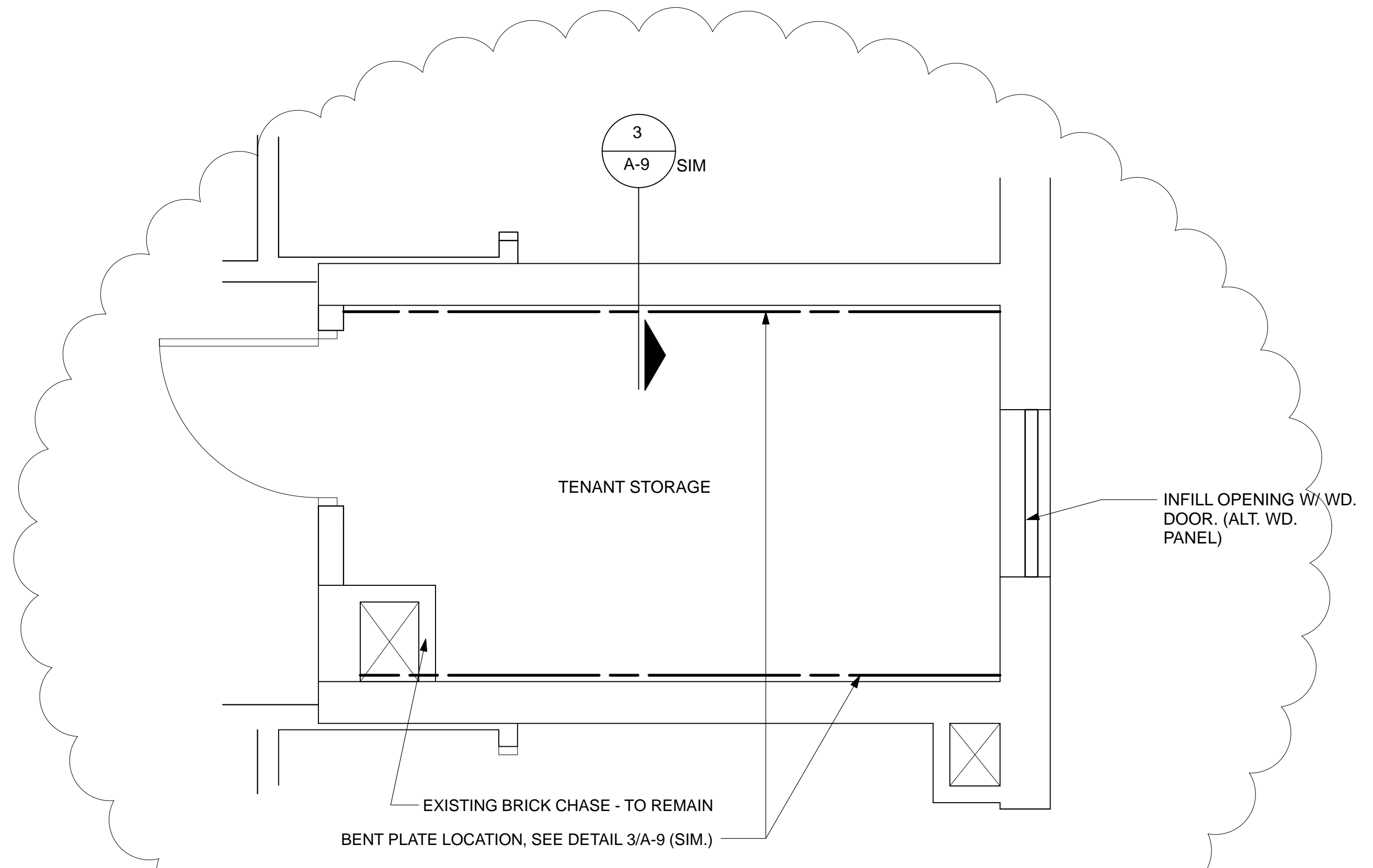
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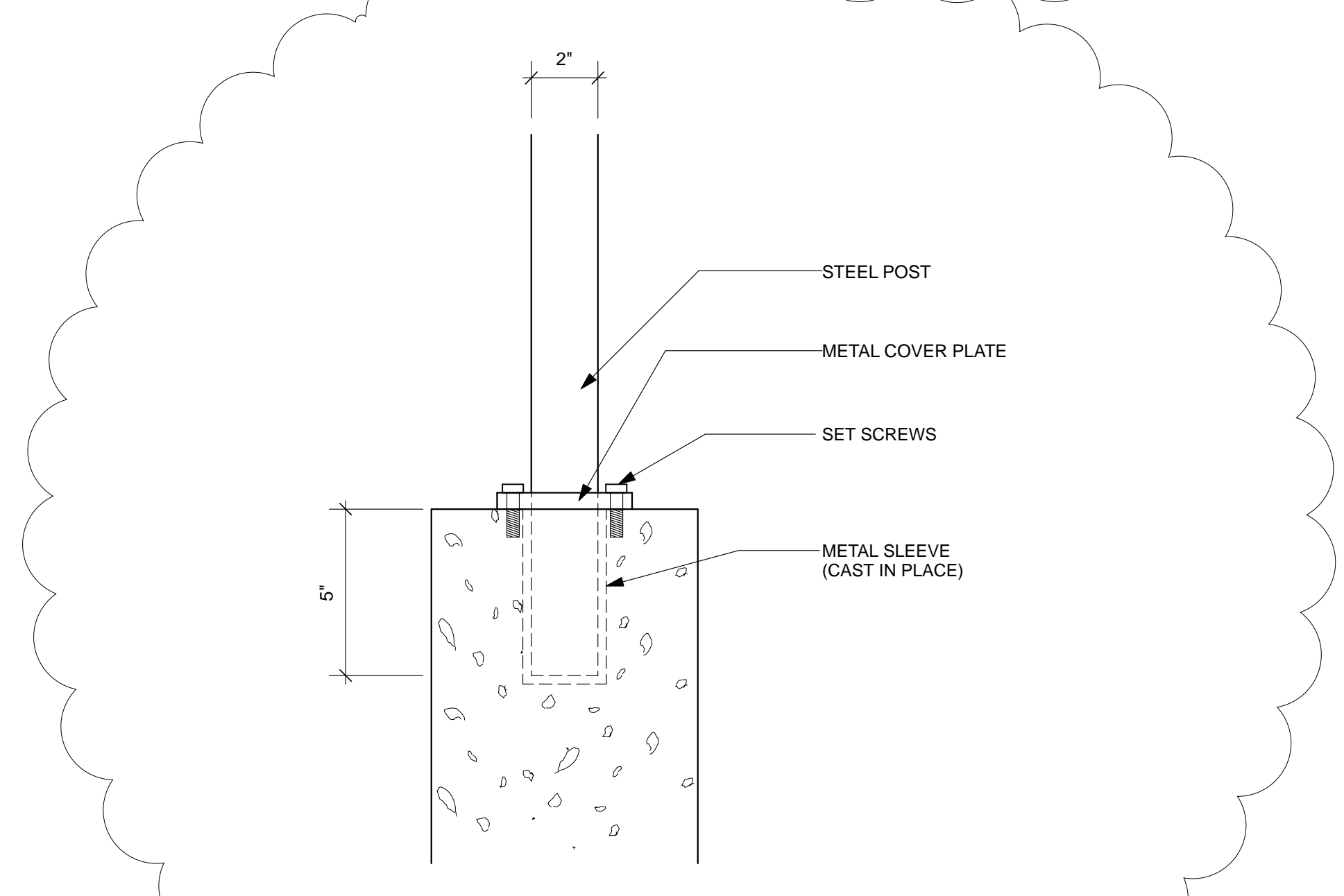
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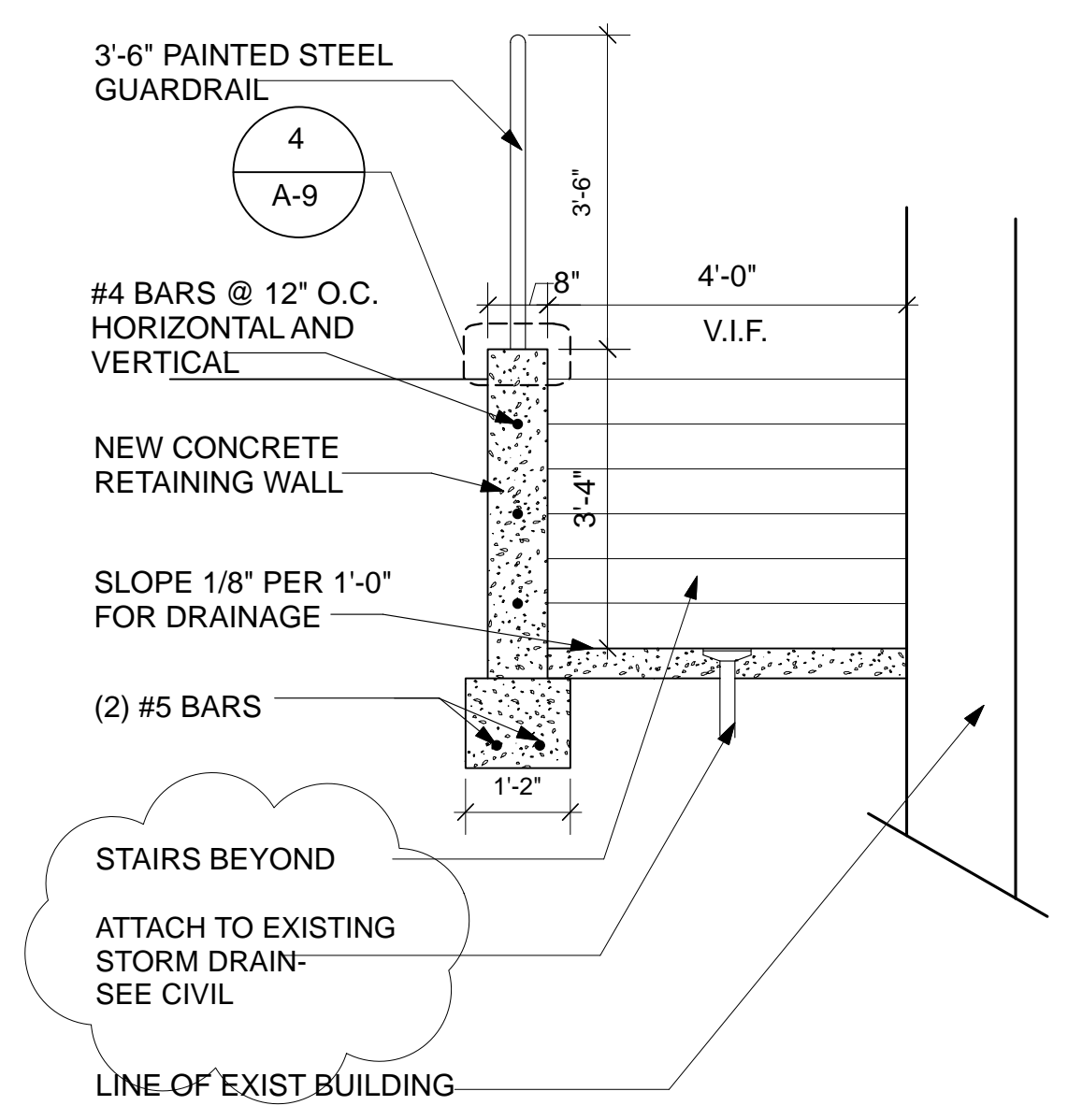
3 NEW FLOOR DETAIL @ STAIR AND UNIT
 SCALE: 1 1/2"=1'-0"



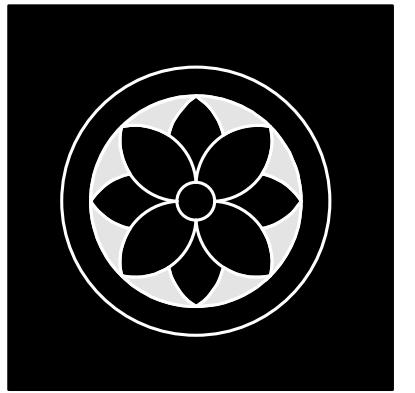
1 ENLARGED PLAN @ TENANT STORAGE ROOM
 SCALE: 1/2"=1'-0"



4 CONNECTION DETAIL (VOID)
 SCALE: 3"=1'-0"



2 RETAINING WALL DETAIL
 SCALE: 1/2"=1'-0"

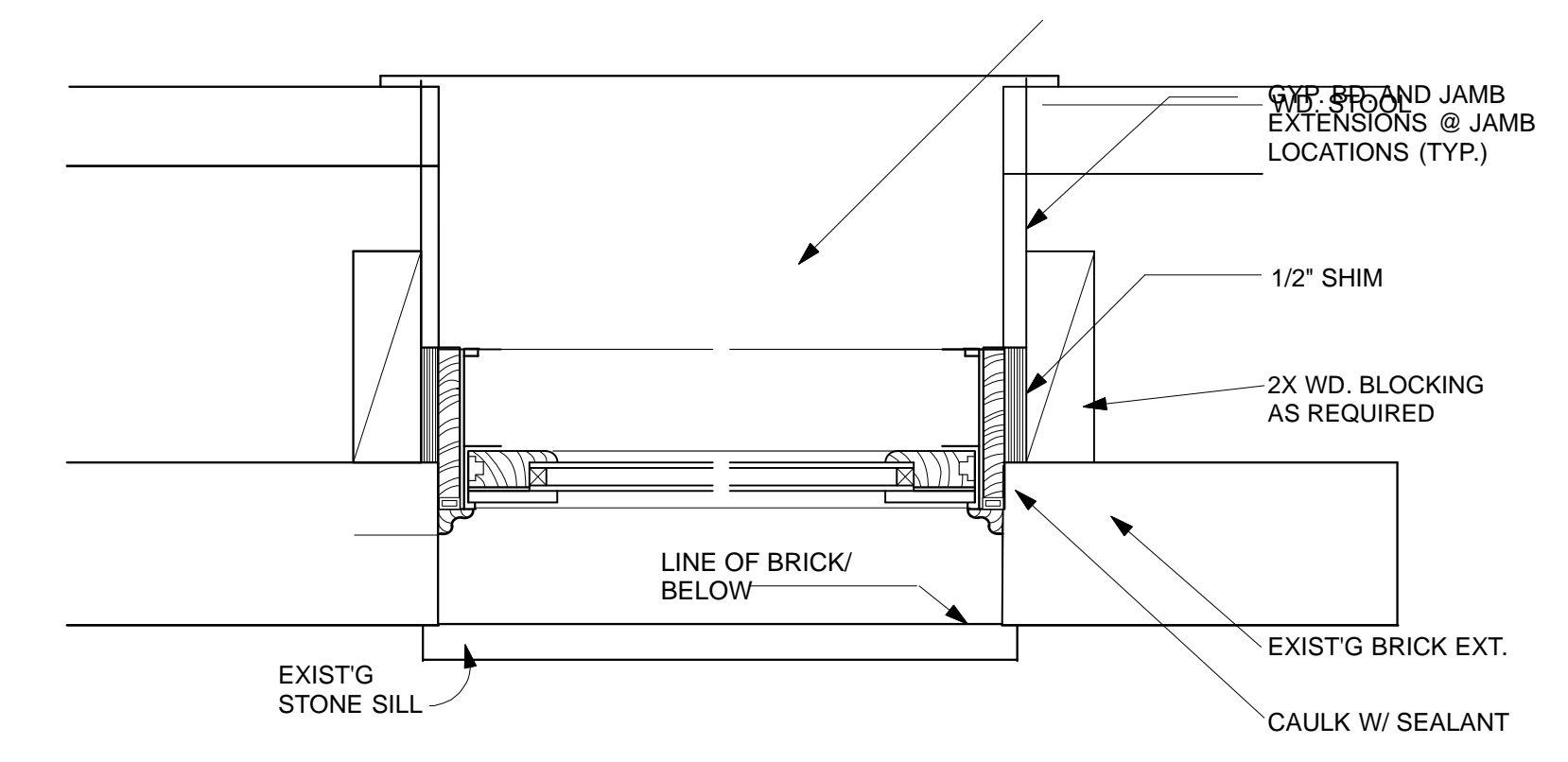


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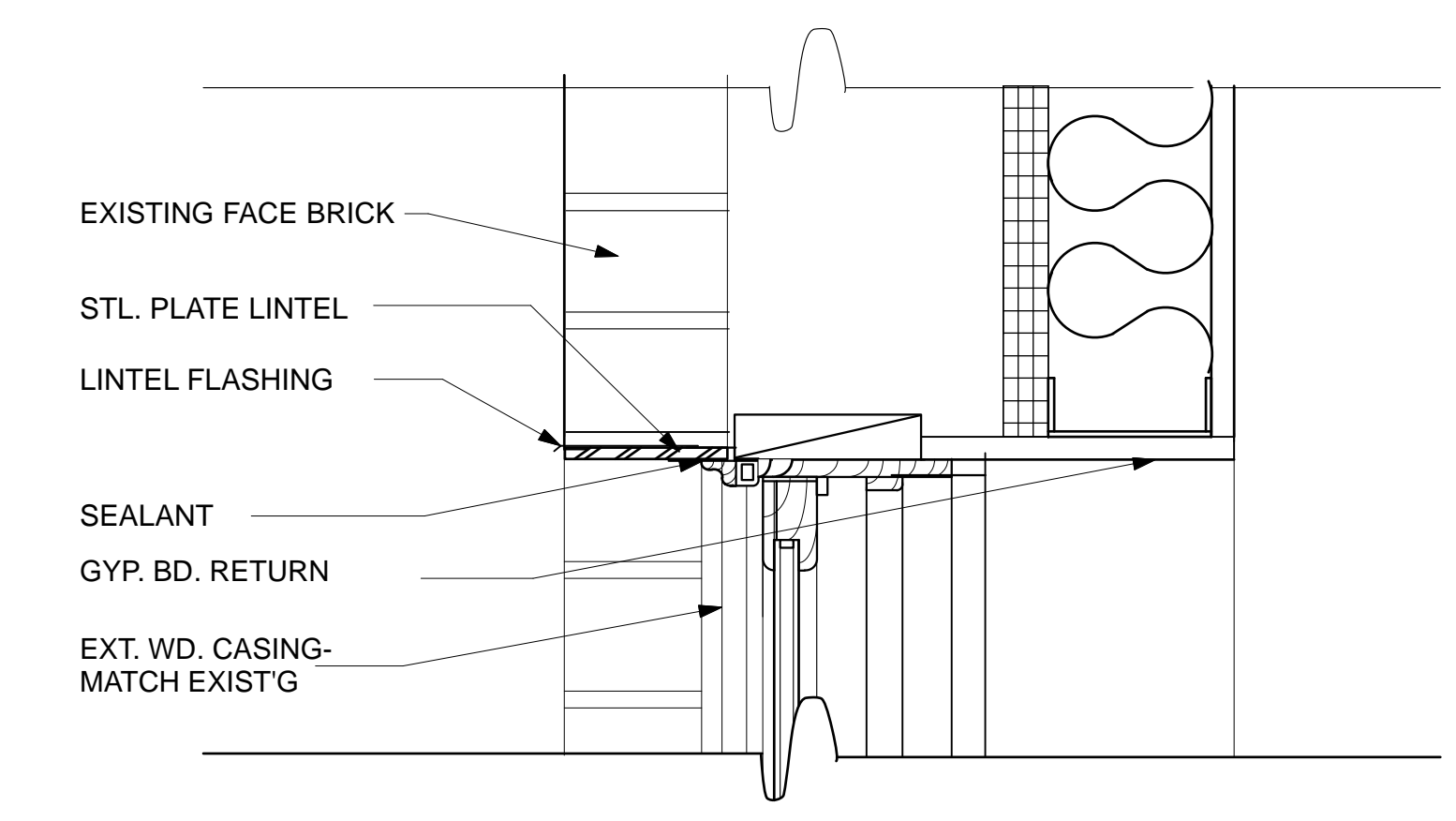
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Permits	06.17
Revisions	07.24.17
	11.06.18
	BULLETIN 1 12.20.18

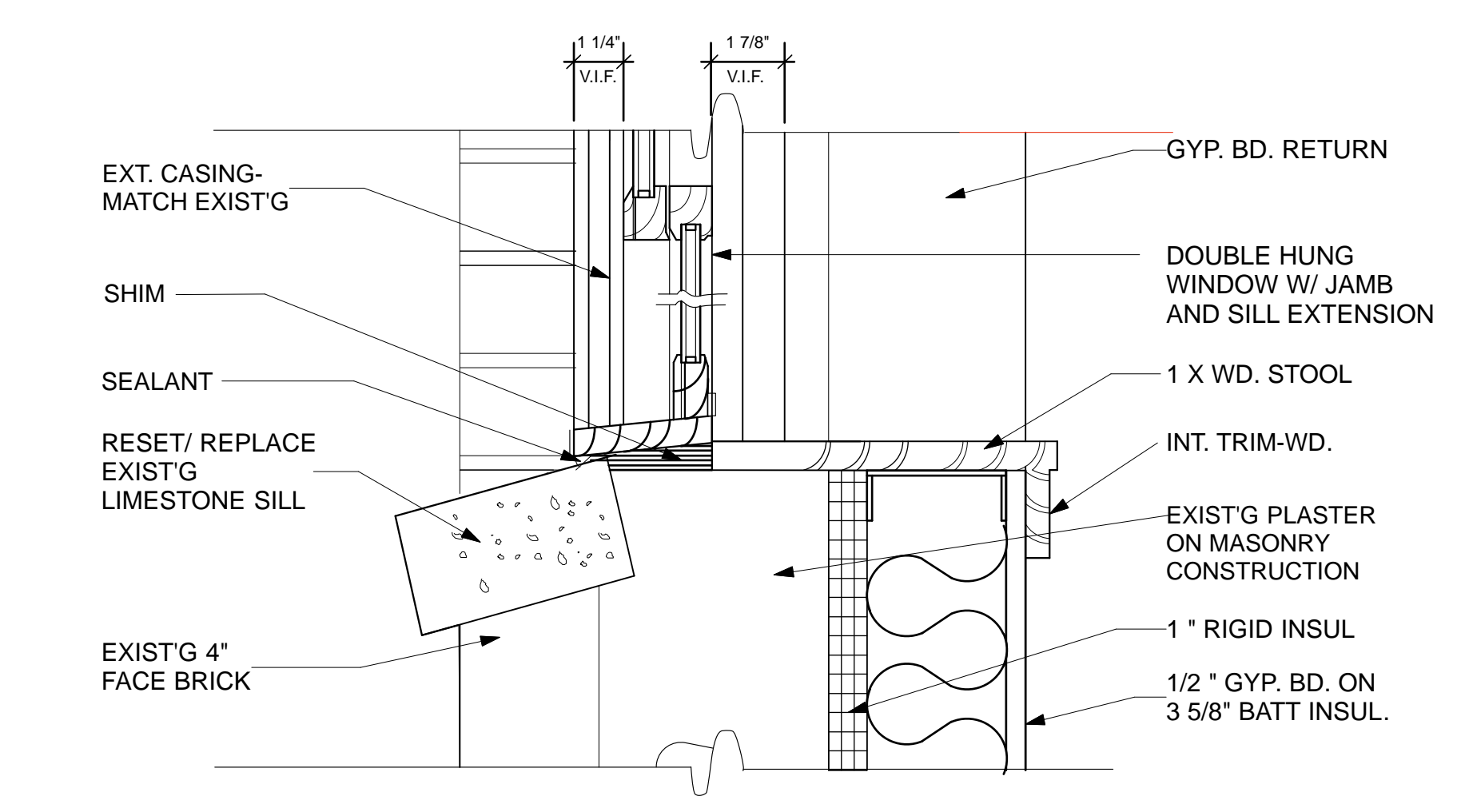
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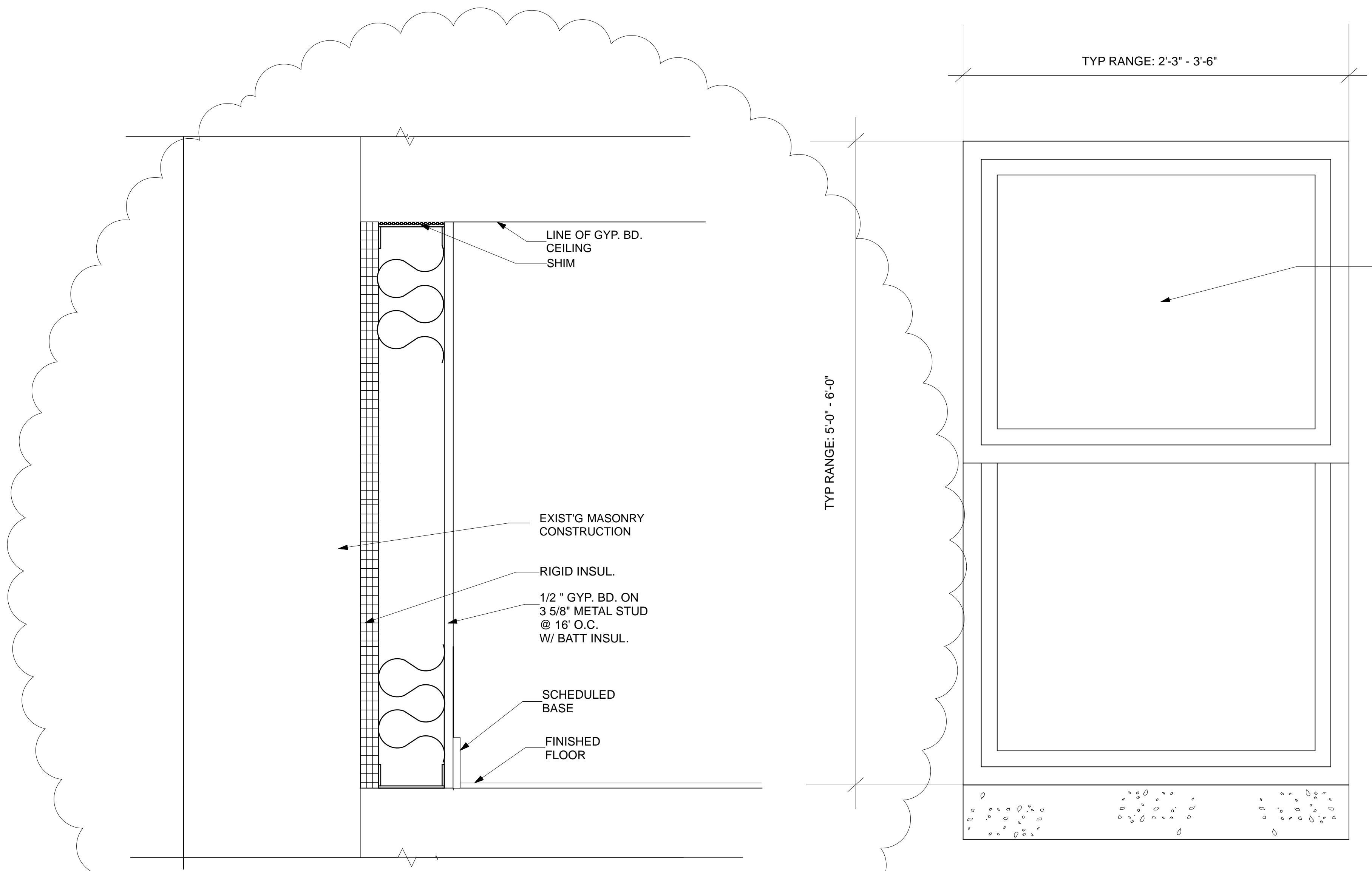
TYP. JAMB DETAIL
 SCALE: 3"=1'-0"



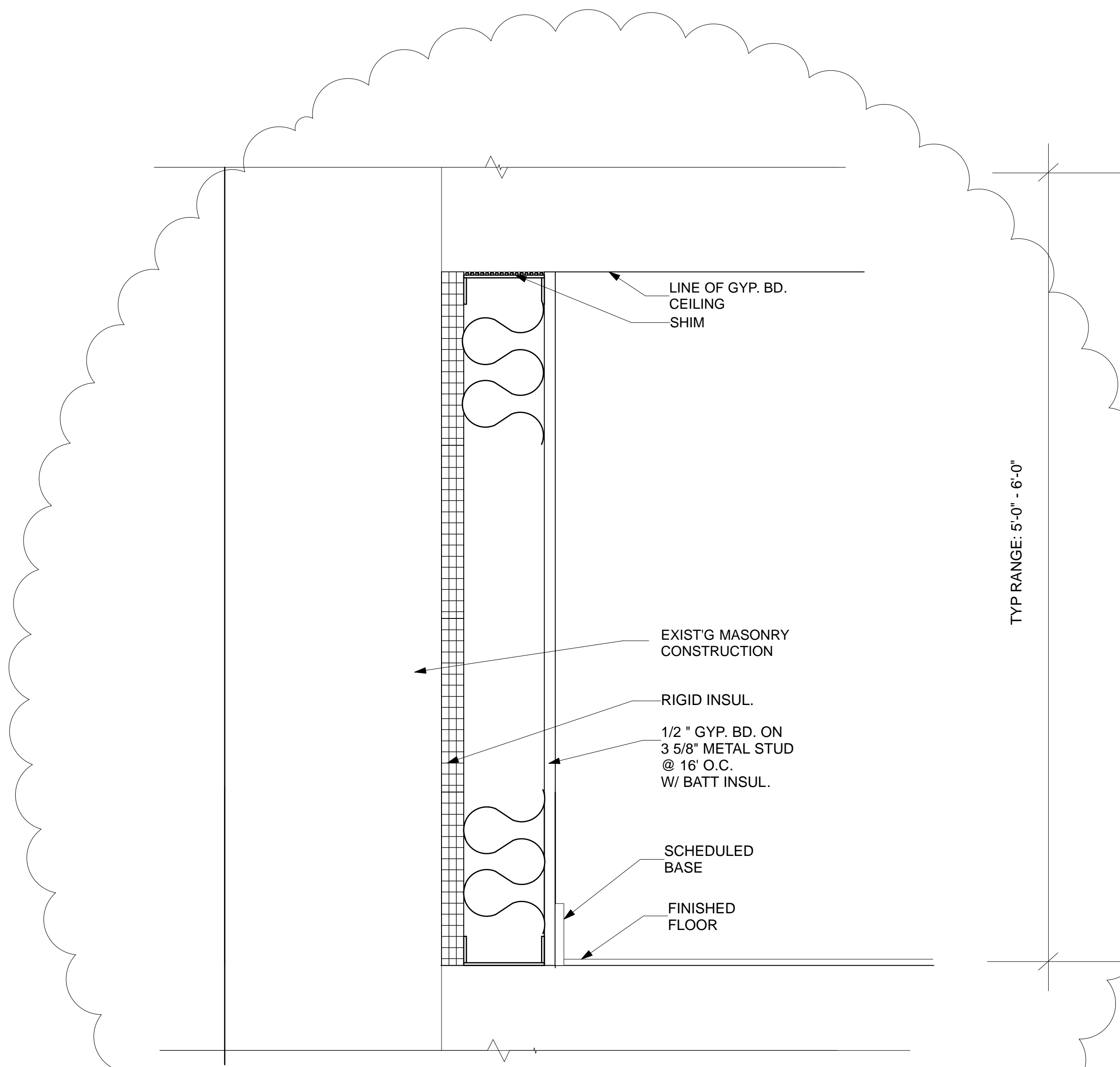
TYP. HEAD DETAIL
 SCALE: 3"=1'-0"



TYP. SILL DETAIL
 SCALE: 3"=1'-0"

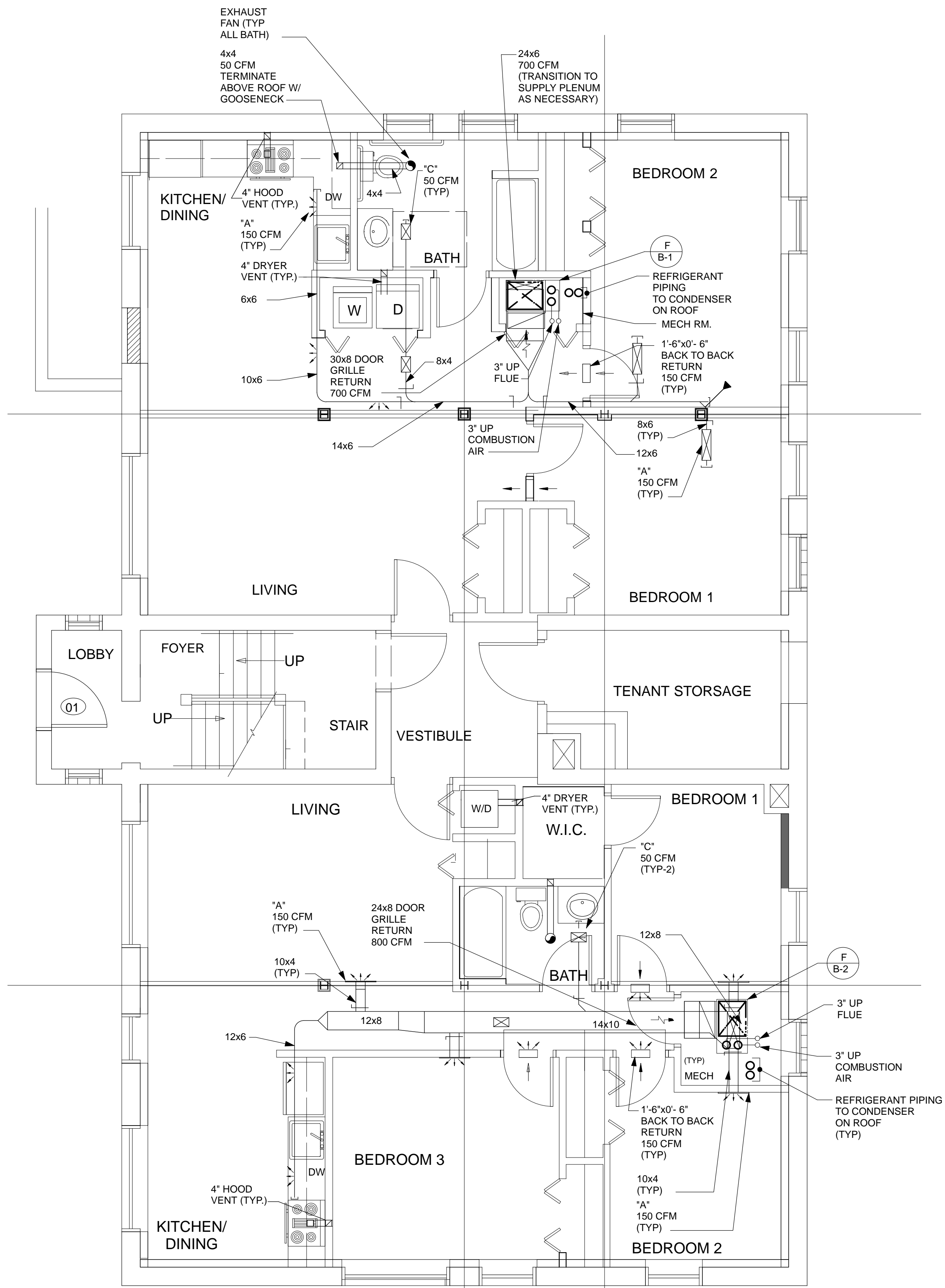


TYP. WINDOW ELEVATION
 SCALE: 1 1/2"=1'-0"



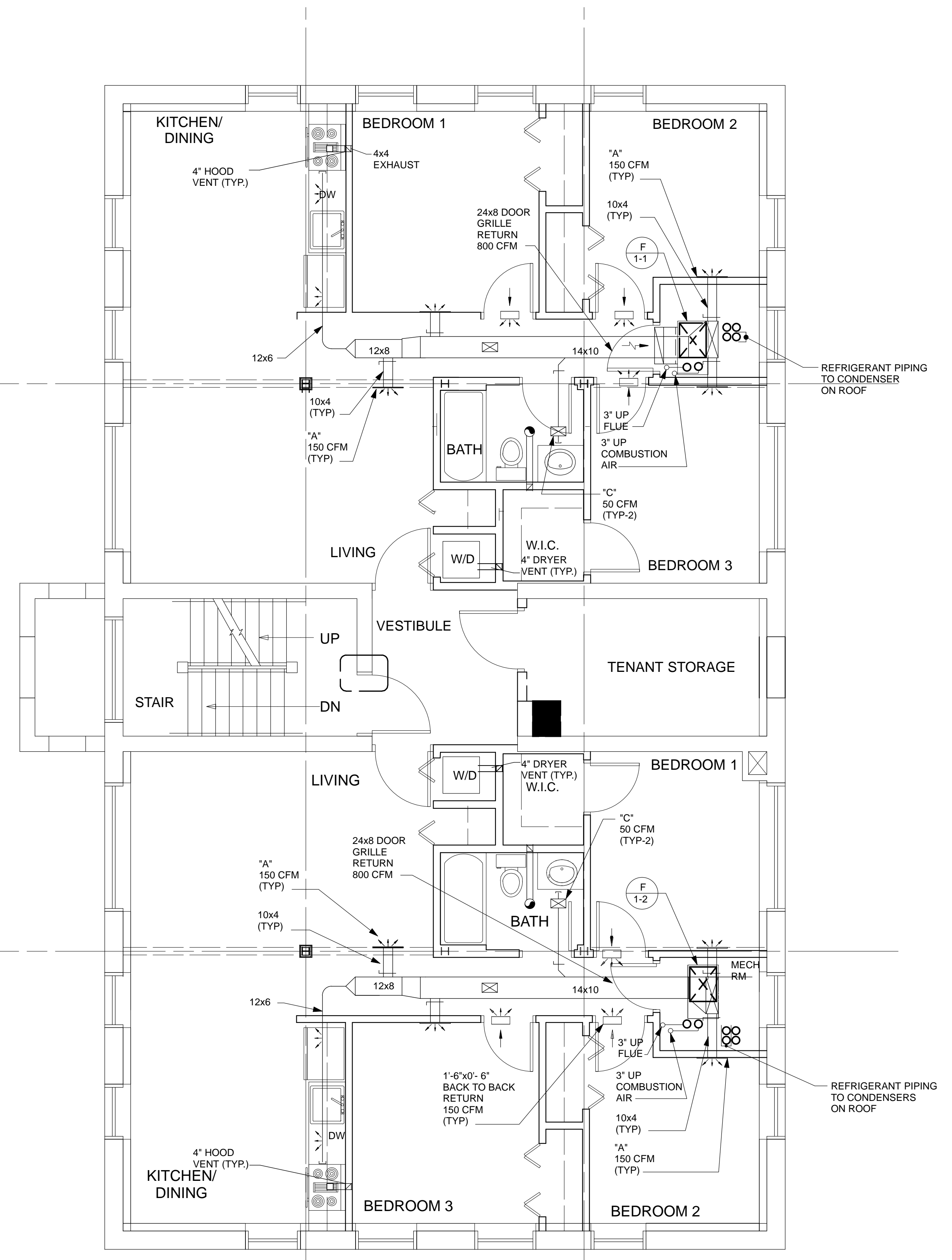
TYP. EXTERIOR WALL BUILD OUT DETAIL
 SCALE: 3"=1'-0"

WOOD WINDOW BY ALLIANCE, ANDERSON, MARVIN, OR EQ. BASIS OF DESIGN: MARVIN "ULTIMATE INSERT" DOUBLE HUNG WINDOW



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

NOTE:
1. PROVIDE ALL BATHS WITH EXHAUST FAN
SIMILAR AS SHOWN ABOVE



FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"

NOTE:
1. PROVIDE ALL BATHS WITH EXHAUST FAN
SIMILAR AS SHOWN ABOVE

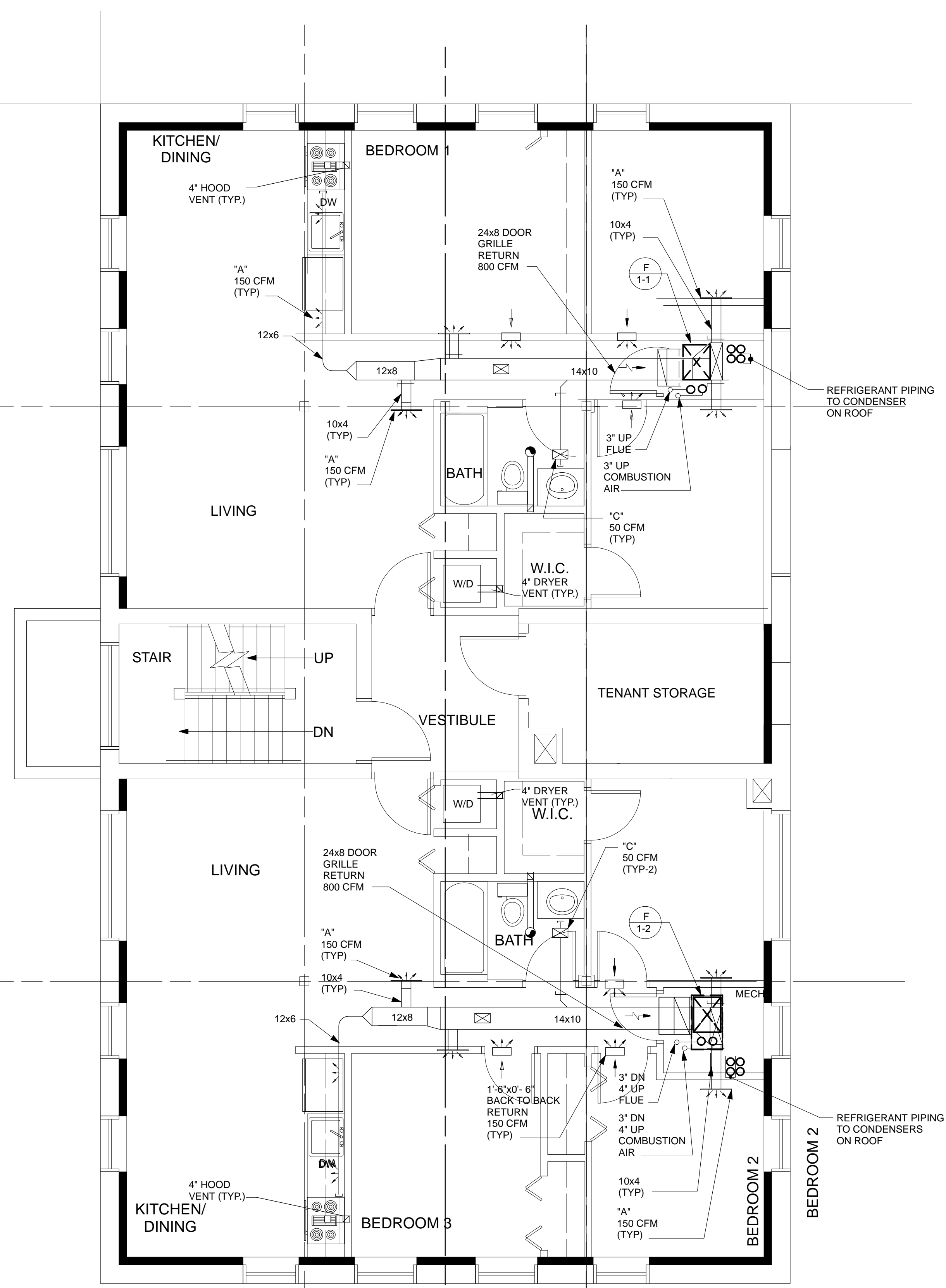
PROJECT TITLE:

**MARBOROUGH APARTMENTS
DETROIT, MICHIGAN**

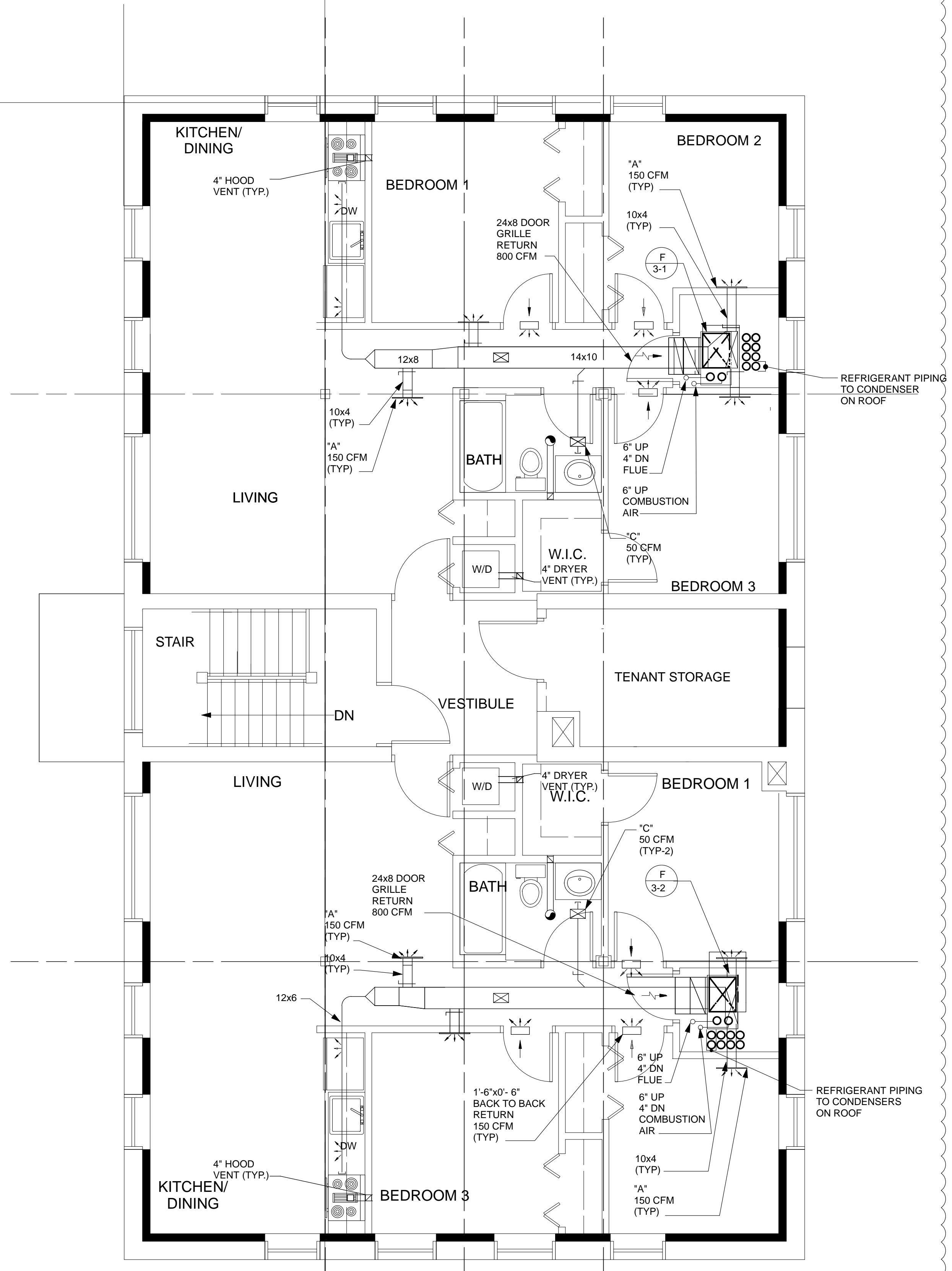
SHEET TITLE

**BASEMENT AND FIRST
FLOOR PLAN-
HVAC**

SHEET #
M-1



SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"

BULLETIN 1

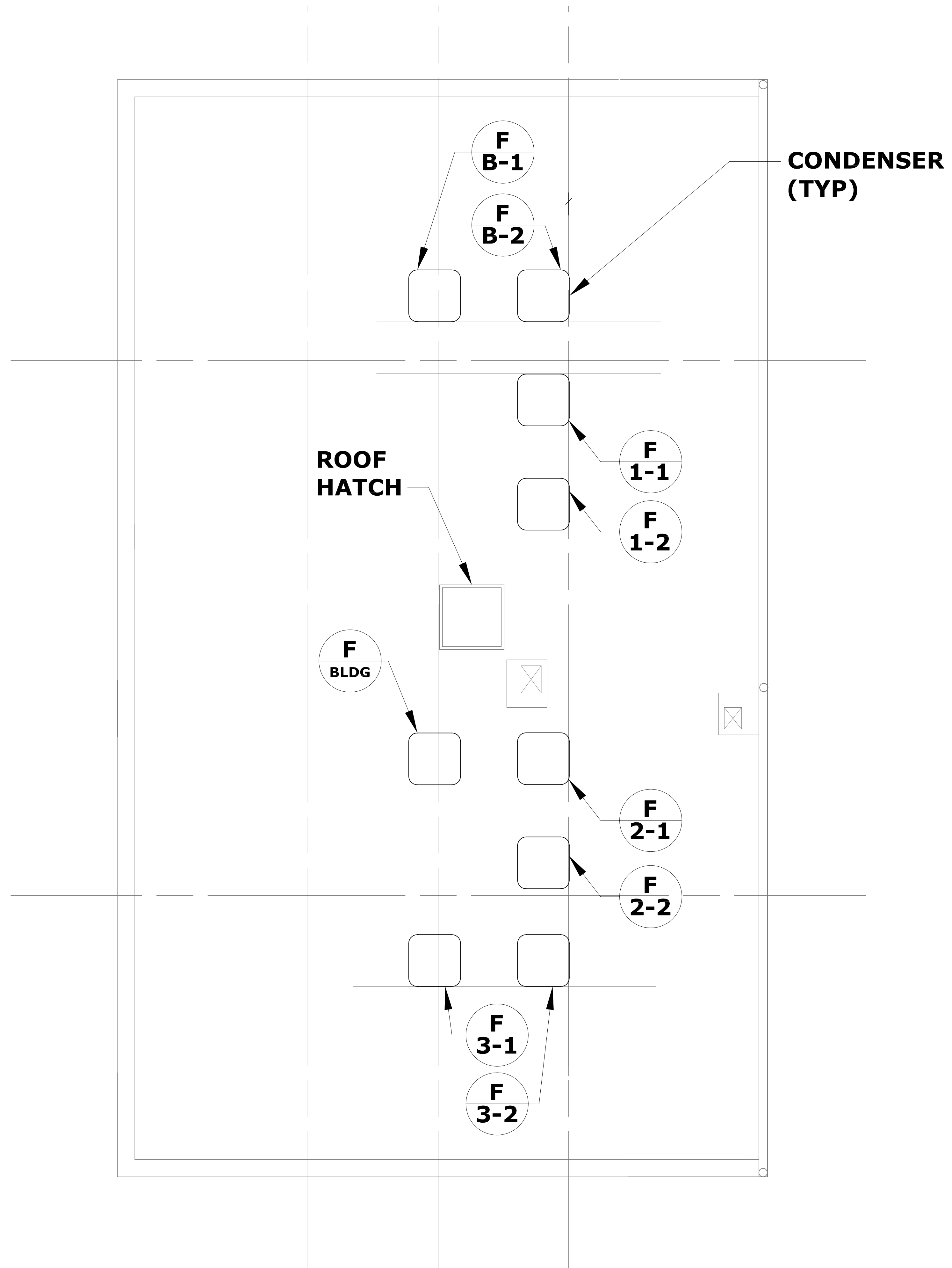
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PROJECT TITLE:
MARBOROUGH APARTMENTS
DETROIT, MICHIGAN

SHEET TITLE
BASEMENT AND FIRST FLOOR PLAN-HVAC

BULLETIN 3

SHEET #
M-2



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

M4

DATE	ISSUED FOR

PROJECT TITLE
MARLBOROUGH APARTMENTS
DETROIT, MICHIGAN

SHEET TITLE
ROOF PLAN

PROJECT #
SHEET #
M-2.1

ROOM NAME	FOOTAGE AREA (FT ²)	OCCUPANT DENSITY (PERSONS/1000.FT ²)	# OF OCCUPANTS (PERSONS)	OUTDOOR AIR FLOW RATE (CFM/PERSON)	OUTDOOR AIR FLOW (CFM)
BASEMENT--(NORTH APARTMENT)					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
3. KITCHEN	-	-	-	EXHAUST ONLY	-
4. BATH	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A.REQUIRED = 95

NOTE: EF-1, SERVES BASEMENT NORTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 850 CFM SUPPLY AIR MAX.

BASEMENT--(SOUTH APARTMENT)					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
3. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
4. KITCHEN	-	-	-	EXHAUST ONLY	-
5. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A. REQD = 160

NOTE: EF-2 TYPE SERVES BASEMENT SOUTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

1ST FLOOR--(NORTH APARTMENT)					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
2. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
3. KITCHEN	-	-	-	EXHAUST ONLY	-
4. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A.REQUIRED = 160

NOTE: EF-2 TYPE SERVES 1ST FLR. NORTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

1ST FLOOR--(SOUTH APARTMENT)					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
3. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
4. KITCHEN	-	-	-	EXHAUST ONLY	-
5. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A. REQD = 160

NOTE: EF-2 TYPE SERVES 1ST FLR. SOUTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

2ND FLOOR--(NORTH APARTMENT)-----SEE DWG. M-4					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
2. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
3. KITCHEN	-	-	-	EXHAUST ONLY	-
4. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A.REQUIRED = 160

NOTE: EF-2 TYPE SERVES 2ND FLR. NORTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

2ND FLOOR--(SOUTH APARTMENT) -----SEE DWG. M-4					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
3. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
4. KITCHEN	-	-	-	EXHAUST ONLY	-
5. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A. REQD = 160

NOTE: EF-2 TYPE SERVES 2ND FLR. SOUTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

3RD FLOOR--(NORTH APARTMENT)-----SEE DWG. M-4					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
2. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
3. KITCHEN	-	-	-	EXHAUST ONLY	-
4. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A.REQUIRED = 160

NOTE: EF-2 TYPE SERVES 3RD FLR. NORTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

3RD FLOOR--(SOUTH APARTMENT) -----SEE DWG. M-4					
1. BEDROOM(#1)	-	-	2	15 CFM/PERSON	30
2. BEDROOM(#2)	-	-	1	15 CFM/PERSON	15
3. BEDROOM(#3)	-	-	1	15 CFM/PERSON	15
4. KITCHEN	-	-	-	EXHAUST ONLY	-
5. BATH(#1)	-	50 CFM/WC	1 WC	50	50
5. BATH(#2)	-	50 CFM/WC	1 WC	50	50
					TOTAL O.A. REQD = 160

NOTE: EF-2 TYPE SERVES 3RD FLR. SOUTH APARTMENT IS SCHEDULED TO PROVIDE A TOTAL OF 1,000 CFM SUPPLY AIR MAX.

BUILDING TOTAL OUTSIDE AIR SUPPLY = 1,215 CFM

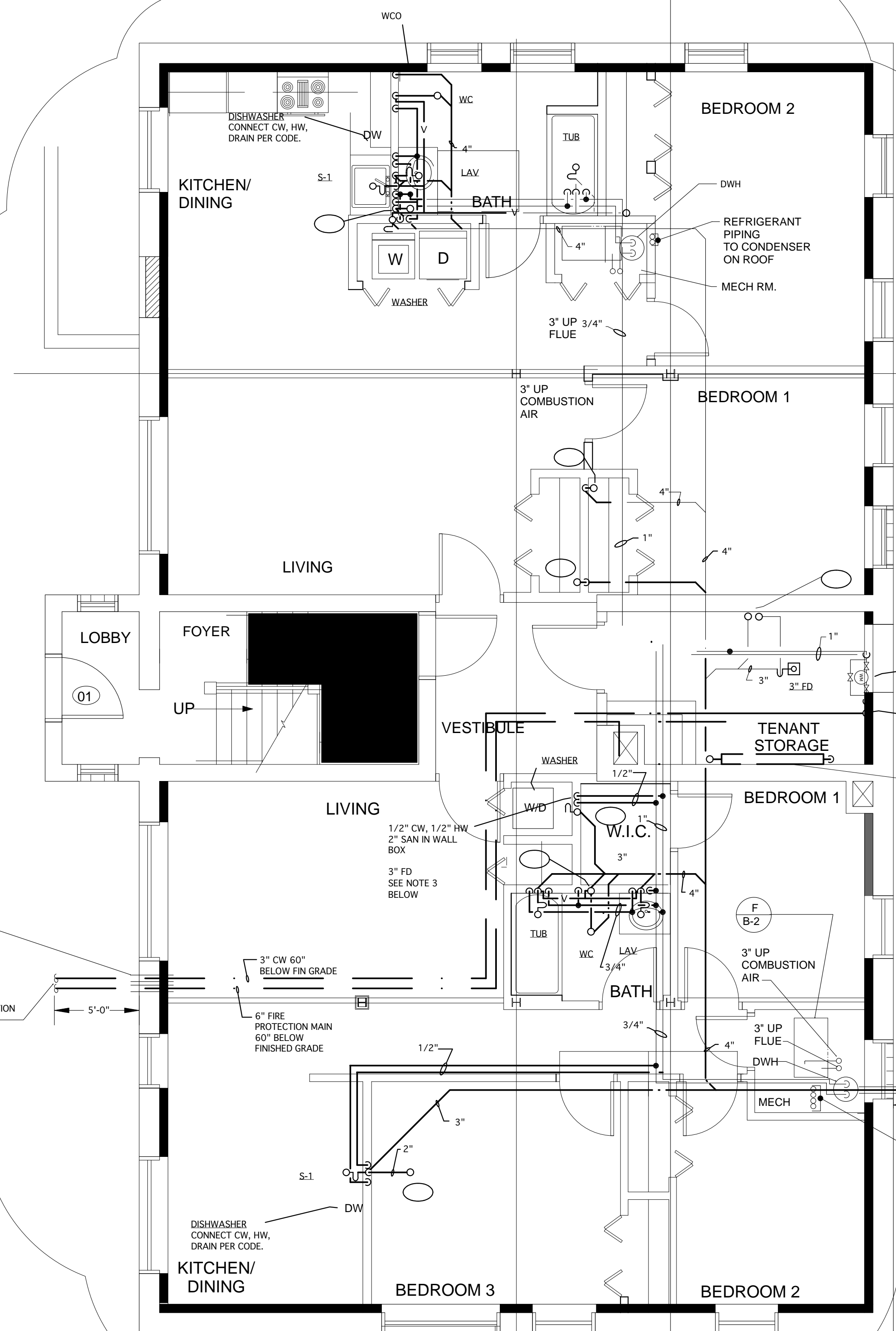
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PROJECT TITLE:
**MARLBOROUGH APARTMENTS
|
DETROIT, MICHIGAN**

SHEET TITLE
**BUILDING
OUTSIDE AIR
REQUIREMENT
CALCULATIONS**

DRAWN BY:
APPROVED BY:
SCALE: -
DATE:

PROJECT #
SHEET #
M3



BASEMENT FLOOR PLAN - PLUMBING
SCALE: 1/4" = 1'-0"

NOTES:

1. ALL HORIZONTAL SAN PIPES SHOWN AS DASHED LINES ARE BELOW SLAB AND TO BE SLOPED 1/8" PER FT.
2. ALL CW, HW VENT PIPES ARE AT BASEMENT CEILING UNLESS NOTED OTHERWISE.
3. PROVIDE ALL LAUNDRY ROOMS WITH FLOOR DRAIN AS SHOWN.
4. PROVIDE ALL DOMESTIC WATER HEATER (DWH) WITH WATER INLET/OUTLET SHUT-OFF VALVES.

ELECTRIC WATER HEATER (EWH)

ELECTRIC WATER HEATER 40 GALLONS CAPACITY, TWO HEATING ELEMENTS 4500WATTS EACH. LOCHINVAR MODEL ETX040KK. INSTALL DRAIN PAN FOR WATER HEATERS INSTALLED AT 1ST, 2ND AND 3RD FLOORS.

(2) 1" WATER METERS AND BY PASSES (STACKED)

FIRE PROTECTION RISER AND CONTINUATION AND CONNECTION TO THE SPRINKLER HEADS BY THE FIRE PROTECTION SUBCONTRACTOR.

(8) PRV AND GAS METER BY THE GAS COMPANY. EXTEND 1 1/4" GAS TO EACH FURNACE AND GAS WATER HEATER AT BASEMENT, 1ST, 2ND, 1ND 3RD FLOORS.

6" SAN ESTIMATED B.E.G. = 12'-6" (FIELD VERIFY).

FOR CONTINUATION SEE CIVIL

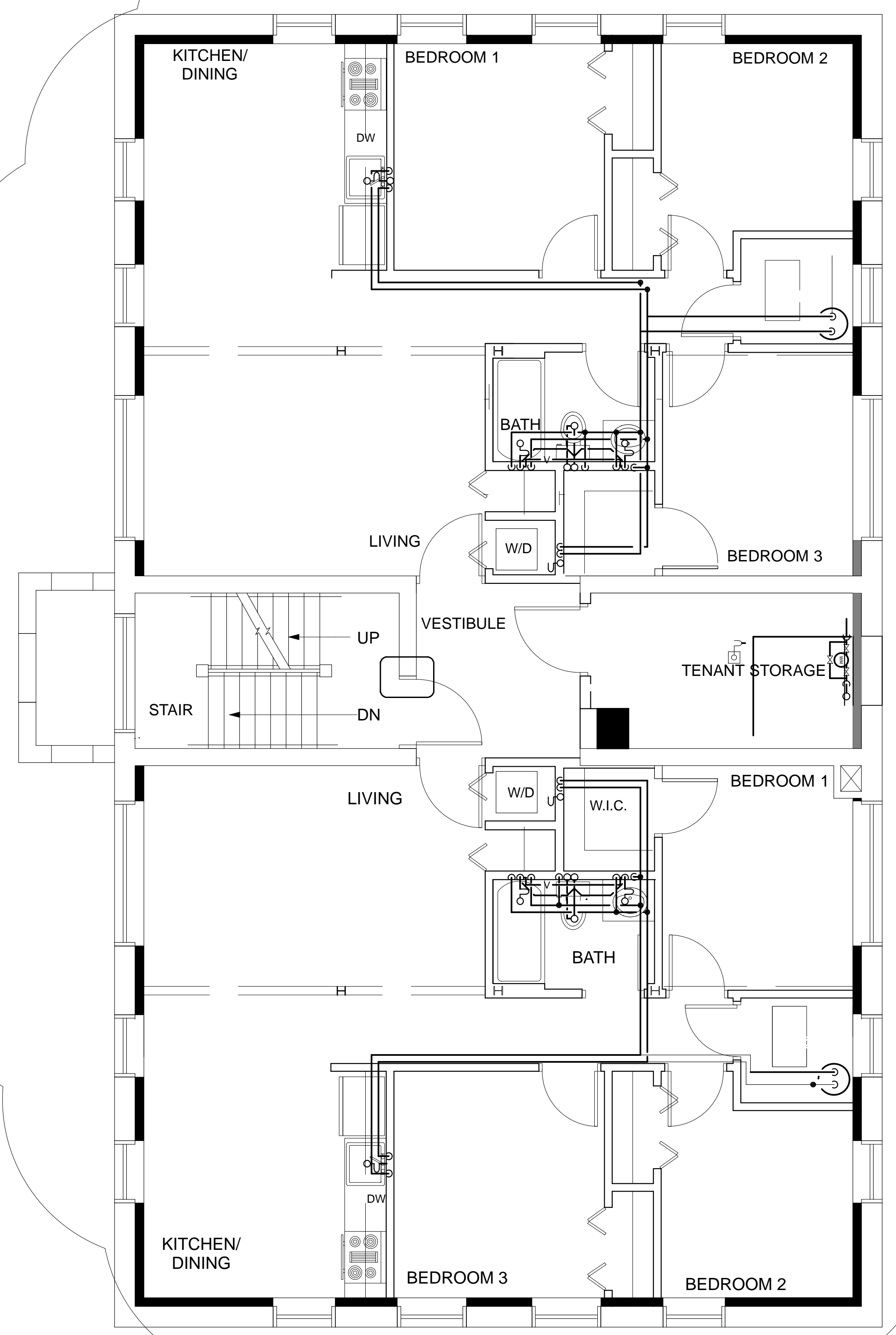
REFRIGERANT PIPING TO CONDENSER ON ROOF (TYP)

PLUMBING FIXTURE SCHEDULE

FIXTURE	COLD WATER	HOT WATER	WASTE	VENT
WC	1/2"	-	4"	2"
LAV	1/2"	1/2"	1 1/2"	1 1/2"
LT	1/2"	1/2"	2"	1 1/2"
S-1	1/2"	1/2"	1 1/2"	1 1/2"
TUB	1/2"	1/2"	2"	1 1/2"
WASHER	1/2"	1/2"	2"	1 1/2"
FD	-	-	3"	1 1/2"

NOTE:

INSTALL 3/4 HP GARBAGE DISPOSER UNDER ALL KITCHEN SINKS.



FIRST FLOOR PLAN-PLUMBING
SCALE: 1/4" = 1'-0"

NOTE:

1. ALL HORIZONTAL CW, HW AND VENT PIPES ARE AT FIRST FLOOR CEILING, UNLESS NOTE OTHERWISE.
2. ALL HORIZONTAL SAN PIPES ARE AT BASEMENT CEILING.
3. SEE RISER DIAGRAMS DRAWING M-5.
4. INSTALL 30"x30" FIBER GLASS DRAIN PAN UNDER ALL WATER HEATERS.

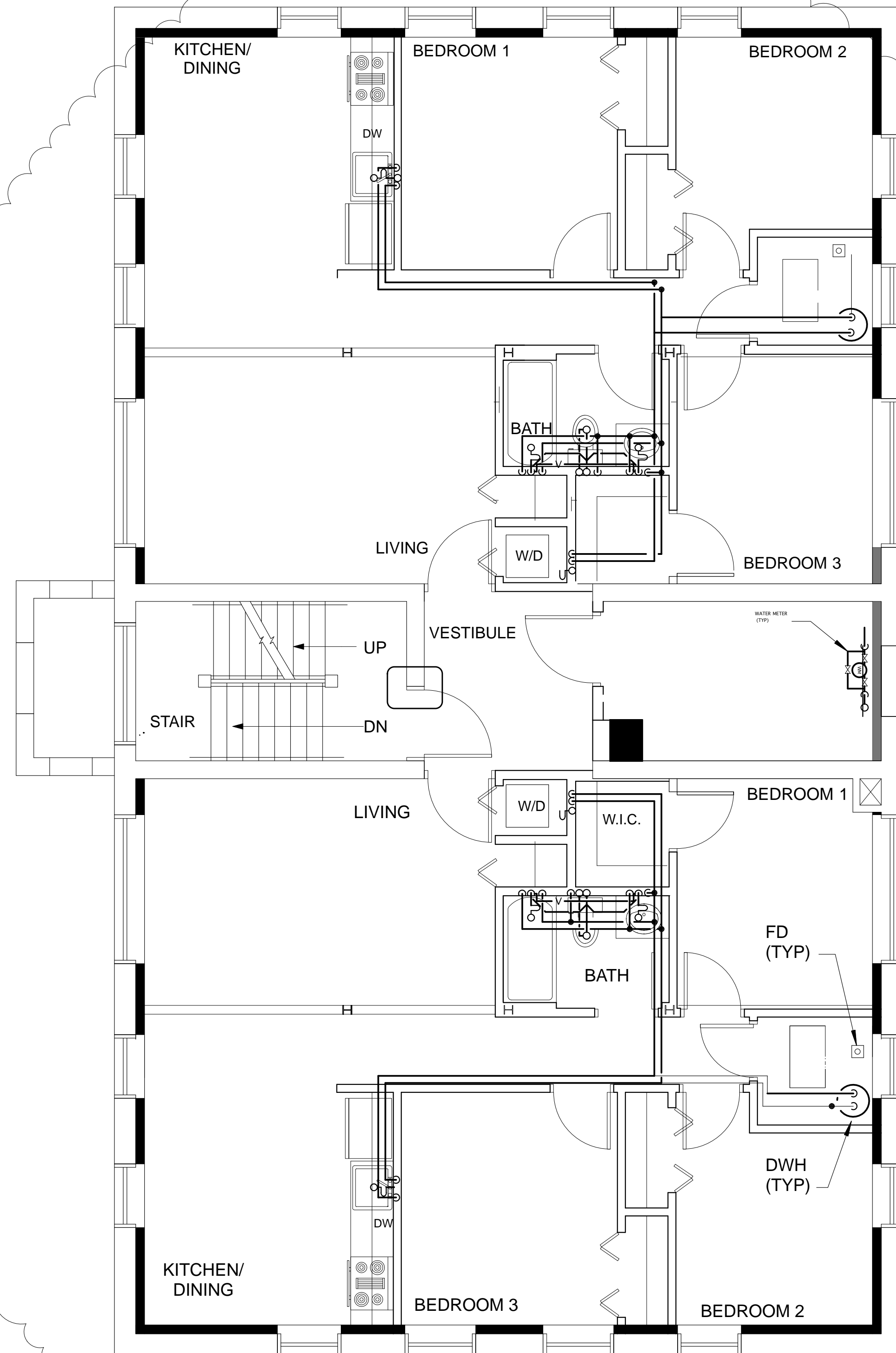
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**MARLBOROUGH APARTMENTS
DETROIT, MICHIGAN**

SHEET TITLE
BASEMENT AND FIRST FLOOR PLAN - PLUMBING

DRAWN BY:
APPROVED BY:
SCALE: -
DATE:

PROJECT # SHEET #
P-1



SECOND FLOOR PLAN - PLUMBING

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

NOTE:

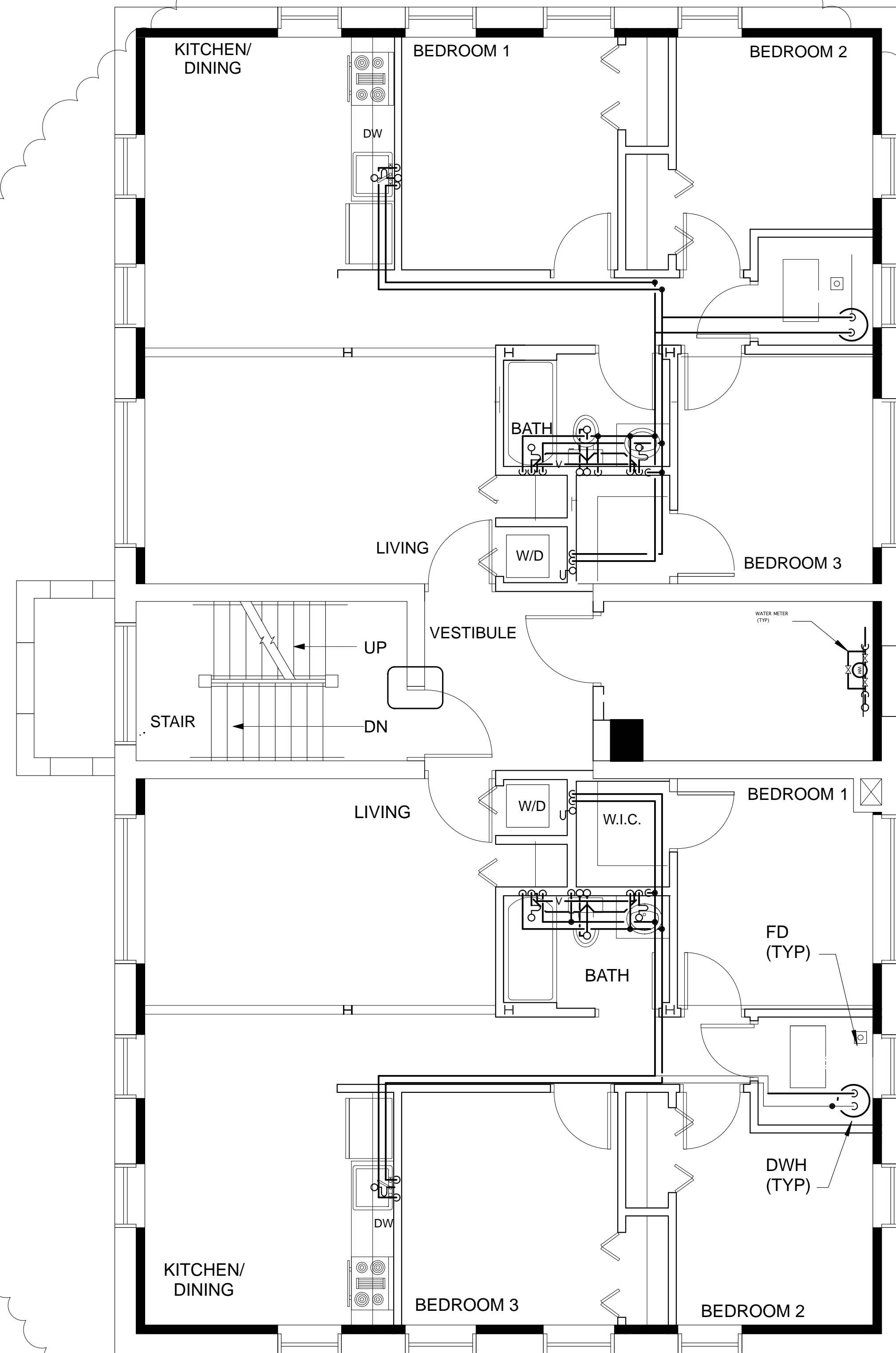
ALL HORIZONTAL CW, HW AND VENT PIPES ARE AT SECOND FLOOR CEILING, UNLESS NOTE OTHERWISE.

ALL HORIZONTAL SAN PIPES ARE AT FIRST FLOOR

SEE RISER DIAGRAMS DRAWING P-3.

INSTALL 30"x30" FIBER GLASS DRAIN PAN UNDER ALL WATERS.

SEE NOTES 3 & 4 BELOW BASEMENT FLOOR PLAN



THIRD FLOOR PLAN - PLUMBING

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

NOTE:

ALL HORIZONTAL CW, HW AND VENT PIPES ARE AT SECOND FLOOR CEILING, UNLESS NOTE OTHERWISE.

ALL HORIZONTAL SAN PIPES ARE AT FIRST FLOOR

SEE RISER DIAGRAMS DRAWING P-3.

INSTALL 30"x30" FIBER GLASS DRAIN PAN UNDER ALL WATERS HEATERS.

SEE NOTES 3 & 4 BELOW BASEMENT FLOOR PLAN

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-	-BULLETIN 2
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PROJECT TITLE:
MARLBOROUGH APARTMENTS
DETROIT, MICHIGAN

SHEET TITLE
SECOND AND THIRD FLOOR PLAN - PLUMBING

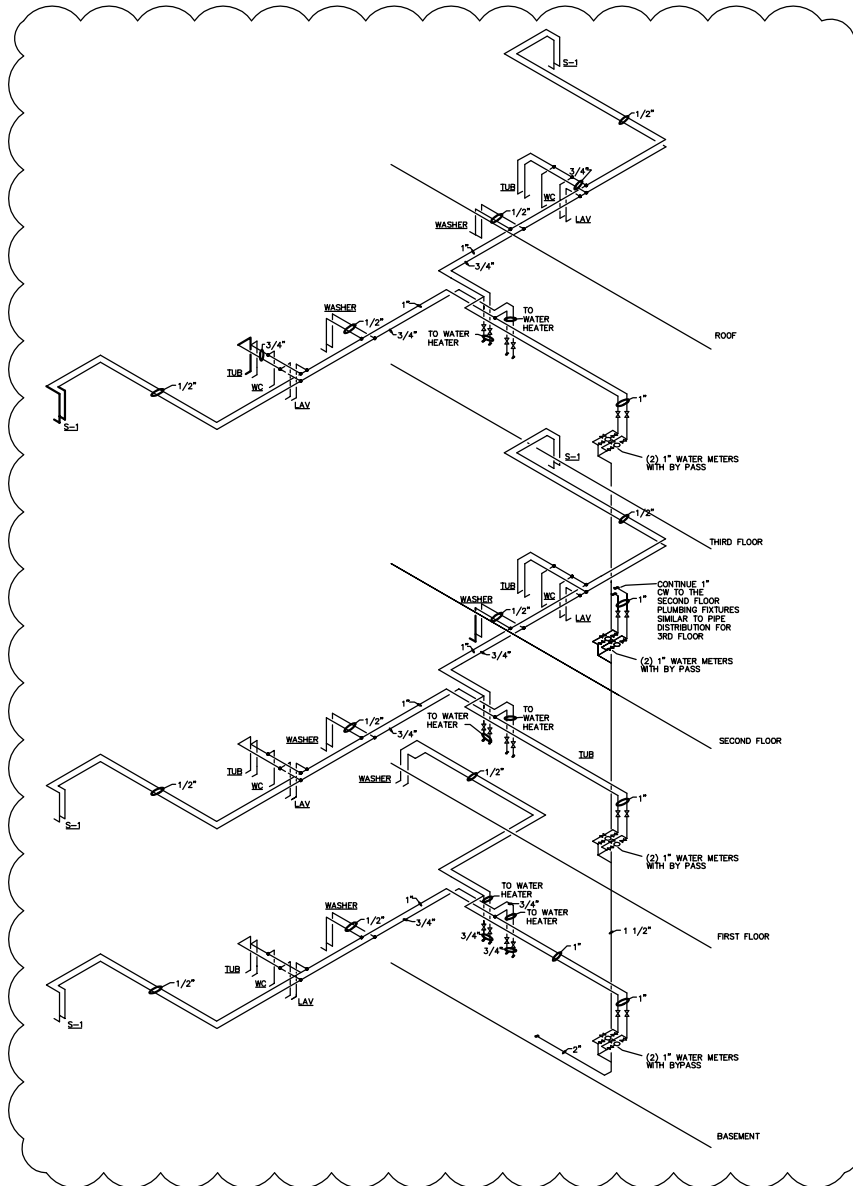
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SCALE:
DATE:

PROJECT # SHEET #
P-2

PLUMBING FIXTURES PIPE SIZES				
PLAN CODE	COLD WATER	HOT WATER	VENT	WASTE
WC	1/2"	-	2"	4"
LAV	1/2"	1/2"	1 1/2"	1 1/2"
KITCH. SINK	1/2"	1 2"	1 1/2"	1 1/2"
WASHER	1/2"	1/2"	1 1/2"	2"
TUB	1/2"	1/2"	1 1/2"	2"

NOTE:

INSTALL 3/4" HP. GARBAGE DISPOSER UNDER ALL KITCHEN SINKS.



WATER RISERS

NOT TO SCALE

NOTE: LOCATE WATER HEATERS IN RESPECTIVE APARTMENT UNIT MECH. ROOM

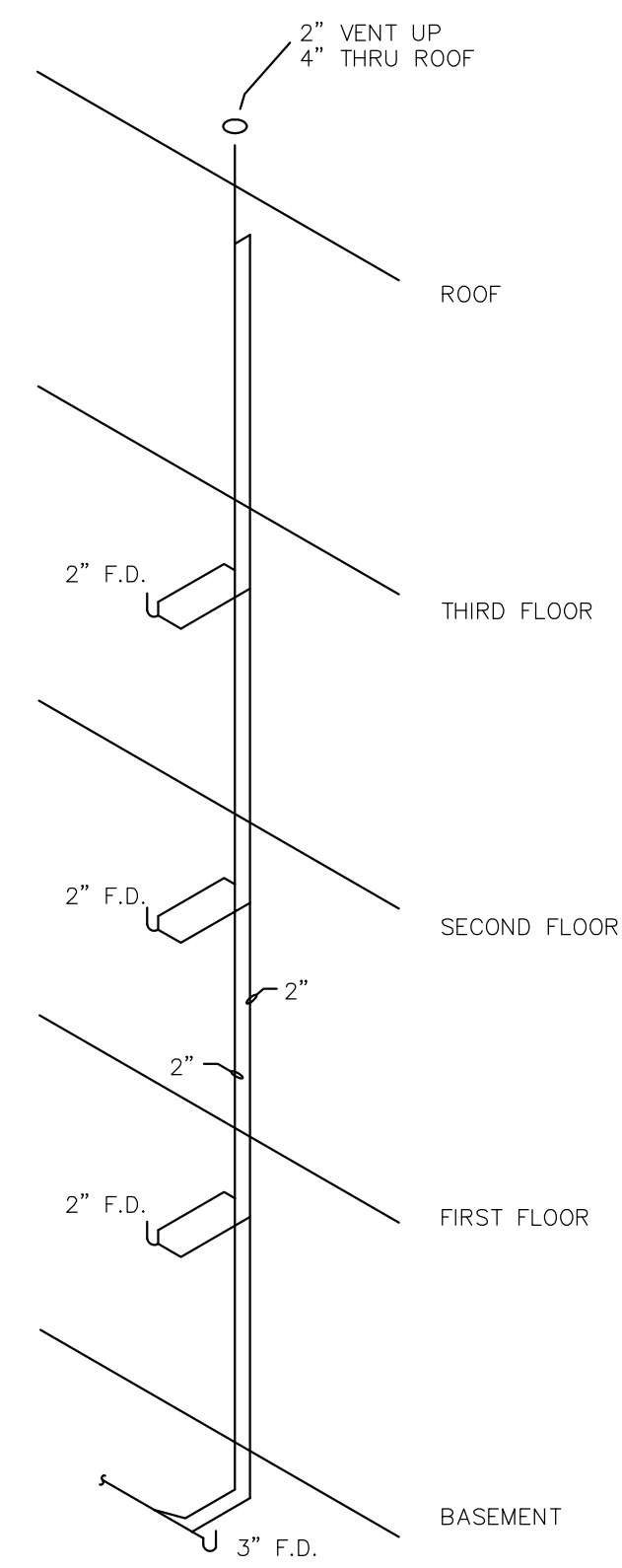
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DETROIT, MICHIGAN

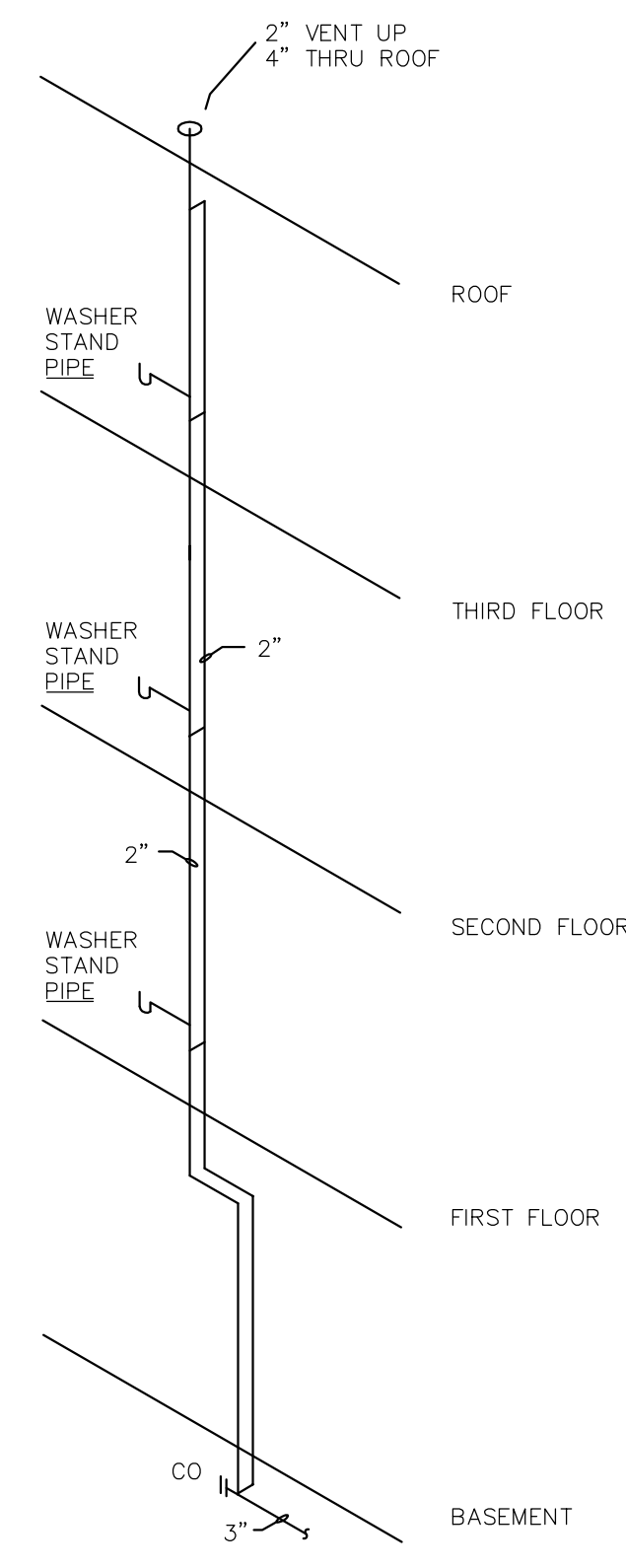
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WATER RISERS

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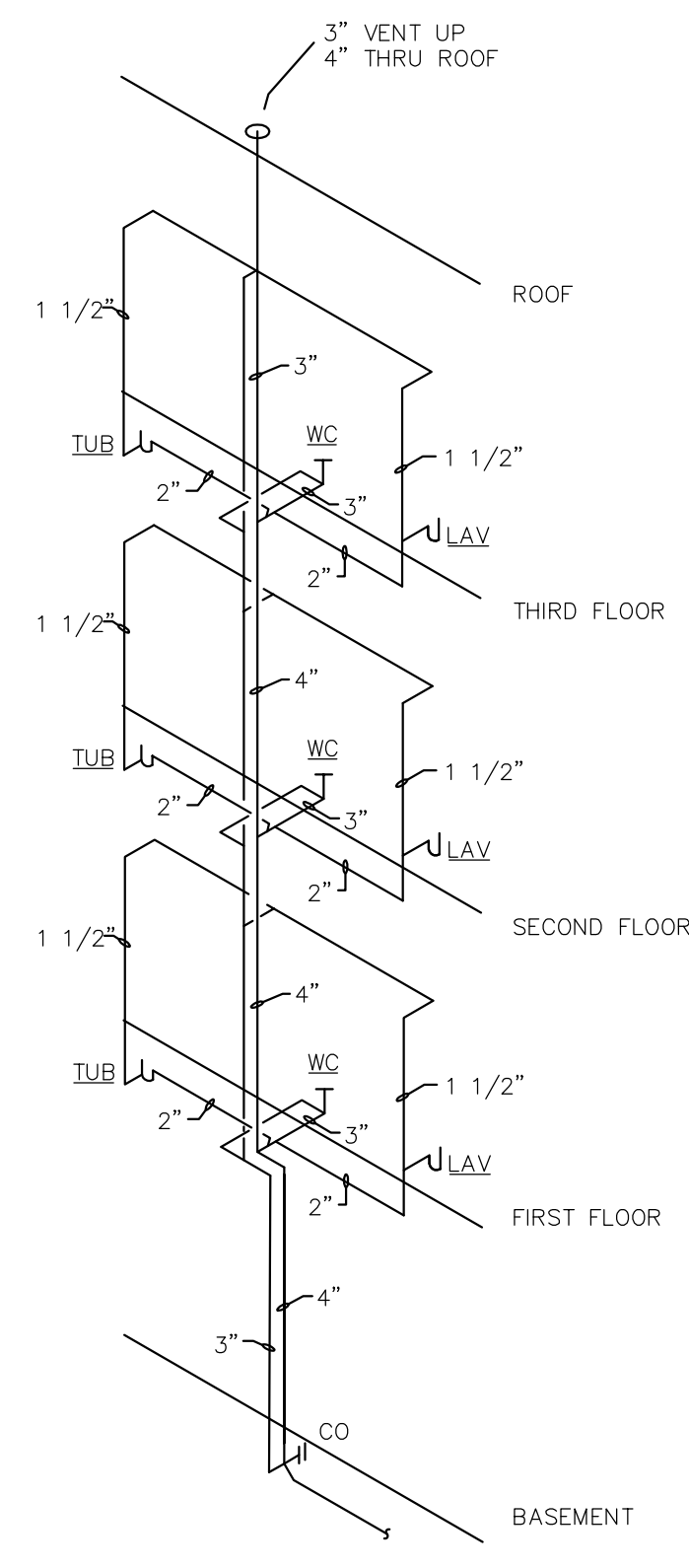
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P-3



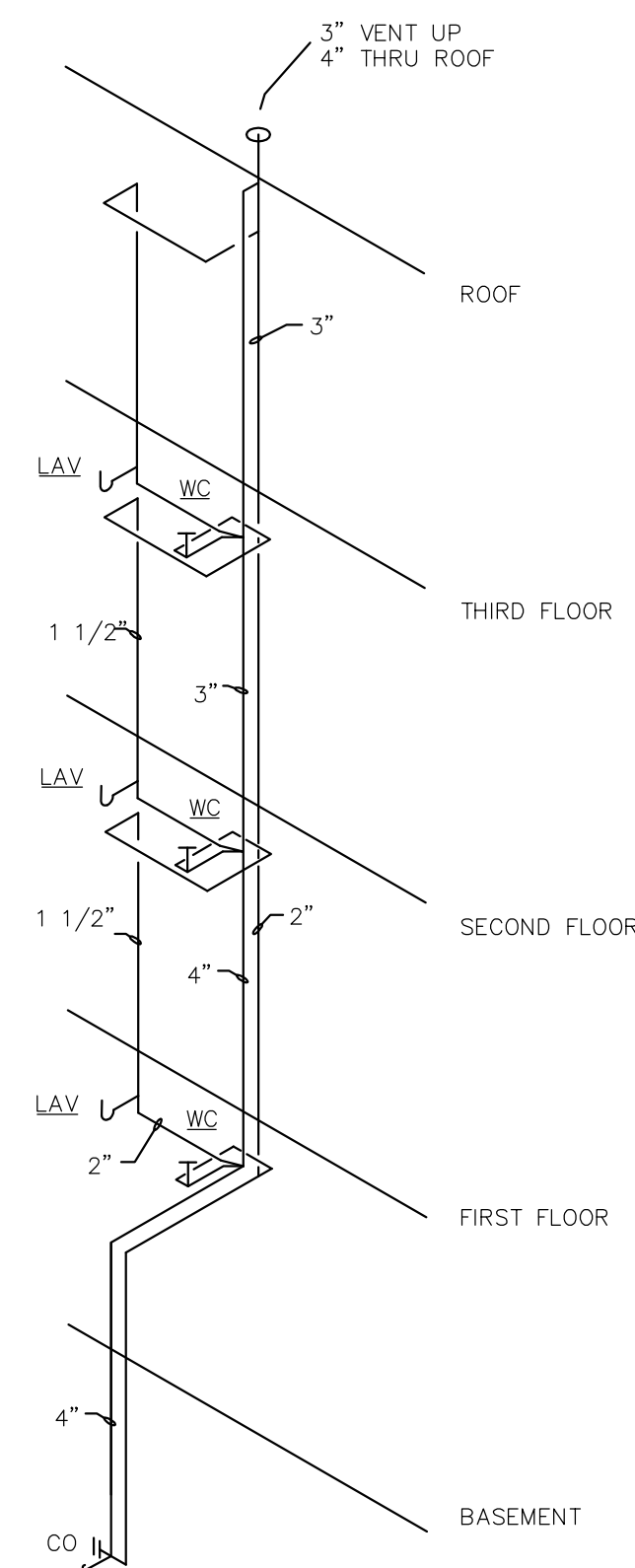
S-5
NOT TO SCALE



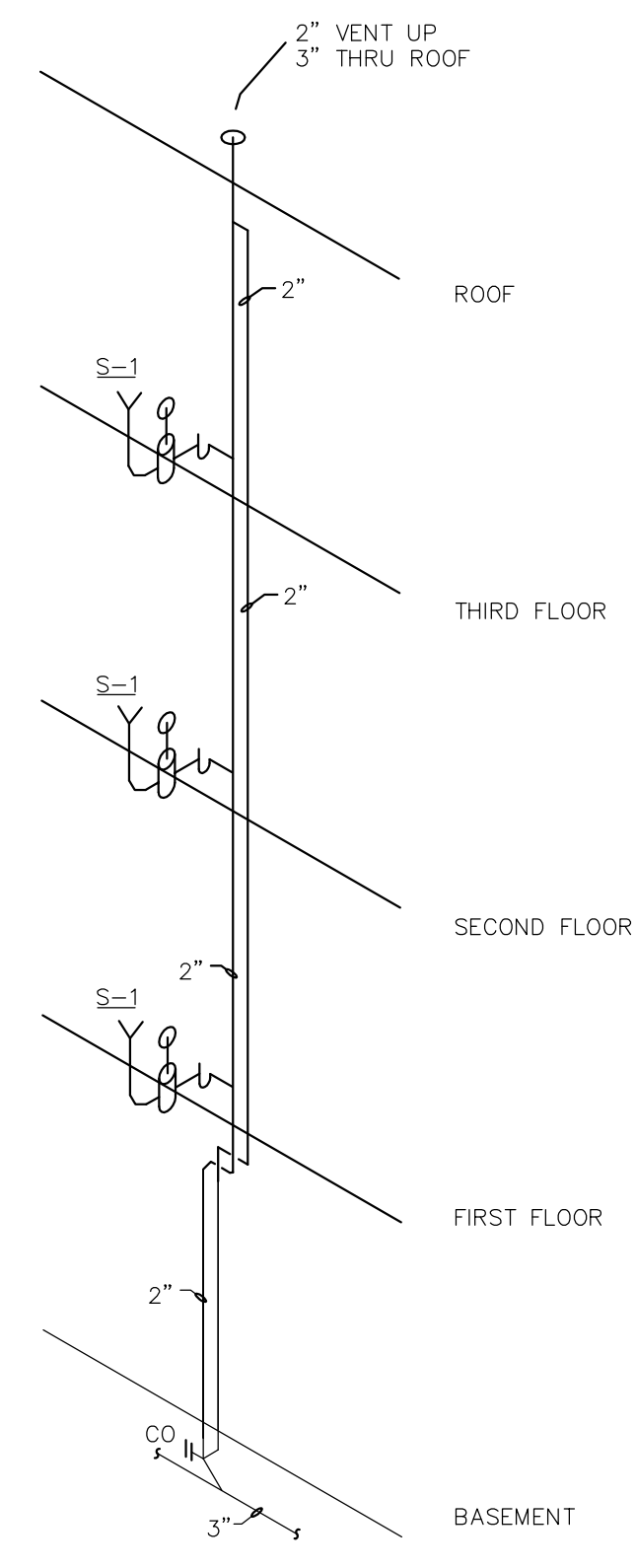
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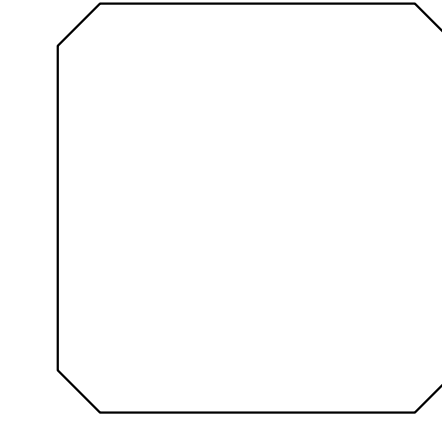


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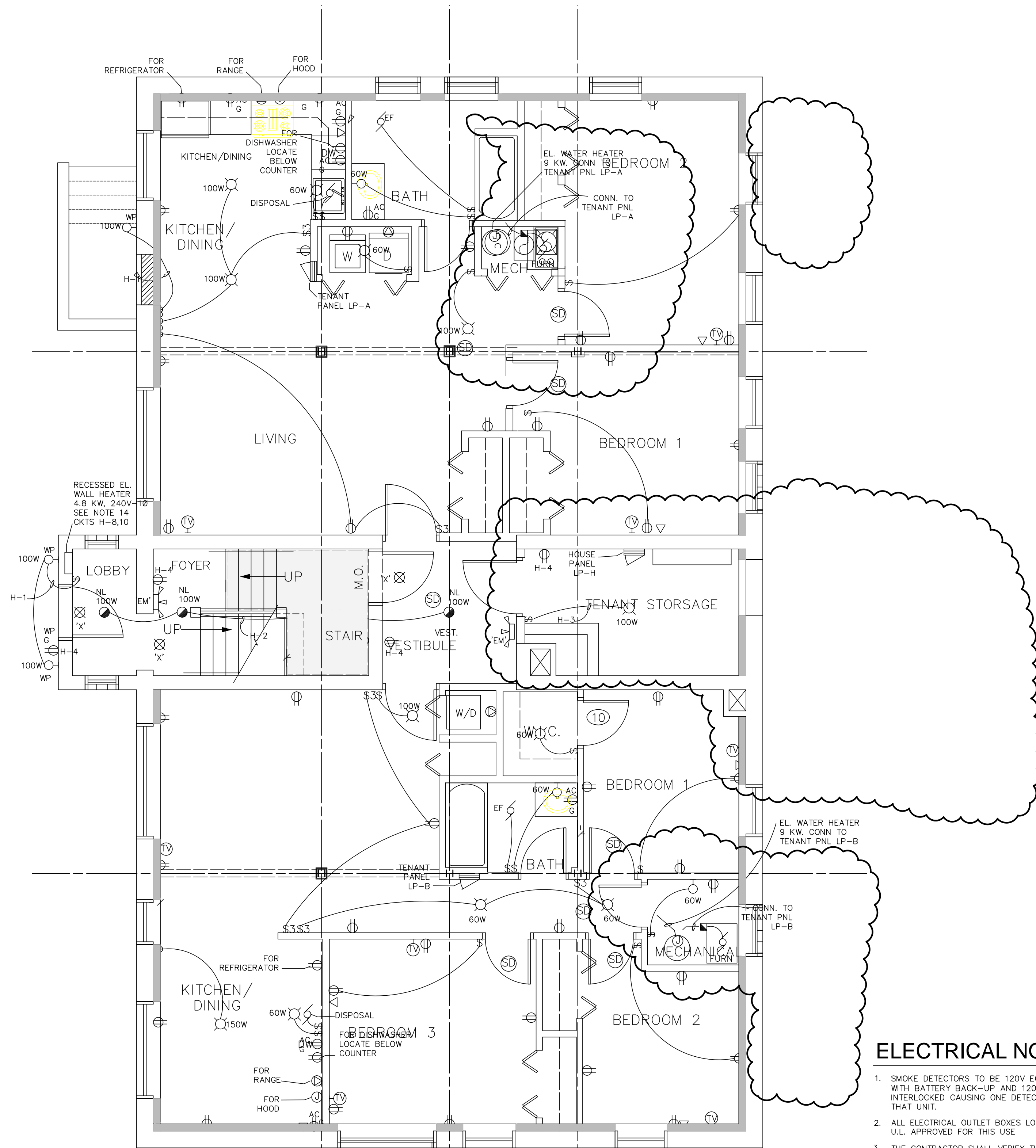
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PROJECT TITLE:
MARLBOROUGH APARTMENTS
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DETROIT, MICHIGAN

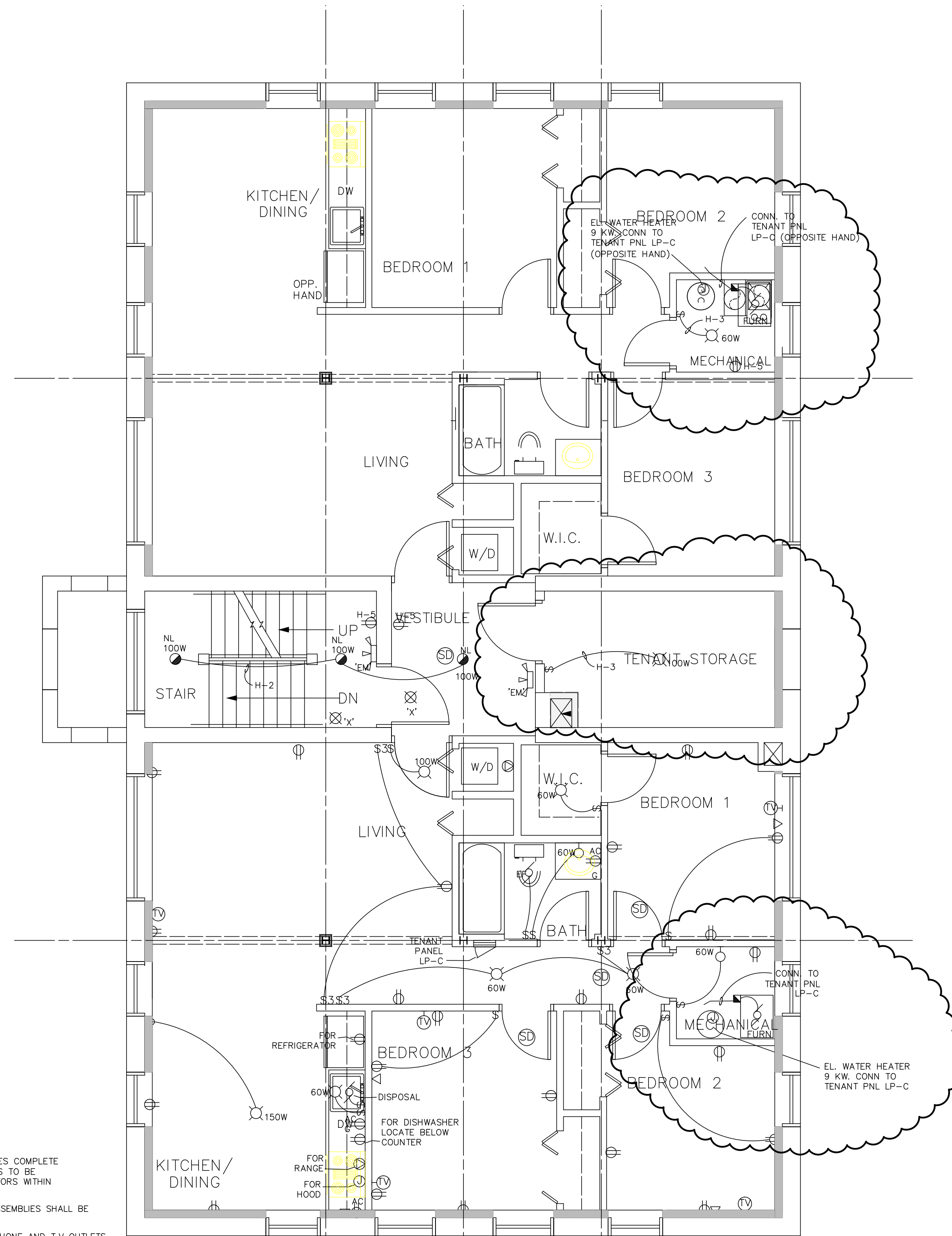
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SANITARY RISERS

DRAWN BY:
APPROVED BY:
SCALE: -
DATE:

PROJECT # SHEET #
P4



BASEMENT FLOOR PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"



FIRST FLOOR PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"

ELECTRICAL NOTES:

1. SMOKE DETECTORS TO BE 120V EQUAL TO GENTEX #9120 SERIES COMPLETE WITH BATTERY BACK-UP AND 120V SUPPLY. SMOKE DETECTORS TO BE INTERLOCKED CAUSING ONE DETECTOR TO SET OFF ALL DETECTORS WITHIN THAT UNIT.
2. ALL ELECTRICAL OUTLET BOXES LOCATED IN IHR RATED WALL ASSEMBLIES SHALL BE U.L. APPROVED FOR THIS USE.
3. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF TELEPHONE AND T.V. OUTLETS PRIOR TO ROUGH-IN.
4. INSTALL ELECTRICAL BOXES ON OPPOSITE SIDES OF WALL MIN. 24" APART HORIZONTALLY, WHEREVER POSSIBLE. PROVIDE U.L. LISTED METALLIC BOXES W/U.L. LISTED PUTTY PADS. BOXES SHALL NOT BE INSTALLED BACK TO BACK.
 - A. NON-METALLIC BOXES, LISTED FOR USE IN STAGGERED STUD CONSTRUCTION SHALL BE MIN. 24" APART, WHEN LOCATED ON OPPOSITE SIDES OF WALL. SEE DETAIL/SECTIONS ON ARCH DRAWINGS.
 - B. PROVIDE U.L. LISTED NON-METALLIC BOXES. BLOCK OFF STUD SPACE & PROVIDE 5/8" TYPE "X" GYP.BD. ON BACK SIDE, SEAL PERIMETER SEE DETAIL/SECTIONS ON ARCH. DRAWINGS.
5. CONTRACTOR SHALL PROVIDE RECEPTACLES INSTALLED PER N.E.C. 210.52
6. CLOTHES CLOSET LIGHTS SHALL BE PROVIDED AND LOCATED TO COMPLY WITH N.E.C. 410.8
7. PROVIDE PERMANENT SIGNAGE FOR METER UNIT NO'S (PERMANENT FELT TIP MARKER SHALL NOT BE ACCEPTABLE TO OWNER) THIS SIGNAGE IS NOT INCLUDED IN OWNERS SIGNAGE ALLOWANCE.
8. PROVIDE STRAPPING OF EXTERIOR CONDUIT AT CONDENSING UNITS TO BE W/NYLON STRAP TIES.
9. SEE ARCH. PLANS FOR ELECTRICAL CONTROLS AND OUTLET MOUNTING HEIGHTS.
10. PC FIXTURES MUST HAVE GLOBES, NO EXPOSED LAMPS.
11. WHERE OUTLETS ARE SHOWN TO BE SWITCHED, SWITCH UPPER OUTLET ONLY
12. CONNECT BEDROOM RECEPTACLES TO "ARC FAULT" BREAKERS IF REQUIRED BY AUTHORITIES HAVING JURISDICTION.
13. ALL EXIT LIGHTS AND EMERGENCY BATTERY LIGHTS TO BE CONNECTED TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING.
14. RECESSED ELECTRIC WALL HEATER 240V, 10, 4800W COMPLETE WITH BUILT-IN THERMOSTAT EQUAL TO QMARK #LFK-484. CONNECT TO 30A-2P BREAKER WITH 2 #10 & 1 #10(G)-3/4".

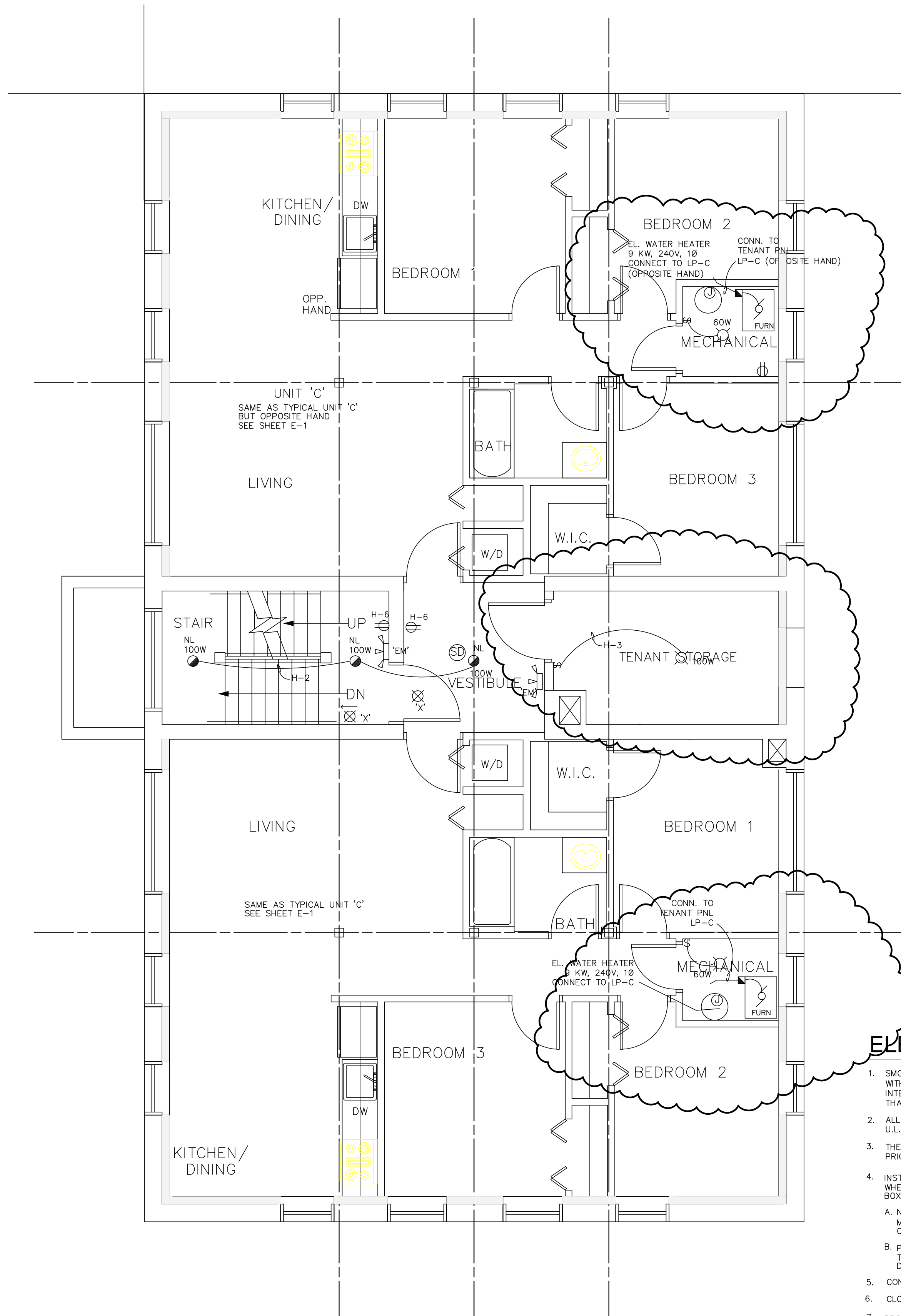
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PROJECT TITLE:
MARLBOROUGH APARTMENTS
-
DETROIT, MICHIGAN

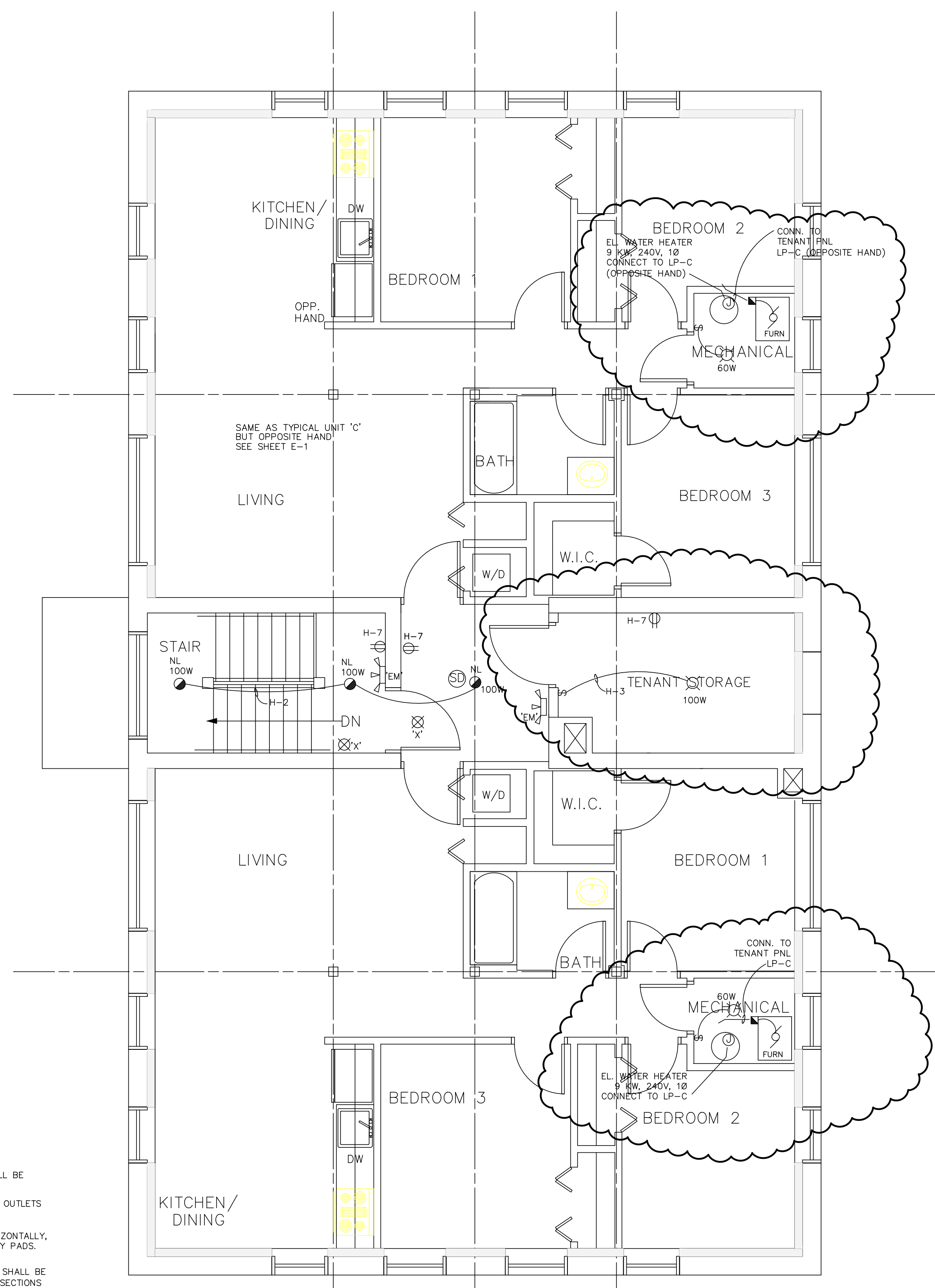
SHEET TITLE
BASEMENT,
FIRST FLOOR
PLANS -
ELECTRICAL

DRAWN BY: LH.N
APPROVED BY: D.A.M.
SCALE: -
DATE:

PROJECT # SHEET #
E-1



SECOND FLOOR PLAN – ELECTRICAL
SCALE: 1/4" = 1'-0"



THIRD FLOOR PLAN – ELECTRICAL
SCALE: 1/4" = 1'-0"

- ELECTRICAL NOTES:**
- SMOKE DETECTORS TO BE 120V EQUAL TO GENTEX #9120 SERIES COMPLETE WITH BATTERY BACK-UP AND 120V SUPPLY. SMOKE DETECTORS TO BE INTERLOCKED CAUSING ONE DETECTOR TO SET OFF ALL DETECTORS WITHIN THAT UNIT.
 - ALL ELECTRICAL OUTLET BOXES LOCATED IN IHR RATED WALL ASSEMBLIES SHALL BE U.L. APPROVED FOR THIS USE
 - THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF TELEPHONE AND T.V. OUTLETS PRIOR TO ROUGH-IN
 - INSTALL ELECTRICAL BOXES ON OPPOSITE SIDES OF WALL MIN. 24" APART HORIZONTALLY, WHEREVER POSSIBLE. PROVIDE U.L. LISTED METALLIC BOXES W/U.L. LISTED PUTTY PADS. BOXES SHALL NOT BE INSTALLED BACK TO BACK.
 - NON-METALLIC BOXES, LISTED FOR USE IN STAGGERED STUD CONSTRUCTION SHALL BE MIN. 24" APART, WHEN LOCATED ON OPPOSITE SIDES OF WALL. SEE DETAIL/SECTIONS ON ARCH DRAWINGS.
 - PROVIDE U.L. LISTED NON-METALLIC BOXES. BLOCK OFF STUD SPACE & PROVIDE 5/8" TYPE "X" GYP.BD. ON BACK SIDE. SEAL PERIMETER SEE DETAIL/SECTIONS ON ARCH. DRAWINGS.
 - CONTRACTOR SHALL PROVIDE RECEPTACLES INSTALLED PER N.E.C. 210.52
 - CLOTHES CLOSET LIGHTS SHALL BE PROVIDED AND LOCATED TO COMPLY WITH N.E.C. 410.8
 - PROVIDE PERMANENT SIGNAGE FOR METER UNIT NO'S (PERMANENT FELT TIP MARKER SHALL NOT BE ACCEPTABLE TO OWNER) THIS SIGNAGE IS NOT INCLUDED IN OWNERS SIGNAGE ALLOWANCE.
 - PROVIDE STRAPPING OF EXTERIOR CONDUIT AT CONDENSING UNITS TO BE W/NYLON STRAP TIES
 - SEE ARCH. PLANS FOR ELECTRICAL CONTROLS AND OUTLET MOUNTING HEIGHTS.
 - PC FIXTURES MUST HAVE GLOBES, NO EXPOSED LAMPS.
 - WHERE OUTLETS ARE SHOWN TO BE SWITCHED, SWITCH UPPER OUTLET ONLY
 - CONNECT BEDROOM RECEPTACLES TO "ARC FAULT" BREAKERS IF REQUIRED BY AUTHORITIES HAVING JURISDICTION.
 - ALL EXIT LIGHTS AND EMERGENCY BATTERY LIGHTS TO BE CONNECTED TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING.

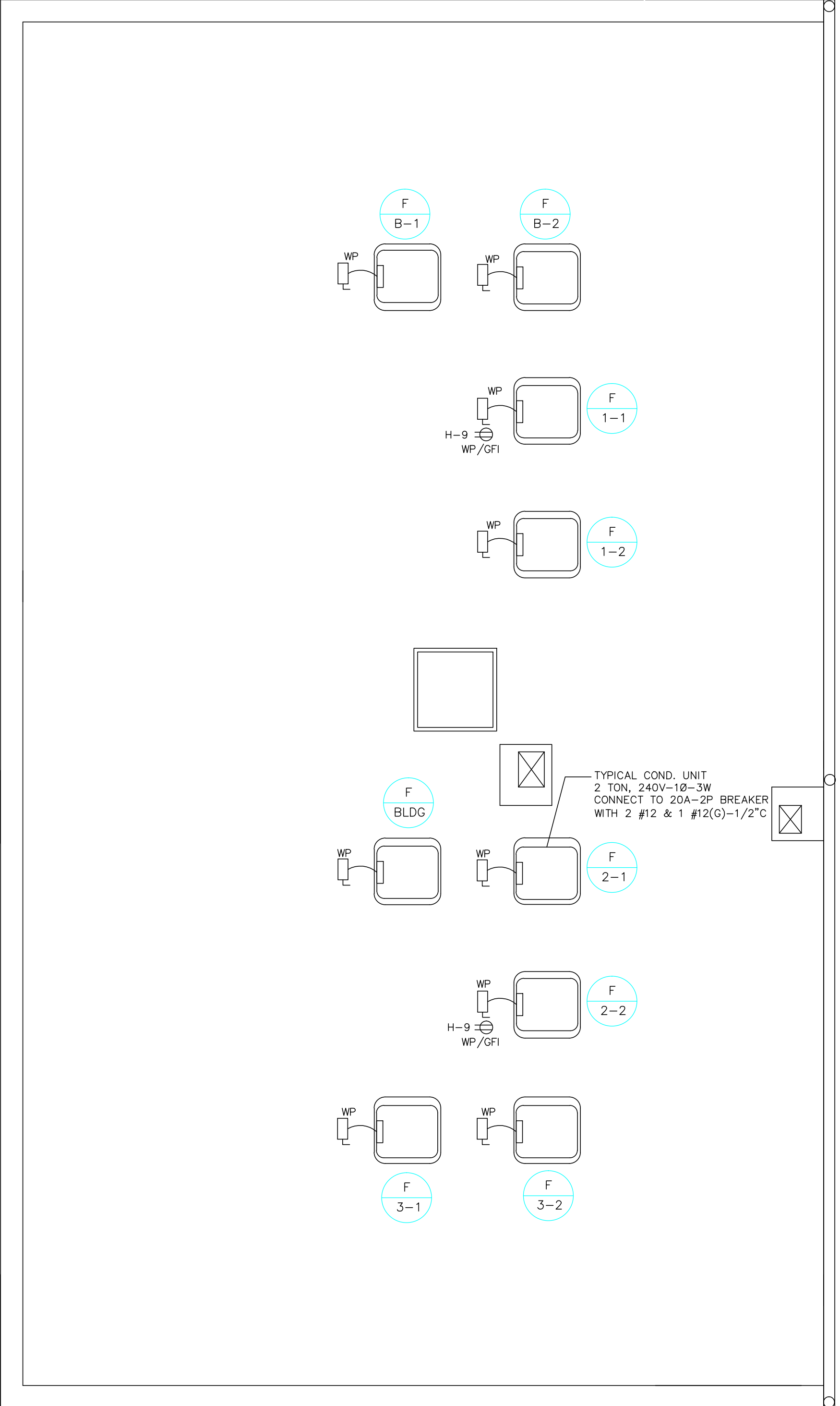
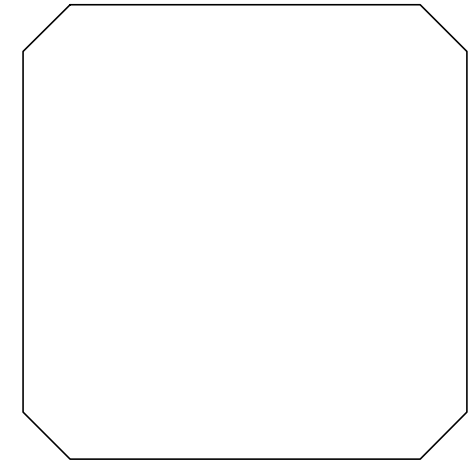
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PROJECT TITLE:
MARLBOROUGH APARTMENTS
—
DETROIT, MICHIGAN

SHEET TITLE
SECOND & THIRD
FLOOR PLANS
— ELECTRICAL

DRAWN BY:
APPROVED BY:
SCALE: —
DATE:

PROJECT #
SHEET #
E-2



ELECTRICAL NOTES:

- 1. MOUNT DISCONNECT SWITCHES AND RECEPTACLES ON MISCELLANEOUS STRUCTURE SUPPORT SYSTEM. SUPPORT SYSTEM SHALL BE GALVANIZED STEEL. MOUNT RECEPTACLES IN WEATHERPROOF ENCLOSURE. COORDINATE ANY ROOF PENETRATION WITH ARCHITECTURAL TRADES.

ROOF PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"

DATE	ISSUED FOR

PROJECT TITLE:
MARLBOROUGH APARTMENTS
-
DETROIT, MICHIGAN

SHEET TITLE
ROOF PLAN,
ELECTRICAL

DRAWN BY: LH.N
APPROVED BY: A.M.
SCALE: -
DATE: -

PROJECT # SHEET #
E-4

Project Manual

for

910 Marlborough Renovation Shelborne Development

DETROIT, MICHIGAN

December 28, 2018
Revised

ARCHITECT



Archive DS
615 Griswold, Ste 1710
Detroit, MI 48226
Phone (313) 963-6687

ARCHITECT'S PROJECT NUMBER 160404

SECTION 00 01 10 - TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

PROJECT NARRATIVE

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00 01 03.....	Project Directory
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00 01 10.....	Table of Contents

PROCUREMENT REQUIREMENTS

AIA forms and pre-printed documents listed below are not included in this Project Manual, but are hereby made a part of the Contract Documents. Copies may be purchased from distributors listed at www.aia.org/groups/aia/documents/pdf/aia076340.pdf or viewed at the office of the Architect.

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00 73 00.....	Supplementary Conditions

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01 40 00.....	Quality Requirements
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DOCUMENT 00 72 00 - GENERAL CONDITIONS

PART 1 - GENERAL CONDITIONS

1.01 FORM

A. AIA Document A201-2007 "General Conditions of the Contract for Construction", forms the General Conditions between the Owner and Contractor for this Project.

B. A sample copy of the above document is available for viewing at the office of the Architect.

C. Copies of the above document may be obtained from distributors listed at www.aia.org/SiteObjects/files/docs_paperdistributors.pdf.

PART 2 - SUPPLEMENTARY CONDITIONS

2.01 AMENDMENTS AND SUPPLEMENTS

A. Refer to Division 00 Section "Supplementary Conditions" for amendments and supplements to the above referenced General Conditions.

END OF DOCUMENT DOCUMENT 00 72 00

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner under separate contracts.
4. Owner-furnished products.
5. Work restrictions.

1. PROJECT INFORMATION

B. Project Identification: 910 Marlborough

C. Owner: Shelborne Development

D. Architect: Archive DS, 615 Griswold, Ste 1710, Detroit, MI 48226, (313) 963-6687

2. WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The Work includes renovation of and additions to an existing 5-story office building complete with first floor retail/mixed use.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

2. OWNER-FURNISHED PRODUCTS

A. Owner-furnished products for installation by Owner (OFOI): As indicated on Drawings.

1. Owner-Furnished Products for Installation by Owner: Contractor is responsible for storing and protecting Owner-furnished products prior to installation by Owner and for protecting Owner-installed products from damage from construction operations.

B. Owner-furnished products for installation by Contractor (OFICI): As indicated on Drawings.

1. Owner-Furnished Products for Installation by Contractor: Contractor is responsible for receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.

C. Owner-furnished products set in place by Owner for final connection to building services by Contractor (OFCC): As indicated on Drawings.

1. Owner-Furnished Products Set in Place by Owner for Final Connection to

Building Services by Contractor: Contractor is responsible for storing and protecting Owner-furnished products prior to installation by Owner and for making final plumbing, mechanical, and electrical and similar connections to building services as required.

3. WORK RESTRICTIONS

A. Access to Site:

1. Contractor's Use of Premises: During construction, Contractor will have full use of site indicated. Contractor's use of premises is limited only by Owner's right to perform work or employ other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

2. On-Site Work Hours: Perform construction only during normal working hours (8 AM to 5 PM Monday thru Friday, other than holidays), unless otherwise agreed to in advance by Owner. Clean up work areas and return to a useable condition at the end of each work period.

3. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

4. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes .

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1. SUMMARY

A. Section Includes:

1. Project management and coordination.
2. Construction progress documentation.
3. Submittal procedures.

2. PROJECT MANAGEMENT AND COORDINATION

A. Project Coordination: Coordinate construction to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Coordination Drawings: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

B. Project Meetings: Schedule and conduct progress meetings at Project site at regular intervals. Notify Owner and Architect of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved with planning or coordination of future activities.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Record minutes and distribute to everyone concerned, including Owner and Architect.
4. Preconstruction Conference: Schedule and conduct a preconstruction conference to review responsibilities and personnel assignments before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
5. Progress Meetings: Conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.
6. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction to review progress of other construction activities and preparations

for the particular activity under consideration. Review and correct or approve prior meeting minutes, review progress since the last meeting, determine how construction behind schedule will be expedited, and review present and future needs of each entity present

7. Project Closeout Conference: Schedule and conduct a project closeout conference to review requirements and responsibilities related to Project closeout, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

3. CONSTRUCTION PROGRESS DOCUMENTATION

A. Contractor's Construction Schedule (Gantt Chart): Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 15 days of date established for commencement of the Work. Base schedule on the startup construction schedule and additional information received since the start of Project. Submit one electronic PDF file of schedule.

B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the following:

1. Notice of Award / Notice to Proceed.
2. Mobilize.
3. Start construction.
4. Complete foundations.
5. Temporary enclosure and space conditioning.
6. Complete building enclosure.
7. Complete site improvements and landscaping.
8. Substantial Completion.
9. Final Completion.

D. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Architect. Identify first workday of each week with a continuous vertical line.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.

4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- F. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
- G. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

4. SUBMITTAL PROCEDURES

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
- B. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals.
1. Architect may furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Contractor shall execute a data licensing agreement in the form of AIA Document C106, Digital Data Licensing Agreement or other form acceptable to the Architect.
- C. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
1. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
3. Submit one electronic PDF file of each submittal.
4. Architect will return submittals, without review, received from sources other than Contractor.

D. Processing Time: Allow not less than 15days for review of each Action Submittal, including time for resubmittals. Time for review shall commence on Architect's receipt of submittal. Architect will return one copy of Action Submittals. Architect will not return copies of Informational Submittals.

1. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action including, but not limited to, product data, shop drawings, and samples.
2. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action including, but not limited to, certificates, delegated design submittals, reports, instructions, quality control submittals, sustainability submittals, qualifications, operation and maintenance data, warranties, and Record Documents. Informational Submittals may be rejected for not complying with requirements.

E. Place a permanent label or title block on each submittal for identification. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect. Include the following information on the label:

1. Project name.
2. Date.
3. Name and address of Contractor.
4. Name and address of subcontractor or supplier.
5. Number and title of appropriate Specification Section.

F. Contractor's Review: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. Identify deviations from the Contract Documents on submittals.

1. Stamp each submittal with a uniform, approval stamp certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

G. Architect's Action: Architect will review each submittal, make marks to indicate corrections or revisions required, stamp and mark as appropriate to indicate action taken, and return copies less those retained.

5. ACTION SUBMITTALS:

A. Product Data: Mark each copy to show applicable products and options. Include the following:

1. Manufacturer's written recommendations, product specifications, and installation instructions.
2. Wiring diagrams showing factory-installed wiring.
3. Printed performance curves and operational range diagrams.
4. Testing by recognized testing agency.
5. Compliance with specified standards and requirements.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Submit on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches. Include the following:

1. Dimensions and identification of products.
2. Fabrication and installation drawings and roughing-in and setting diagrams.
3. Wiring diagrams showing field-installed wiring.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.

C. Samples: Submit Samples for review of kind, color, pattern, and texture and for a comparison of these characteristics between submittal and actual component as delivered and installed. Include name of manufacturer and product name on label.

1. If variation is inherent in material or product, submit at least three sets of paired units that show variations.

6. INFORMATION SUBMITTALS:

A. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

C. Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

D. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

E. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable.

7. DELEGATED DESIGN SUBMITTALS:

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit one electronic PDF file copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 30 00

SECTION 02 41 00 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Items indicated to be removed and salvaged remain Owner's property. Remove, clean, and deliver to Owner's designated storage area.
- B. Comply with EPA regulations and hauling and disposal regulations of authorities having jurisdiction.
- C. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- D. It is not expected that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

1. DEMOLITION

- A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the building.
- B. Locate, identify, shut off, disconnect, and cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
- C. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- D. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain or construction being demolished.

- E. Provide temporary weather protection to prevent water leakage and damage to structure and interior areas.
- F. Protect walls, ceilings, floors, and other existing finish work that are to remain. Erect and maintain dustproof partitions. Cover and protect furniture, furnishings, and equipment that have not been removed.
- G. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.
- H. Promptly remove demolished materials from Owner's property and legally dispose of them. Do not burn demolished materials.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data concrete mix designs and submittals required by ACI 301.
- B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

PART 2 - PRODUCTS

1. MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain Steel Wire: ASTM A 82, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- E. Portland Cement: ASTM C 150, Type I or II.
- F. Fly Ash: ASTM C 618, Type C or F.
- G. Aggregates: ASTM C 33, uniformly graded.
- H. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, 1/2 to 1-1/2 inches long.
- I. Air-Entraining Admixture: ASTM C 260.
- J. Chemical Admixtures: ASTM C 494, water reducing . Do not use calcium chloride or admixtures containing calcium chloride.
- K. Vapor Retarder: Clear 10-mil- thick polyethylene sheet or reinforced polyethylene sheet, ASTM E 1745, Class C.

- L. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
 - M. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 - N. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
 - O. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
 - P. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
2. MIXES
- A. Comply with ACI 301 requirements for concrete mixtures.
 - B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 - 1. Minimum Compressive Strength: As indicated on Drawings.
 - 2. Maximum Water-Cementitious Materials Ratio: As indicated on Drawings.
 - 3. Slump Limit: As indicated on Drawings , plus or minus 1 inch.
 - 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
 - C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M.
 - 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

1. CONCRETING

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch for concrete exposed to view and Class C, 1/2 inch for other concrete surfaces.
- B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches and sealed.
- C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing,

and supporting reinforcement.

- D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.
- E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.
- F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
- G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.
- H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
 - 1. Scratch finish for surfaces to receive mortar setting beds.
 - 2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
 - 3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
 - 4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
 - 5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.
- I. Cure formed surfaces by moist curing for at least seven days.
- J. Begin curing concrete slabs after finishing. Apply membrane-forming curing and sealing compound to concrete.
- K. Owner will engage a testing agency to perform field tests and to submit test reports.
- L. Protect concrete from damage. Repair surface defects in formed concrete and slabs.

END OF SECTION 03 30 00

SECTION 04 01 20.91 - UNIT MASONRY RESTORATION

PART 1 - GENERAL

1. SECTION REQUIREMENTS

A. Section Includes:

1. Replacement of damaged and missing brick and stone.
2. Patching deteriorated and damaged stone.
3. Repointing mortar joints.

B. Definitions:

1. Defective Mortar Joints: Joints in which mortar is missing, loose, spalled, eroded, powdered, broken, hollow, unsound, soft, or weathered more than 3/16 inch (5 mm) from original plane. Sound joints containing fine hairline cracks are excluded.
2. Deteriorated Brick: Brick exhibiting deterioration and damage as described in "A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments"; Department of the Interior, National Park Service, Preservation Assistance Division.

C. Reference Standards:

1. U.S. Department of the Interior, National Park Service:
 - a. Preservation Brief No. 2 - Repointing Mortar Joints in Historic Brick Buildings.

D. Sequencing:

1. Restore and clean masonry in following sequence:
 - a. Replace damaged and missing masonry.
 - b. Rout and repoint mortar joints.
 - c. Clean restored masonry under provisions of Division 04 Section "Unit Masonry Cleaning."
2. Schedule the work to accomplish this requirement.

E. Samples: Brick and stone for replacement units in sufficient quantity to show full color and texture range.

F. Field Mockup: Prepare mockups of each restoration process to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation

1. Location: Architect will select areas to represent surfaces and conditions for cleaning.
 2. Size: Approximately 100 sq ft for each type of substrate and surface condition.
 3. Restore existing brick and stone in location approved by Architect.
 4. Show proposed:
 - a. Masonry replacement procedures.
 - b. Stone patching techniques.
 - c. Routing and repointing procedures.
 - d. Mortar color and texture.
 - e. Joint tooling sequence and profile.
 - f. Overall workmanship and procedures.
 5. Approved mockup may remain as part of the Work.
- G. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- H. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

1. MATERIALS

- A. Brick and Stone:
1. Reuse existing materials salvaged during demolition operations.
 2. If salvaged materials are of insufficient quantity or are unsuitable for reuse, provide new materials or materials salvaged from an off-site source to match existing in compressive strength, absorption, initial rate of absorption, color, size, and surface texture.
- B. Mortar: As specified in Division 04 Section "Unit Masonry."

2. ACCESSORIES

- A. Reinforcing, Ties, and Anchors: As specified in Division 04 Section "Common Work Results for Masonry."
- B. Sealant: Provide sealant compatible with adjacent materials and complying with

requirements in Division 07 Section "Joint Sealants."

- C. Patching Compound: Premixed cementitious mortar mix, color to match existing stone.
- D. Epoxy: Multiple component, 100 percent solids, produced specifically for setting anchors in masonry.
- E. Bonding Agent: Two component modified epoxy resin.

PART 3 - EXECUTION

1. EXAMINATION

- A. Prior to beginning work examine existing mortar joints to determine procedures required to match new mortar to existing, including:
 - 1. Order in which horizontal and vertical joints were tooled.
 - 2. Style of tooling including depth and profile.
- B. Protection of In-Place Conditions:
 - 1. Protect surrounding areas and surfaces from damage or disfiguration.

2. REPLACEMENT OF DAMAGED AND MISSING MASONRY

- A. Remove damaged and deteriorated masonry without damage to adjacent masonry.
- B. Install new or salvaged masonry units where existing units are missing or were removed.
- C. Establish lines, levels, and courses to match existing. Fit new masonry to bond and coursing of existing masonry.
- D. Lay masonry plumb and true to line.
- E. Do not shift masonry after mortar has achieved initial set. If adjustments must be made after initial set, remove mortar and replace with new.
- F. Lay solid masonry units in full mortar bed, with full head joints.
- G. Lay hollow masonry units with face shell bedding on head and bed joints.
- H. Do not butter corners or excessively furrow joints.
- I. Cut masonry with straight, true cuts and clean, unchipped edges. Prevent oversized or

undersized joints. Discard damaged units.

- J. Do not expose cut cells in finished work. Where fresh masonry joins existing or partially set masonry, remove loose masonry and mortar; clean and lightly wet exposed surface of set masonry.
- K. Do not permit mortar to accumulate in cavities.
- L. Rake out joints to 1/2 inch depth.

3. PATCHING STONE

A. Small Spalled Areas, Minor Cracks and Holes, and Lightly Deteriorated Surfaces:

1. Patch stone with patching compound to match existing.
2. Remove deteriorated stone until sound material is reached.
3. Score or groove contact surfaces of stone to form mechanical bond with patching compound.
4. Lightly wet masonry. Apply chemical bonding agent in accordance with manufacturer's instructions.
5. Mix and apply patching compound in accordance with manufacturer's instructions. Build up in maximum 1/2 inch thick layers.
6. Allow each layer to cure minimum 12 hours before proceeding. Lightly wet set material and existing masonry before applying next layer.
7. Finish patches to match color and texture of surrounding stone.
8. Keep patches moist until fully cured.

B. Large Spalled Areas and Severely Deteriorated Surfaces:

1. Resurface deteriorated stone with new stone to match existing.
2. Remove deteriorated stone to point at which sound material is reached.
3. Drill holes for dowels at interface of new and existing stone.
4. Anchor new stone to existing with anchors set in epoxy.
5. Finish new stone flush with existing.

4. REPOINTING MORTAR JOINTS

- A. Rout out defective mortar joints.
- B. Prepare dynamic (moving) joints and cracks to receive sealant as specified in Division 07 Section "Joint Sealants."
- C. Repoint static (non-moving) joints with pointing mortar to match existing.

- D. Remove existing mortar to depth equal to 2-1/2 times joint width, but not less than 1/2 inch or depth at which sound mortar is reached.
- E. Power saws or grinders may be used as a preliminary step in removing horizontal joints only. Cut thin line down center of mortar joint; remove remaining mortar using hand tools. Use hand tools for vertical joints.
- F. Remove mortar cleanly, without damaging masonry. Cut back of joints square.
- G. Remove loose particles with compressed air or water.
- H. Lightly wet masonry just prior to repointing.
- I. Fill areas where mortar has been removed to greatest depth first.
- J. Build up mortar in several 1/4 inch compacted layers until outer face of masonry is reached.
- K. Allow each layer to reach thumbprint hardness prior to applying next layer.
- L. If existing masonry has worn, rounded edges, recess mortar slightly from face of masonry.
- M. When final mortar layer has reached thumbprint hardness, tool to match sequence and profile of existing. Avoid light streaks, hairline cracks, tool burning, open joints, and other defects caused by tooling when mortar is excessively wet or dry.
- N. Remove excess mortar from edge of joint by brushing with stiff bristle brush; wire brushes not permitted.
- O. If necessary to more closely match original mortar color and texture, artificially age mortar by one of the following methods:
 - 1. Lightly brush with stiff natural brush after tooling.
 - 2. Apply fine mortar spray with low pressure water after tooling.
 - 3. Staining is not permitted.
- P. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

5. FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
- B. CLEANING
- C. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
 - 1. Do not use metal scrapers or brushes.
 - 2. Do not use acidic or alkaline cleaners.
- D. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.
- E. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- F. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.
- G. Waste Management: Legally dispose of waste off Owner's property.

END OF SECTION 04 01 20.91

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. See Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
- B. See sheet C-1 on drawings for specific historic designation requirements for brick.
- C. Submittals:
 - 1. Samples for face brick and colored mortar.
 - 2. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.
- D. Comply with ACI 530.1/ASCE 6/TMS 602.
- E. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing required by authorities having jurisdiction.
- F. Sample Panels: Construct a sample wall panel approximately 48 inches long by 48 inches high to demonstrate aesthetic effects and set quality standards for materials and execution.

PART 2 - PRODUCTS

1. MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90; Weight Classification, Normal Weight.
 - 1. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
 - 2. Bullnose units for outside corners, unless otherwise indicated.
- B. Concrete Lintels: Precast units matching concrete masonry units and with reinforcing bars indicated or required to support loads indicated.
- C. Face Brick: ASTM C216, Grade SW, Type FBS .
 - 1. Where indicated to "match existing," provide facing brick matching color range, texture, and size of existing adjacent brickwork.
 - 2. Size: 3-1/2 inches wide by 2-1/4 inches high by 7-1/2 inches long or 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
 - 3. Solid brick with exposed surfaces finished for ends of sills and caps.
 - 4. Special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- D. Specialty Facing Brick, Single Fired: ASTM C1405, Grade SS, Type I.
 - 1. Product:

- a. To be determined
2. Texture: Smooth Glazed.
3. Durability Classification (Grade): Exterior.
4. Efflorescence: Provide brick that has been tested per ASTM C67 and is rated "not effloresced."
5. Size (Nominal Dimensions - Actual dimensions 3/8 inch less than nominal):
Match existing
6. Application: Use where brick is exposed unless otherwise indicated.

2. MORTAR AND GROUT

- A. Mortar: ASTM C 270, proportion specification.
 1. Masonry Cement: Do not use masonry cement or plastic cement.
 2. Do not use calcium chloride in mortar.
 3. For masonry below grade or in contact with earth, use Type S.
 4. Delete first subparagraph below if no masonry is grouted and reinforced with steel reinforcing bars.
 5. For reinforced masonry, use Type S.
 6. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N.
 7. Colored Mortar: For face brick and glazed brick, use colored cement or cement- lime mix of color selected.
 8. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.
- B. Grout: ASTM C 476 with a slump of 8 to 11 inches.
- C. Refractory Mortar: Ground fireclay mortar or other refractory mortar that passes ASTM C 199 test and is acceptable to authorities having jurisdiction.

3. REINFORCEMENT, TIES, AND ANCHORS

- A. Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.
- B. Joint Reinforcement: ASTM A 951.
 1. Coating: Hot-dip galvanized at both interior and exterior walls.
 2. Wire Diameter for Side Rods: W1.7 or 0.148 inch.
 3. Wire Diameter for Cross Rods: W1.7 or 0.148 inch.
 4. For single-wythe masonry, provide either ladder design or truss design.
 5. For multiwythe masonry, provide ladder design with three side rods.
- C. Veneer Anchors: Stainless-steel, two-piece adjustable masonry veneer anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to studs, and

acceptable to authorities having jurisdiction.

4. EMBEDDED FLASHING MATERIALS

- A. Sheet Metal Flashing: Stainless steel, 0.0156 inch thick.
- B. Rubberized Asphalt Sheet Flashing: Pliable and highly adhesive rubberized asphalt compound, 26 mils thick, bonded to a polyethylene film, 4 mils thick, to produce an overall thickness of 30 mils.

5. MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.
- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
- C. Insulation: Per Div. 07 Section "THERMAL INSULATION."
- D. Proprietary Acidic Masonry Cleaner: Product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

PART 3 - EXECUTION

1. INSTALLATION, GENERAL

- A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
- B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- D. Stopping and Resuming Work: Rack back units; do not tooth.
- E. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- F. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- G. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.

- H. Keep cavities clean of mortar droppings and other materials during construction.
2. LINTELS
- A. Install lintels where indicated.
 - B. Minimum bearing of 8 inches at each jamb, unless otherwise indicated.
3. FLASHING AND WEEP HOLES
- B. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile indicated.
3. CLEANING
- A. In-Progress Cleaning: Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.
 - B. Final Cleaning: After mortar is thoroughly cured, remove large mortar particles, scrub, and rinse stone masonry veneer.
 - 1. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

END OF SECTION 04 43 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

1.- GENERAL

1.1. SECTION REQUIREMENTS

- A. Submittals: Product Data Shop Drawings and material certificates.
- B. Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing.
- C. Comply with HUD's "Prescriptive Method for Residential Cold-Formed Metal Framing."
- D. Comply with AWS D1.3, "Structural Welding Code - Sheet Steel."
- E. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

1. MATERIALS

- A. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 zinc coated; Structural Steel (SS); Grade 33.
- B. Steel Studs: C-shaped, with flange width of not less than 1-5/8 inches, minimum uncoated steel thickness of 0.0329 inch , and of depths indicated.
- C. Steel Track: U-shaped, minimum uncoated metal thickness same as studs or joists used with track, with flange widths of 1-1/4 inches for studs and 1-5/8 inches for joists, of web depths indicated.

2. ACCESSORIES

- A. Accessories: Fabricate from the same material and finish used for framing members, of manufacturer's standard thickness and configuration, unless otherwise indicated.
- B. Cast-in-Place Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

- C. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws.
- D. Insulation: ASTM C 665, Type I, unfaced mineral-fiber blankets.
- E. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

PART 3 - EXECUTION

1. FRAMING

- A. Install framing and accessories level, plumb, square, and true to line, and securely fastened, according to ASTM C 1007. Temporarily brace framing until entire integrated supporting structure has been completed and permanent connections are secured.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten framing members by welding or screw fastening.
 - 3. Install insulation in built-up exterior framing members.
 - 4. Fasten reinforcement plates over web penetrations larger than standard
- B. Erection Tolerances: Install cold-formed metal framing with a maximum variation of 1/8 inch in 10 feet and with individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- C. Studs: Install continuous top and bottom tracks securely anchored at corners and ends. Squarely seat studs against webs of top and bottom tracks. Space studs as indicated, set plumb, align, and fasten both flanges of studs to top and bottom tracks.
 - 1. Install and fasten horizontal bridging in stud system, spaced in rows not more than 48 inches apart.
 - 2. Install steel-sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom track and anchor to structure.
 - 3. Install miscellaneous framing and connections to provide a complete and stable wall-framing system.
 - 4. Isolate non-load-bearing, curtain-wall framing from building structure using vertical slide clips or deflection track to prevent transfer of vertical loads while providing lateral support.
- D. Joists: Install and securely anchor perimeter joist track sized to match joists. Install joists bearing on supporting framing, brace and reinforce, and fasten to both flanges of joist track.
 - 1. Install bridging and fasten bridging at each joist intersection.
 - 2. Install miscellaneous joist framing and connections, including web stiffeners,

closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners.

END OF SECTION 05 40 00

SECTION 05 50 00 - METAL FABRICATIONS

1.- GENERAL

1.1. SECTION REQUIREMENTS

- A. Submittals: Shop Drawings showing details of fabrication and installation.

PART 2 - PRODUCTS

1. METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), black finish.
- D. Slotted Channel Framing: Cold-formed steel channels, 1-5/8 by 1-5/8 inches by 0.0528 inch thick, complying with MFMA-3.

2. GROUT

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.

3. FABRICATION

- A. General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.
- B. Welding: Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth with contour of welded surface matching those adjacent.
- C. On units indicated to be cast into concrete or built into masonry, provide welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch

hook, not less than 8 inches from ends and corners of units and 24 inches o.c.

- A. ~~General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.~~
 - B. ~~Welding: Use materials and methods that minimize distortion and develop strength of base metals. At exposed connections, finish welds and surfaces smooth.~~
 - C. ~~Stair Framing: Fabricate stringers of steel plates or channels. Construct platforms of steel plate or channel headers and miscellaneous framing members.~~
 - D. ~~Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch thick.~~
 - E. Railings: Per Div. 05 Section "METAL RAILINGS."
4. FINISHES
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal stairs after assembly.
 - B. Hot-dip galvanize steel stairs at exterior locations.
 - C. Prepare uncoated ferrous metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning," and paint with a fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

PART 3 - EXECUTION

1. INSTALLATION

- A. Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections

that are not to be left as exposed joints. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. ~~Place and finish concrete fill for treads and platforms to comply with Division 03 Section "Cast-in-Place Concrete." Install abrasive nosings with anchors fully embedded in concrete.~~

END OF SECTION 05 51 00

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Model code evaluation reports for fire-retardant-treated plywood .

PART 2 - PRODUCTS

1. WOOD PANEL PRODUCTS, GENERAL

- A. Plywood: DOC PS 1.
- B. Oriented Strand Board: DOC PS 2.

2. TREATED PLYWOOD

- A. Preservative-Treated Plywood: AWPA C9.
 - 1. Use treatment containing no arsenic or chromium.
 - 2. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- B. Provide preservative treated plywood for all plywood, unless otherwise indicated .
- C. Fire-Retardant-Treated Plywood: Comply with performance requirements in AWPA C27, labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Use Exterior type for exterior locations and where indicated.
 - 2. Use Interior Type A, High Temperature (HT) for roof sheathing and where indicated.
 - 3. Use Interior Type A, unless otherwise indicated.
 - 4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Provide fire-retardant treated plywood for items indicated on Drawings.

3. WALL SHEATHING

- A. Plywood Wall Sheathing: Exposure 1 sheathing.
- B. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. CertainTeed Corporation; GlasRoc.
 - b. G-P Gypsum Corporation; Dens-Glass Gold.
 - c. National Gypsum Company; Gold Bond e(2)XP.
 - d. Temple-Inland Inc.; GreenGlass
 - e. United States Gypsum Co.; Securock.
2. Type and Thickness: As indicated on Drawings thick.
 3. Size: 48 by 96 inches to 48 by 120 inches for vertical installation.

4. SUBFLOORING AND UNDERLAYMENT

A. Subflooring:

1. Plywood Subflooring: Exterior, Structural I single-floor panels or sheathing.

B. Underlayment:

1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.
2. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than 5/8-inch nominal thickness, for ceramic tile set in epoxy adhesive.
3. Plywood Underlayment for Carpet: DOC PS 1, Exterior, C-C Plugged Interior, Underlayment.

5. MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
2. Power-Driven Fasteners: CABO NER-272.

B. Weather-Resistant Sheathing Paper:

1. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke- developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

C. Sheathing Joint-and-Penetration Treatment Materials:

1. Sealant for Gypsum Sheathing Board: Joint sealant recommended by sheathing manufacturer for application indicated.
2. Sheathing Tape for Gypsum Sheathing Board: Self-adhering glass-fiber tape recommended by sheathing and tape manufacturers for application indicated.

- D. Adhesives for Field Gluing Panels to Framing: APAAFG-01.
- E. Flexible Flashing: Adhesive rubberized-asphalt compound, bonded to polyethylene film, with an overall thickness of 0.030 inch.

PART 3 - EXECUTION

1. INSTALLATION

- A. Securely attach to substrates, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code .
- B. Structural Insulated Panel Installation
 - 1. Install structural insulated panels in accordance with manufacturer's printed instructions, SIPA recommendations, and approved submittals.
 - 2. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
 - 3. Securely and rigidly anchor panels to support framing.
 - 4. SIPS fasteners shall have a minimum edge distance of 1-9/16 inch and a maximum edge distance of 2-7/8 inch with a minimum 1-1/2 inch penetration into support framing.
 - 5. Electrical: Provide 1-1/2 inch diameter access holes in edge plating to align with electrical wire chases in SIPS. Align all electrical chases in SIPs and maintain debris free electrical chases.
 - 6. Seal perimeter edges of each panel at underside (interior) as installation progresses with sealant compatible with adjacent materials and complying with requirements in Division 07 Section "Joint Sealants."
 - 7. Apply SIP tape at joints between roof SIPS, at the roof-to-wall connection and at the ridge. Tape shall only be installed after all spline connections are completed as per Manufacturer installation instructions.
 - 8. Do not over-cut panel skins for approved field-cut openings. Do not cut skins to install electrical chases. Do not expose EPS core of SIPS to any solvents or solvent-based adhesives.
 - 9. Remove and replace SIP panels which have become wet or damaged before proceeding with the installation of additional SIPS or other work that may cover a compromised SIP.

C. Fastening Methods:

1. Subflooring:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
2. Wall and Roof Sheathing:
 - a. Screw to cold-formed metal framing.
3. Underlayment:
 - a. Nail to subflooring.

D. Building Wrap Installation:

1. Apply building wrap immediately after sheathing is installed.
2. Seal seams, edges, fasteners, and penetrations with tape.
3. Extend into jambs of openings and seal corners with tape.

END OF SECTION 06 16 00

SECTION 06 20 00 - FINISH CARPENTRY

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Section Includes:
 - 1. Exterior Decking.
 - 2. Interior trim, including non-fire-rated interior door frames.

PART 2 - PRODUCTS

1. MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- B. Softwood Plywood: DOC PS 1.
- C. Hardwood Plywood: HPVA HP-1.
- D. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.
- E. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.
- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

2. EXTERIOR FINISH CARPENTRY

- A. Exterior Lumber Trim: Smooth -textured, Species: As selected by Architect..
 - 1. Maximum Moisture Content: 19 percent.

3. INTERIOR STANDING AND RUNNING TRIM

- A. Interior Softwood Lumber Trim: C Select (Choice), eastern white, Idaho white, lodgepole, ponderosa, or sugar pine .
 - 1. Maximum Moisture Content: 15percent.

- B. Wood Moldings: WMMPA WM 4 made to patterns in WMMPA WM 12 from kiln-dried stock.
 - 1. Softwood Moldings for Transparent Finish: Douglas fir .
 - 2. Moldings for Painted Finish: P-Grade eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine .

4. MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Stainless-steel.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer.
 - 1. Use waterproof resorcinol glue for exterior applications.

PART 3 - EXECUTION

1. INSTALLATION

- A. Condition finish carpentry in installation areas for 24 hours before installing.
- B. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Scribe and cut to fit adjoining work. Refinish and seal cuts.
- C. Install standing and running trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.

END OF SECTION 06 20 00

SECTION 07163 - METAL-OXIDE WATERPROOFING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data.
- B. Applicator Qualifications: Authorized, approved, or licensed by waterproofing manufacturer.
- C. Warranties: Provide manufacturer's written warranty, signed by manufacturer agreeing to promptly repair or replace waterproofing that does not comply with requirements or fails to perform as required, and to maintain watertight conditions within five years from date of Substantial Completion.

PART 2 - PRODUCTS

1. MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following:
 - 1. A-H-Metallic Waterproofing; Anti Hydro International, Inc.
 - 2. Burke Metallic Waterproofer; Burke Group.
 - 3. Iron Waterpeller; Euclid Chemical Company.
 - 4. Ironite Metallic Waterproofing; Ironite Company.
 - 5. Metalcrete Waterproofing; Metalcrete Industries.

2. MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Slurry-Coat Aggregate: ASTM C 144, sand.
- C. Trowel-Coat Aggregate: ASTM C 33, fine aggregate.
- D. Water: Potable.
- E. Metal-Oxide Compound: A product specifically formulated for waterproofing concrete and masonry substrates and weighing not less than 85 percent of pulverized cast iron, 3 to 7 percent of a chemical-oxidizing agent, and not more than 5 percent of iron oxide or more than 0.05 percent of oil and 1 percent of other foreign substances. Provide finely graded, pulverized cast iron with 100 percent passing a No. 20 (0.85-

mm) sieve and 10 to 25 percent passing a No. 200 (0.075-mm) sieve.

- F. Calking: Lead wool saturated in a slurry of metal-oxide

waterproofing. PART 3 - EXECUTION

1. EXAMINATION

- A. Examine walls, floors, and other surfaces where waterproofing is to be applied with Applicator present, for compliance with requirements for surface preparation, cleaning, and other conditions affecting waterproofing performance. Proceed with application only after unsatisfactory conditions have been corrected.
 - 1. Begin waterproofing application only after unsatisfactory conditions have been corrected.
 - 2. Application of waterproofing indicates acceptance of surfaces and conditions.

2. PREPARATION

- A. Protect other work from damage or discoloration from metal-oxide waterproofing during application. Provide temporary enclosure to ensure adequate ambient temperatures and ventilation conditions for application.
- B. Stop active water leaks according to waterproofing manufacturer's written instructions.
- C. Schedule cleaning and coating application so dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.
- D. Surface Preparation of Concrete: Comply with waterproofing manufacturer's written instructions and requirements indicated below to ensure that waterproofing bonds to concrete surfaces. Clean concrete surfaces according to ASTM D 4258 by using one or a combination of procedures as needed to effectively remove efflorescence, chalk, dust, dirt, mortar spatter, grease, oils, curing compounds, and form-release agents.
 - 1. Prepare smooth-formed and trowel-finished concrete by mechanical abrading or abrasive-blast cleaning according to ASTM D 4259.
 - 2. Concrete Joints: Clean reveals according to waterproofing manufacturer's written instructions.
- E. Mask-off surfaces adjoining areas to receive waterproofing treatment where surface damage or discoloration might result from application of waterproofing. Do not allow metal-oxide waterproofing or metal-oxide compound to migrate into reveals or

annular spaces intended for resilient sealants or gaskets, such as joint spaces between pipes and pipe sleeves, unless indicated to be filled with metal-oxide calking.

- F. At cracks in concrete, remove loosened chips and cut square reveal approximately 1 inch (25 mm) deep.

3. APPLICATION

- A. General: Comply with waterproofing manufacturer's written instructions, unless more stringent requirements are indicated.
- B. Mix waterproofing components according to waterproofing manufacturer's written instructions. Pretreatment: Slush-coat reveals, depressions, cracks, and similar surface features with a thick-cream mixture of metal-oxide compound and water.
- C. Slush-coat entire surface of area to be waterproofed with a thick-cream mixture of metal-oxide compound and water. Apply by brush, exercising extreme care to work mix thoroughly into surfaces over entire area. Maintain in damp condition during a minimum 24-hour oxidation period before applying next coat. Continue curing until slush coat has oxidized to a uniform, brown color.
- D. Brush on uniform successive coats of slurry, proportioned with 2 cu. ft. (0.06 cu. m) of aggregate to one bag of portland cement to 10 to 15 lb (4.5 to 6.8 kg) of metal-oxide compound, and comply with waterproofing manufacturer's written instructions. Apply coats at 24-hour intervals with continuous moisture curing between coats, and provide longer curing times where necessary for coat to achieve uniform oxidation as shown by uniformity of color. Apply the number of coats necessary to provide a total, average, metal-oxide compound content, excluding compound used for grouting, of 30 lb/100 sq. ft. (1.46 kg/sq. m), but not less than two slurry coats.
- E. Apply floor-protective coating over horizontal metal-oxide waterproofing. Apply 1/4-inch- (6-mm) thick float finish of plaster/grout mix proportioned with 2.5 cu. ft. (0.07 cu. m) of aggregate to one bag of portland cement.
- F. Apply wall-protective coating over vertical metal-oxide waterproofing. Apply 1/8-inch- (3-mm-) thick brush or float finish of thick-cream plaster mix proportioned with 2 cu. ft. (0.06 cu. m) of aggregate to one bag of portland cement.

- G. Waterproofing Treatment Extensions: Apply treatment to columns that are integral with walls to be treated, and extend treatment onto partition walls that intersect exterior walls, for a distance of 24 inches (600 mm) for cast-in-place concrete and 48 inches (1200 mm) for masonry partitions. Where floors (but not walls) are treated, extend treatment 12 inches (300 mm) high onto exterior walls and onto both exterior and interior columns. Unless otherwise indicated, extend treatment to every surface of substrate in area indicated for treatment, including stair treads and risers, pipe trenches, pipe chases, pits, sumps, and similar offsets and features.

4. PROTECTION

- A. Protect applied metal-oxide waterproofing and protective courses from rapid drying, severe weather exposure, and water accumulation. Maintain completed Work in moist condition for not less than seven days by covering with impervious sheeting or by other curing procedures recommended by waterproofing manufacturer.
- B. END OF SECTION 07163

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data.
- B. Surface-Burning Characteristics: ASTM E 84, and as follows:
 - 1. Flame-Spread Index: 25 or less where exposed; otherwise, as indicated in Part 2 "Insulation Products" Article.
 - 2. Smoked-Developed Index: 450 or

less. PART 2 - PRODUCTS

1. INSULATION PRODUCTS

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV , with flame-spread index of 75 or less.
- B. Fiber Mat-Faced, Polyisocyanurate Board Wall Insulation: ASTM C 1289, Type II, Class 2, Grade 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Board Size: 48-inch wide by 8-foot long.
 - 2. Board Thickness: As indicated but not to exceed 2 inches maximum per layer.
- C. Glass-Fiber-Board Insulation: ASTM C 612, Type IA or Types IA and IB; black glass-fiber mat faced or black finish; nominal density of 2.25 lb/cu. ft. , with flame-spread index of 25 or less.
- D. Mineral-Fiber-Blanket Insulation: ASTM C 665, Type I, unfaced with fibers manufactured from glass, slag wool, or rock wool , with flame-spread index of 25 or less.
- E. Open-Cell Polyurethane Foam Insulation: Spray-applied polyurethane foam using water as a blowing agent, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

PART 3 - EXECUTION

1. INSTALLATION

- A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation.
- B. Except for loose-fill insulation and insulation that is friction fitted in stud cavities, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

END OF SECTION 07 21 00

SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Shop Drawings of tapered insulation.
- A. Exterior Fire-Test Exposure: ASTM E 108, Class A .
- A. Warranties: Manufacturer's standard form, without monetary limitation, signed by roofing manufacturer agreeing to repair leaks due to defects in materials or workmanship for period of 20 years.

PART 2 - PRODUCTS

1. ROOFING MATERIALS

- A. EPDM Sheet: ASTM D 4637, Type I, nonreinforced; 60 mils thick; black.
 - 1. Available Products:
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products.
 - c. GenFlex Roofing Systems.
 - d. Johns Manville.
 - e. Versico Incorporated.
- A. Auxiliary Materials: Recommended by roofing system manufacturer for intended use and as follows:
 - 1. Sheet Flashing: 60-mil- thick EPDM.
 - 2. Seaming Material: Synthetic-rubber-polymer primer and 3-inch- wide minimum, butyl splice tape with release film.

1. ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II.
- A. Fabricate tapered insulation with slope of 1/4 inch per 12 inches unless otherwise indicated.

PART 3 - EXECUTION

1.

- A. Mechanically fasten each layer of insulation to deck.
- A. Install EPDM sheet according to roofing system manufacturer's written instructions and as follows:
 - 1. Adhered Sheet Installation: Apply bonding adhesive to substrate and underside of sheet and allow to partially dry. Do not apply bonding adhesive to splice area of sheet.
- A. Seams: Clean and prime splices areas, applying splice tape, and firmly roll side and end laps of overlapping sheets. Seal exposed edges of sheet terminations.
- A. Install sheet flashings and preformed flashing accessories and adhere to substrates. Protect roofing from damage and wear during remainder of construction period.
- A. Correct deficiencies in or remove and reinstall roofing and sheet flashing that does not comply with requirements.

END OF SECTION 07 53 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and Samples.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

1. SHEET METAL

- A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, temper suitable for forming and structural performance required, but not less than H14; not less than 0.032 inch thick; and finished as follows:
 - 1. Fluoropolymer Two-Coat System: Manufacturer's standard system with topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, with No. 2D finish; not less than 0.016 inch thick.
- C. Zinc-Tin Alloy-Coated Stainless Steel: ASTM A 240/A 240M, Type 304, dead-soft, fully annealed stainless-steel sheet, coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin); not less than 0.016 inch thick.
- D. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet, and minimum thickness of 0.062 inch except at least 0.094 inch thick for applications where burning (welding) is involved.

2. FLASHING AND TRIM

- A. Fabricate sheet metal flashing and trim to comply with recommendations in

SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

3. ACCESSORIES

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- C. Solder for Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.
- D. Solder for Lead: ASTM B 32, Grade Sn50.
- E. Butyl Sealant: ASTM C 1311, solvent-release type, for expansion joints with limited movement.
- F. Asphalt Mastic: SSPC-Paint 12, asbestos free, solvent type.
- G. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.
- H. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq.

ft.. PART 3 - EXECUTION

1. INSTALLATION

- A. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.
 - 1. Roof-Edge Flashings: Secure metal flashings at roof edges according to FMG Loss Prevention Data Sheet 1-49 for specified wind zone.
- B. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- C. Fabricate nonmoving seams in sheet metal with flat-lock seams. For metals other than aluminum, tin edges to be seamed, form seams, and solder.

1. Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, unless pretinned surface would show in finished Work.
- D. Separation: Separate noncompatible metals or corrosive substrates with a coating of asphalt mastic or other permanent separation.

END OF SECTION 07 62 00

SECTION 07 70 00 - ROOF AND WALL SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1. SUMMARY

A. Section Includes the following manufactured items:

1. Roof Specialties:

- a. Fascias.
- b. Flashing and counterflashing systems.
- c. Reglets.

2. Wall Specialties:

- a. Through-wall flashing.
- b. Flashing and counterflashing systems.
- c. Reglets.

2. PERFORMANCE REQUIREMENTS

A. SPRI Wind Design Standard: Manufacture and install roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:

- 1. Design Pressure: As indicated on Drawings.

3. ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

C. Samples: For each exposed product and for each color and texture specified.

4. INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Warranty: Sample of special warranty.

5. CLOSEOUT SUBMITTALS

A. Maintenance data.

6. QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project

site. PART 2 - PRODUCTS

1. EXPOSED METALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, No. 2D (dull, cold rolled) finish.
- B. Prepainted, Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation, structural quality, and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
1. Surface: Smooth, flat finish.
 2. High-Performance Organic Finish: As specified in Division 5 Section "Factory Applied Metal Coatings."

2. CONCEALED METALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

3. UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

4. MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

 - C. Elastomeric Sealant: Provide sealant compatible with adjacent materials and complying with requirements in Division 7 Section "Joint Sealants."
 - D. Butyl Sealant: Provide sealant compatible with adjacent materials and complying with requirements in Division 7 Section "Joint Sealants."

 - E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15- mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

 - F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
5. FASCIAS
- A. Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed- or extruded-aluminum anchor bar with integral drip edge cleat to engage fascia cover. Provide matching factory mitered corner units.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Firestone Building Products.
 - b. Hickman, W. P. Company.
 - c. Metal-Era, Inc.
 - d. Metal-Fab Manufacturing LLC.
 - e. MM Systems Corporation.
 - f. Perimeter Systems, a division of Southern Aluminum Finishing Co.
 - g. Petersen Aluminum Corp.
 - 2. Fascia Cover: Manufacture from the following exposed metal in thickness as required to comply with performance requirements but not less than the following:
 - a. Prepainted, Zinc-Coated Steel: 0.028 inch thick.

3. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

6. FLASHING AND COUNTERFLASHING

- A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment under precast stone copings with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cheney Flashing Company; Cheney Flashing (Dovetail) or Cheney 3-Way Flashing (Sawtooth).
 - b. Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
 - c. Sandell Manufacturing Company, Inc.; Pre-Formed Metal Flashing.
 2. Manufacture from the following metal:
 - a. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.
 3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 - 4.

Fabricate ribbed through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.

- a. Fabricate metal drip edges for ribbed metal flashing from plain flat metal flashing of same metal as ribbed flashing and extending at least 1 inch into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
 - b. Fabricate ribbed through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
- B. Counterflashings: Manufactured units in lengths not exceeding 12 feet designed to snap into reglets and compress against base flashings with joints lapped. Provide matching factory mitered corner units.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Cheney Flashing Company.
 - b. Fry Reglet Corporation.
 - c. Hickman, W. P. Company.
 - d. Keystone Flashing Company.
 - e. Metal-Era, Inc.
 - f. MM Systems Corporation.
2. Manufacture from the following exposed metal in thickness as required to comply with performance requirements but not less than the following:
 - a. Stainless Steel: 0.0250 inch thick.
 - b. Prepainted, Zinc-Coated Steel: 0.028 inch thick.
 3. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

7. REGLETS

- A. Reglets: Manufactured units of type and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory mitered corners.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cheney Flashing Company, Inc.
 - b. Fry Reglet Corporation.
 - c. Heckmann Building Products Inc.
 - d. Metal-Era, Inc.
 - e. MM Systems Corporation.
 2. Manufacture from the following exposed metal in thickness as required to comply with performance requirements but not less than the following:
 - a. Stainless Steel: 0.0187 inch thick.
 - b. Prepainted, Zinc-Coated Steel: 0.028 inch thick.
 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
 5. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.

1. INSTALLATION, GENERAL

- A. General: Install according to manufacturer's written instructions. Anchor securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
1. Install with provisions for thermal and structural movement.
 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 4. Torch cutting is not permitted.
 5. Install underlayment with adhesive for temporary anchorage. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches. Roll laps of self-adhering sheet underlayment with roller; cover within 14 days.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.
- C. Expansion Provisions: Provide for thermal expansion
1. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections unless otherwise shown on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints with sealant as required by manufacturer
- F. Seal joints as required for watertight construction. Place sealant to be

completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except reduce pre-tinning where pre-tinned surface would show in completed Work.. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

2. FASCIA INSTALLATION

- A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor gravel stops and fascias to resist uplift and outward forces according to performance requirements.

3. FLASHING AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of counterflashings with installation of base flashings.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies."
- C. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counterflashings tightly to base flashings.

4. REGLET INSTALLATION

- A. General: Coordinate installation of reglets with installation of base flashings.
- B. Embedded Reglets: Installation of reglets is specified in Division 4 Section "Unit Masonry."
- C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

5. CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION 07 70 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data and product certificates signed by manufacturer certifying that products furnished comply with requirements.
- B. Provide firestopping systems with fire-resistance ratings indicated by reference to UL designations as listed in its "Fire Resistance Directory," or to designations of another testing agency acceptable to authorities having jurisdiction.
- C. Provide through-penetration firestopping systems with F-ratings indicated, as determined according to ASTM E 814, but not less than fire-resistance rating of construction penetrated.
 - 1. Provide through-penetration firestopping systems with T-ratings as well as F-ratings, as determined according to ASTM E 814, where indicated.
- D. For exposed firestopping, provide products with flame-spread indexes of less than 25 and smoke-developed indexes of less than 450, as determined according to ASTM E 84. PART

2 - PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1. 3M Fire Protection Products.
 - 2. A/D Fire Protection Systems Inc.
 - 3. Grace Construction Products.
 - 4. Hilti, Inc.
 - 5. Johns Manville.
 - 6. Nelson Firestop Products.
 - 7. NUCO Inc.
 - 8. Passive Fire Protection Partners.
 - 9. RectorSeal Corporation.
 - 10. Specified Technologies Inc.
 - 11. Tremco, Inc.; Tremco Fire Protection Systems Group.
 - 12. USG Corporation.

2. FIRESTOP SYSTEMS Any through-penetration firestop system that is classified by UL for the application and with F-rating and T-rating indicated may be used.
 - A. Penetrations in Fire-Resistance-Rated Walls: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg
 - B. Penetrations in Horizontal Assemblies: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - C. Penetrations in Smoke Barriers: Ratings determined per UL 1479.
 - D. Joints in or between Fire-Resistance-Rated Construction: Ratings determined per ASTM E 1966 or UL 2079:
 - E. Joints in Smoke Barriers: Ratings determined per UL 2079.

PART 3 - EXECUTION

1. INSTALLATION
 - A. Install firestopping systems to comply with requirements listed in testing agency's directory for indicated fire-resistance rating.
 - B. Identification: Identify through-penetration firestop systems with permanent labels attached to surfaces adjacent to firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb."
 2. Classification/listing designation of applicable testing and inspecting agency.
 3. Through-penetration firestop system manufacturer's name and product name.

END OF SECTION 07 84 13

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

1. JOINT SEALANTS

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- B. Sealant for Use in Building Expansion Joints:
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, M, and O, with the additional capability to withstand 50 percent movement in both extension and compression for a total of 100 percent movement.
- C. Sealant for General Exterior Use Where Another Type Is Not Specified, One of the Following:
 - 1. Single-component, nonsag polysulfide sealant, ASTM C 920, Type S; Grade NS; Class 12-1/2; Uses NT, M, G, A, and O.
 - 2. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
 - 3. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; and Uses NT, M, A, and O.
- D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:
 - 1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
- E. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable

Sealant:

1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; Uses T, M, G, A, and O.
 - F. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:
 1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses NT, G, A, and O; formulated with fungicide.
 - G. Sealant for Interior Use at Perimeters of Door and Window Frames:
 1. Latex sealant, single-component, nonsag, mildew-resistant, paintable, acrylic-emulsion sealant complying with ASTM C 834.
 - H. Acoustical Sealant for Exposed Interior Joints:
 1. Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834.
 - I. Acoustical Sealant for Concealed Joints:
 1. Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
2. JOINT-SEALANT BACKING
- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer.
 - B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint- filler materials or joint surfaces at back of joint.

PART 3 - EXECUTION

1. INSTALLATION
 - A. Comply with ASTM C 1193.

B. Comply with ASTM C 919 for use of joint sealants in acoustical applications.

END OF SECTION 07 92 00

JOINT SEALANT USAGE SCHEDULE

Joint Location	Sealant Chemistry	Class	Color
Exterior Horizontal Traffic Joints			
Isolation & contraction joints in concrete, cast-in-place	Silicone	50	Standard
Joints between asphalt paving & walls & other vertical surfaces	Silicone	50	Standard
Joints between concrete paving & walls & other vertical surfaces	Silicone	50	Standard
Joints in pedestrian plazas subject to water immersion	Urethane or Polysulfide	25	Custom
Exterior Vertical & Horizontal Non-Traffic Joints			
Construction joints in concrete, cast-in-place	Silicone	50	Standard
Control & expansion joints in unit masonry, clay	Silicone	50	Custom
Control & expansion joints in unit masonry, concrete, painted	Urethane	25	Standard
Control & expansion joints in unit masonry, concrete, unfinished	Silicone	50	Standard
Joints in dimension stone cladding; (natural & cast)	Silicone	50	Custom
Control & expansion joints in direct-applied finish systems	Silicone	50	Custom
Joints between metal flashings, concealed lapped joints	Butyl	7½	Standard
Joints between metal flashings, exposed, prefinished	Silicone	50	Custom
Joints between metal flashings, exposed, unfinished	Silicone	50	Standard
Joints between metal panels, prefinished	Silicone	50	Custom
Joints between metal panels, natural finish	Silicone	50	Custom
Perimeter joints around frames, metal, field painted	Urethane	25	Standard
Perimeter joints around frames, metal, prefinished	Silicone	50	Custom
Setting bed for flashing receivers	Butyl	7½	Standard
Setting bed for thresholds & sills	Butyl	7½	Standard
Setting bed for metal flashing, metal frames, & wood frames	Butyl	7½	Standard
Interior Horizontal Traffic Joints			
Isolation & contraction joints in concrete slabs, concealed	None required	N/A	N/A
Isolation & contraction joints in concrete slabs, exposed	Urethane	25	Standard
Isolation & contraction joints in concrete slabs, decorative, exposed	Urethane	25	Custom
Control & expansion joints in tile flooring in toilet rooms & kitchens	MR silicone	25	Custom

Control & expansion joints in tile flooring not in toilet rooms & kitchens	Urethane	25	Custom
Interior Vertical & Horizontal Non-Traffic Joints			
Control & expansion joints in cast-in-place concrete	Urethane	25	Standard
Control & expansion joints in unit masonry, clay	Urethane	25	Custom
Control & expansion joints in unit masonry, concrete, painted	Urethane	25	Standard
Control & expansion joints in unit masonry, concrete, unfinished	Urethane	25	Standard
Joints in dimension stone panels (natural & cast)	Urethane	25	Custom
Joints between woodwork, painted & adjacent surfaces	Latex	0	Standard
Joints in & between plastic laminate & adjacent surfaces	Silicone	50	Custom
Joints in & between FRP panels & adjacent surfaces	Silicone	50	Custom
Perimeter joints around frames, metal, field painted	Latex	0	Standard
Perimeter joints around frames, metal, prefinished	Silicone	50	Custom
Control joints in gypsum board ceilings & partitions	Latex	7½	Standard
Joints between gypsum shaftwall panels & penetrations & adjacent surfaces	Acoustic latex or rubber	Min	Standard
Control joints in acoustic gypsum board walls & partitions including gaps	Acoustic latex or rubber	Min	Standard
Joints between tile backing panels & penetrations	MR silicone	25	White
Control & expansion joints in tile in toilet rooms & kitchens	MR silicone	25	Custom
Control & expansion joints in tile not in toilet rooms & kitchens	Urethane	25	Custom
Joints in & between countertops & adjacent surfaces	Silicone	50	Custom
Joints between plumbing fixtures & adjacent walls, floors, & counters	MR silicone	25	White
Setting bed for thresholds & sills	Butyl	7½	Standard
Setting bed for metal & wood frames	Butyl	7½	Standard

Joint Location	Sealant Chemistry	Classes	Color
Glazing Joints			
Structural sealant securing glass to framing	Silicone	50	Black
Weatherseal joints between panes of structural-sealant-glazed glass	Silicone	50	Black
Hollow metal frames to glass, cap bead	Silicone	50	Custom

Colors of Exposed Joint Sealants:
Standard Color: As selected by Architect from manufacturer's full range for this characteristic.
Custom Color: Provide a custom color matching Architect's sample that complies with requirements.

END OF SCHEDULE 07 92 00.14

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Flush Wood Doors".
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of anchorages, joints, field splices, and connections.
 6. Details of accessories.
 7. Details of moldings, removable stops, and glazing.
 8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. CECO Door Products (C).
 - 2. Curries Company (CU).
 - 3. Steelcraft (S).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Design: Flush panel.
 - 2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
 - 3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
 - 4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw

attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products (C) Polystyrene Core - Legion Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Manufacturers Basis of Design:
 - a. CECO Door Products (C) – SU Series.
 - b. Curries Company (CU) – M Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.

2. Manufacturers Basis of Design:

- a. CECO Door Products (C) - SU Series.
- b. Curries Company (CU) - M Series.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently.

Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
 - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
 - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 9. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

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1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section “Hollow Metal Doors and Frames”.
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Five years for standard duty cylindrical (bored) locks and latches.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Hager Companies (HA).
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - c. Stanley Hardware (ST).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - b. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

- C. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should comply with ANSI/BHMA A156.14.
1. Sliding Bi-Passing Pocket Door Hardware: Provide complete sets consisting of track, hangers, stops, bumpers, floor channel, guides, and accessories indicated.
 2. Bi-folding Door Hardware: Rated for door panels weighing up to 125 lb.
 3. Pocket Sliding Door Hardware: Rated for doors weighing up to 200 lb.
 4. Manufacturers:
 - a. Hager Companies (HA).
 - b. Johnson Hardware (JO).
 - c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 5. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Manufacturer's Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

- a. Lund Equipment (LU).
- b. MMF Industries (MM).
- c. Telkee (TK).

I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 2 (Standard Duty): ANSI/BHMA A156.2, Series 4000, Grade 2 certified.

1. Locks are to be non-handed and fully field reversible.
2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - CL3800 Series.
 - b. Sargent Manufacturing (SA) - 7-Line.
 - c. Yale Locks and Hardware (YA) - 4600LN Series.

B. Interconnected Locksets: ANSI/BHMA A156.12, Series 5000. Grade 2.

1. Interconnected locksets designed with an interlocking tubular chassis and latchbolt and allow simultaneous retraction of latchbolt and deadbolt with a single motion turning of the lever/knob.
2. Locksets to be UL listed for use on a fire door.
3. Locksets to be field adjustable for center to center dimension.
4. Locksets to be non-handed, and have a 2 3/8" standard backset.
5. Manufacturers:
 - a. Schlage (SC) – H Series.
 - b. Yale Residential (YR) - YH Series.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Fabricate latchbolts from cast stainless steel, Pullman type, incorporating a deadlocking feature.

1. Manufacturers:

- a. Adams Rite (AD) - EX Series.
- b. Yale Locks and Hardware (YA) - 6000 Series.

2.8 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Unitrol): Unitrol arms to have door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - Unitrol Series.
 - b. Norton Door Controls (NO) - Unitrol Series.
 - c. Yale Locks and Hardware (YA) - Unitrol Series.

C. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 certified surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body

construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC6000 Series.
 - b. Norton Door Controls (NO) - 8500 Series.
 - c. Sargent Manufacturing (SA) - 1431 Series.
 - d. Yale Locks and Hardware (YA) - 3500 Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated,

unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- c. Trimco (TC).

2.11 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Refer to Section 080671, Door Hardware Sets, for hardware sets.

Hardware Sets

Set: 1.0

Doors: 01

1 Continuous Hinge	CFM-HD1		PE
1 Rim Exit Device	6100 121NL	630	YA
1 Cylinder	1109	626	YA
1 Pull	RM201	US32D	RO
1 Surface Closer	UNI4400	689	YA
1 Threshold	252x3AFG		PE
1 Gasketing	2891APK TKSP8		PE
1 Sweep	345CV		PE
1 Door Contact	BY SECURITY CONTRATOR		

Notes:

Set: 2.0

Doors: 04

910 MARLBOROUGH
DETROIT, MI

3 Hinge	MPB79 4-1/2" x 4-1/2"	US26D	MK
1 Fire Rated Rim Exit	6100F TM628F	630	YA
1 Surface Closer	5801	689	YA
1 Kick Plate	K1050 - 10" x 2" LDW x 4BE x CSK	US32D	RO
1 Wall Stop	409	US32D	RO
1 Gasketing	S88D		PE

Set: 3.0

Doors: 05, 06

3 Hinge	MPB79 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom Lock	MO 4605LN	626	YA
1 Surface Closer	5801	689	YA
1 Kick Plate	K1050 - 10" x 2" LDW x 4BE x CSK	US32D	RO
1 Wall Stop	409	US32D	RO

Set: 4.0

Doors: 10

3 Hinge	BY PRE-HUNG DOOR SUPPLIER	619	
1 Passage Latch	11 MO	619	YR
1 Door Stop	505/528	US15	RO

Notes: PROVIDE HINGE PIN OR BASE STOP PER OPENING CONDITIONS.

Set: 5.0

Doors: 08, 09, 13, 14

3 Hinge	BY PRE-HUNG DOOR SUPPLIER	619	
1 Privacy Lock	21 MO	619	YR
1 Door Stop	505/528	US15	RO

Notes: PROVIDE HINGE PIN OR BASE STOP PER OPENING CONDITIONS.

Set: 6.0

Doors: 07

910 MARLBOROUGH
DETROIT, MI

3 Hinge (spring)	1502 4-1/2" x 4-1/2"	US15	MK
1 Interconnected Lock	YR872 MO	626	YR
1 Door Stop	519	US15	RO
1 Threshold	EV232BL		PE
1 Gasketing	S88D		PE
1 Door Bottom	2343AV		PE
1 Viewer	622	STNN	RO

Notes:

Set: 7.0

Doors: 02

3 Hinge (spring)	1502 4-1/2" x 4-1/2"	US15	MK
1 Interconnected Lock	YR872 MO	626	YR
1 Door Stop	519	US15	RO
1 Threshold	252x3AFG		PE
1 Gasketing	S88D		PE
1 Door Bottom	2343AV		PE
1 Viewer	622	STNN	RO

Notes:

Set: 8.0

Doors: 12, 15

1 Sliding Door Hdwe	HF2/100A		PE
1 Pull	853	US26D	RO

Set: 9.0

Doors: 03, 11

1 Bi-Fold Hardware Set	HF4/100A		PE
2 Pull	853	US26D	RO

Hardware Sets

Set: 3.1

Doors: 05

3 Hinge	MPB79 4-1/2" x 4-1/2"	US26D	MK 087100
1 Storeroom Lock	MO 4605LN	626	YA 087100
1 Surface Closer	5801	689	YA 087100
1 Kick Plate	K1050 - 10" x 2" LDW x 4BE x CSK	US32D	RO 087100
1 Wall Stop	409	US32D	RO 087100
1 Gasketing	S88D		PE 087100

Opening List

<u>Opening</u>	<u>Hdw Set</u>	<u>Fire Rating</u>	<u>Door Material</u>	<u>Frame Material</u>
01	1.0	None	Wood	Existing
02	7.0	None	Wood	Wood
03	9.0	None	Wood	Wood
04	2.0	90	Hollow Metal	Hollow Metal
05	3.1	45	Hollow Metal	Hollow Metal
06	3.0	None	Hollow Metal	Hollow Metal
07	6.0	20	Wood	Wood
08	5.0	None	Wood	Wood
09	5.0	None	Wood	Wood
10	4.0	None	Wood	Wood
11	9.0	None	Wood	Wood
12	8.0	None	Wood	Wood
13	5.0	None	Wood	Wood
14	5.0	None	Wood	Wood
15	8.0	None	Wood	Wood

910 MARLBOROUGH
DETROIT, MI

END OF SECTION 087100

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Samples for factory-finished doors.
- B. Quality Standard: WDMA I.S.1-A.
- C. Fire-Rated Wood Doors: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per NFPA 252 at neutral pressure .
 - 1. At stairs and exit passageways, provide doors that have a temperature rise rating of 450 deg F.
- D. Forest Certification: Provide doors produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

PART 2 - PRODUCTS

1. DOOR CONSTRUCTION, GENERAL

- A. WDMA I.S.1-A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
 - 2. Standard Duty: Closets (not including janitor's closets) Private toilets and where indicated.
- B. Particleboard-Core Doors: Provide structural composite lumber cores instead of particleboard cores for doors with exit devices or protection plates.
- C. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated. Provide the following for mineral-core doors:
 - 1. Composite blocking where required to eliminate through-bolting hardware.
 - 2. Laminated-edge construction.
 - 3. Formed-steel edges and astragals for pairs of doors.

2. FLUSH WOOD DOORS

- A. Doors for Transparent Finish:
 - 1. Interior Solid-Core Doors: Custom grade, seven-ply, structural composite lumber cores.
 - a. Faces: Grade A plain-sliced red oak .
 - b. Veneer Matching: Slip and running match.
 - c. Pair matching.
 - 2. Interior Hollow-Core Doors: Custom grade, seven-ply, Standard hollow cores with lock blocks both sides.
 - a. Faces: Grde A plain-sliced red oak .
 - b. Veneer Matching: Slip and running match.
 - c. Pair matching.

3. FABRICATION AND FINISHING

- A. Factory fit doors to suit frame-opening sizes indicated and to comply with clearances specified.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3.
- C. Cut and trim openings to comply with referenced standards.
 - 1. Trim light openings with moldings indicated.
 - 2. Factory install glazing in doors indicated to be factory finished.
 - 3. Factory install louvers in prepared openings.
- D. Factory finish doors indicated for transparent finish with stain and manufacturer's standard finish complying with WDMA System TR-6, catalyzed polyurethane for grade specified for doors.

PART 3 - EXECUTION

1. INSTALLATION

- A. Install doors to comply with manufacturer's written instructions, WDMA I.S.1-A and as indicated.
 - 1. Install fire-rated doors to comply with NFPA 80.
- B. Align and fit doors in frames with uniform clearances and bevels. Machine doors for hardware. Seal cut surfaces after fitting and machining.

- C. Clearances: As follows, unless otherwise indicated:
1. 1/8 inch at heads, jambs, and between pairs of doors.
 2. 1/8 inch from bottom of door to top of decorative floor finish or covering.
 3. 1/4 inch from bottom of door to top of threshold.
 4. Comply with NFPA 80 for fire-rated doors.
- D. Repair, refinish, or replace factory-finished doors damaged during installation, as directed by Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - WOOD WINDOWS

PART

1.- GENERAL

1.1. SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and color Samples.
- B. Quality Standard: Comply with Wood Standards for c certified wood products
 - 1. Provide AAMA- or WDMA-certified aluminum windows with an attached label.

PART 2 - PRODUCTS

1. WOOD CLAD WINDOWS

- A. Available Products:
 - 1. Anderson Windows.
 - 2. Marvin Windows.
 - 3. Quaker Window Products Co.
- B. Window Types: The following types, as indicated on Drawings:
 - 1. Double Hung.
 - 2. Fixed.
- C. Performance Class: LC.
- D. Performance Grade: 30 .
- E. Condensation-Resistance Factor: 45 per AAMA 1503.
- F. Thermal Transmittance: Whole-window U-factor not more than 0.40 Btu/sq. ft. x h x deg F at 15-mph wind velocity and winter temperatures per AAMA 1503 .
- G. Solar Heat-Gain Coefficient: Whole-window SHGC not more than 0.40 , per NFRC 200.
- H. Construction: Provide units with a concealed, thermal break.
- I. Glaze units with clear, low-e coated, sealed insulating glass, complying with Division 08 Section "Glazing."
- J. Finish: As selected by Architect from mfr's full range.

PART 3 - EXECUTION

1. INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.
- B. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- C. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- D. Clean aluminum surfaces and glass immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 08 31 13

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Submittals: Product Data and 12-inch- square Samples.
- B. Fire-Resistance-Rated Assemblies: Provide products that comply with NFPA 80 and are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for applications indicated.
- C. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. GANA Publications: GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- E. Insulating-Glass Certification Program: Permanently marked with certification label of Insulating Glass Certification Council.

PART 2 - PRODUCTS

1. GLASS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AGC Industries, Inc.
 - 2. Guardian Industries Corp.
 - 3. Pilkington Building Products North America.
 - 4. PPG Industries, Inc.
- B. Float Glass: ASTM C 1036, Type I, Class 1 (clear), and Quality Q3.
- C. Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated), Type I, Class 1 (clear) , Quality Q3, Kind FT (fully tempered).

- D. Coated Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear), Quality Q3, Kind FT (fully tempered), Kind CV (coated vision). Use sputter-coat process to coat glass with low-e coating.
- E. Mirror Glass: ASTM C 1503, Mirror Select Quality, 3.0 mm thick, with edges beveled polished.
 - 1. Safety Glass for Mirrors: Fully tempered .

2. FABRICATED GLASS PRODUCTS

- A. Sealed Insulating-Glass Units: Factory-assembled units complying with ASTM E 774 for Class CBA units, with two 6.0-mm- thick sheets of glass separated by a 1/4-inch dehydrated space filled with air.
 - 1. Inboard Lite: 6 mm (1/4") Clear
 - 2. Outboard Lite: 6 mm (1/4") Clear
 - 3. Low-Emissivity Coating: Second surface.

PART 3 - EXECUTION

1. INSTALLATION

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."
- B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 08 80 00

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Summary: Paint exposed surfaces unless otherwise indicated.
 - 1. Paint the back side of access panels.
 - 2. Color-code mechanical piping in accessible ceiling spaces.
 - 3. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

- B. Submittals:
 - 1. Product Data. Include printout of "MPI Approved Products List" with product highlighted.
 - 2. Samples.

- C. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

- D. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.

- E. Extra Materials: Deliver to Owner 1 gal. of each color and type of finish coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

1. PAINT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Finishes, Inc.
 - 3. Sherwin-Williams Company (The).

- B. Material Compatibility: Provide materials that are compatible with one another and with substrates.
 - 1. For each coat in a paint system, provide products recommended in writing by

manufacturers of topcoat for use in paint system and on substrate indicated.

- C. Colors: As indicated by manufacturer's designations in the Finish Material Schedule.

PART 3 - EXECUTION

1. PREPARATION

- A. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.
- B. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

2. APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use brushes only for exterior painting and where the use of other applicators is not practical.
 - 2. Use rollers for finish coat on interior walls and ceilings.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

3. PAINTING SCHEDULE

- A. Refer to separate Paint Systems Schedule for areas of application and color selection.

END OF SECTION 09 91 00

SECTION 10 13 00 - DIRECTORIES

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. Section Includes:
 - 1. Changeable-letter directories.
- B. Product Data: For each type of product.
- C. Shop Drawings: For directories.
- D. Samples: For each exposed product and for each color and texture specified.
- E. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paper Message-Strip Stock: Colored, perforated paper stock for printing paper message-strip inserts using manufacturer-supplied software, equal to 2 times message-strip capacity of directory.

PART 2 - PRODUCTS

1. PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

2. NONILLUMINATED MESSAGE-STRIP DIRECTORIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. APCO Graphics, Inc.
 - 2. ASI Sign Systems, Inc.
 - 3. Clarke Systems.
 - 4. Desk & Door Nameplate Co.
 - 5. InPro Corporation.

6. Nelson-Harkins Industries.Poblocki Sign Company.
 7. Sign International, Inc.
 8. Signature, Inc.
 9. Tablet & Ticket Co. (The). 11.
- Visiontron Corp.
12. Vomar Products, Inc.

B. Metal Frame: Directory with full perimeter metal frame and sheet metal rear cover, housing changeable message strips in configuration indicated.

1. Perimeter Frame:
 - a. Material: Extruded aluminum.
 - b. Profile: Square.
 - c. Corners: Square.
 - d. Depth: Manufacturer's standard 1-3/4- to 2-3/4-inch frame depth.
2. Cover: Non-sectional single-piece cover with full-length concealed hinge, full width of directory. Equip with cylinder lock(s).
 - a. Frame: Same material and finish as perimeter frame.
 - b. Hinge Location: Side.
 - c. Glazing: Clear tempered glass .
3. Number of Columns: Three columns of message strips.
4. Mounting: Surface.
5. Header Panel: Full width of directory, by 4 inches high.
6. Divider Strips: Provide divider strips between columns of message strips, and between header and message strips.
 - a. Color: As selected by Architect from full range of industry colors.
7. Aluminum Finish: Manufacturer's standard baked enamel or powder coat.
 - a. Color: As selected by Architect from full range of industry colors.

C. Message Strips: Provide message strips compatible with directory system selected, with message copy indicated in message-strip schedule.

1. Type:
 - a. Channel-shaped aluminum strips, which snap into receiver frame or rails, with slot for inserting paper strips with computer-printed copy; with clear acrylic cover to cover paper.
2. Width: 7 inches long.
3. Height: 1/2 inch .
4. Color:
 - a. Message-Strip Background: As selected by Architect from manufacturer's full range.
 - b. Lettering: As selected by Architect from manufacturer's full range.
5. Lettering: As selected by Architect from manufacturer's full range.
6. Width: As indicated or, if not indicated, as selected from manufacturer's full

range.Height: As indicated or, if not indicated, as selected from manufacturer's full range..

3. MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
 - 1. Sheet: ASTM B 209.
 - 2. Extruded Shapes: ASTM B 221, Alloy 6063.
- B. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality q3, with exposed edges seamed before tempering.

4. FABRICATION

- A. Fabricate directories to requirements indicated for dimensions, design, and thickness and finish of materials. Use metals and shapes of thickness and reinforcement to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.
- B. Fabricate directory cabinets and door frames with reinforced corners, mitered and welded to a hairline fit, with no exposed fasteners. Provide structural reinforcement to prevent racking and misalignment.
- C. Message-Strip Directories: Provide blank message strips for each carrier in entire directory.
- D. Message-Strip Directories: Provide message strips with wording and other designations for the locations where wording is indicated. Include blank message strips as needed to fill out remainder of directory.

5. ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

1. INSTALLATION

- A. General: Install directories in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Surface-Mounted Directories: Attach directories to wall surfaces with concealed clips, hangers, or grounds fastened at not more than 16 inches o.c. Secure both top and bottom of directories to walls.
- C. Comply with requirements specified elsewhere for connecting illuminated directories.

2. ADJUSTING AND CLEANING

- A. Adjust directory doors to operate smoothly without warp or bind and so that contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 10 13 00

SECTION 10 55 00 - POSTAL SPECIALTIES

PART 1 - GENERAL

1. SUMMARY

- A. Section Includes:
 - 1. Vertical mail receptacles.

2. ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For postal specialties. Include plans, elevations, sections, details, identification sequence for compartments, and attachments to other work.
- C. Samples: For each exposed product and for each color and texture specified.

3. INFORMATIONAL SUBMITTALS

- A. Product certificates, including written approval by Postmaster General.
- B. Other Informational Submittals: Final USPS local postmaster approval for installed postal specialties to be served by USPS.

4. CLOSEOUT SUBMITTALS

- A. Maintenance data.

5. QUALITY ASSURANCE

- A. Source Limitations for Each Type of Postal Specialty: For USPS-approved products, use only those included on current lists of USPS manufacturers and models.
- B. Preinstallation Conference: Conduct conference at Project site.

6. DELIVERY, STORAGE, AND HANDLING

- A. Deliver lock keys to Owner by registered mail or overnight package service with

a record of each corresponding lock and key number.

B. WARRANTY

- C. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of postal specialties that fail in materials or workmanship within Fiveyears from date of Substantial Completion.

PART 2 - PRODUCTS

1. MATERIALS

- A. Aluminum: Manufacturer's standard alloy and temper for type of use and finish indicated.
- B. Steel Sheet: Cold rolled, ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, exposed matte finish where exposed.
- C. Metallic-Coated Steel Sheet: Galvanized-steel sheet, ASTM A 653/A 653M, G60 coating designation, extra smooth where exposed; or electrolytic zinc-coated steel sheet, ASTM A 879/A 879M, Coating Designation 08Z.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304.
- E. Brass Sheet: ASTM B 36/B 36M, manufacturer's standard copper alloy.
- F. Stainless-Steel Anchor Bolts, Nuts, and Washers: ASTM A 193/A 193M, Grade B8M, Type 316.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2. VERTICAL MAIL RECEPTACLES

- A. USPS-Approved Vertical Mail Receptacles: Three to seven compartments enclosed within wall box; with inside dimensions of each compartment not less than 15 inches high by 5 inches wide by 6 inches deep. Provide access to compartments for distributing incoming mail from front of unit by unlocking master lock and tilting inner compartments forward as a group. Provide access to each compartment for removing mail by swinging compartment door. Comply with USPS-STD-4B+.
1. Basis-of-Design Product: Subject to compliance with requirements,

provide 3500 Series by Salsbury Industries or comparable product by one of the following:

- a. American Eagle Mailboxes.
 - b. Auth-Florence Manufacturing; a Florence company.
 - c. Bommer Industries, Inc.
 - d. Security Manufacturing Corporation.
2. Mounting: As indicated on Drawings.
 3. Compartments: Provide number as indicated on Drawings.
 4. Compartment Doors and Frames: Fabricated from striated, extruded aluminum. Equip each compartment door with lock, slot in face of door to receive tenant identification, and concealed, full-length, flush hinge on one side. Provide one double-wide compartment with outgoing mail slot.
 - a. Tenant Identification: Cardboard name and number tab.
 - b. Compartment-Door Locks: Five-pin tumbler, cylinder cam locks capable of at least 1000 key changes; with three keys for each compartment door. Key each compartment differently.
 5. Frames: Fabricated from aluminum or cold-rolled steel sheet; ganged and nested units, with cardholder and blank cards for tenant's identification within each compartment.
 6. Concealed Components and Mounting Frames: Aluminum or steel sheet with manufacturer's standard finish.
 7. Exposed Aluminum Finish: Finish surfaces exposed to view as follows:
 - a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

3. ACCESSORIES

4. FABRICATION

- A. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid, and without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs and safe to touch.
- B. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly.
- C. Form joints exposed to weather to exclude water penetration.
- D. Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other

permanent separation.

E. PART 3 - EXECUTION

1. INSTALLATION

A. General:

1. Where dissimilar metals will be in permanent contact with each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation.
2. Where aluminum will contact grout, concrete, masonry, or wood, protect against corrosion by painting contact surfaces with bituminous coating.
3. Final acceptance of postal specialties depends on compliance with USPS requirements.

- #### B. Vertical Mail Receptacles:
- Install vertical mail receptacles with center of master lock cylinder not more than 48 inches and not less than 30 inches above finished floor.

2. FIELD QUALITY CONTROL

- #### A.
- Arrange for USPS personnel to examine and test postal specialties after they have been installed according to USPS regulations.
- #### B.
- Obtain written final approval from USPS postmaster that authorizes mail collection for the served installation.

END OF SECTION 10 55 00

SECTION 10801 - TOILET AND BATH ACCESSORIES PART 1

- GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.
 - 2. Warm-air dryers.
 - 3. Underlavatory guards.
- B. Related Sections include the following:
 - 1. Division 10 Section "Toilet Compartments" for compartments and screens.

3. SUBMITTALS

- A. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

4. QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
 - 1. Products of other manufacturers with equal characteristics, as judged solely by Architect, may be provided.

5. COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

6. WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing

to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

1. MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:

1. Toilet and Bath Accessories:

- a. A & J Washroom Accessories, Inc.
- b. American Specialties, Inc.
- c. Bobrick Washroom Equipment, Inc.
- d. Bradley Corporation.
- e. General Accessory Manufacturing Co. (GAMCO).
- f. McKinney/Parker Washroom Accessories Corp.

2. Warm-Air Dryers:

- a. A & J Washroom Accessories, Inc.
- b. American Dryer, Inc.
- c. American Specialties, Inc.
- d. Bobrick Washroom Equipment, Inc.
- e. Bradley Corporation.
- f. Excel Dryer Corporation.
- g. General Accessory Manufacturing Co. (GAMCO).
- h. McKinney/Parker Washroom Accessories Corp.
- i. World Dryer.

3. Underlavatory Guards:

- a. Brocar Products, Inc.
- b. Truebro, Inc.

- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2. MATERIALS

- A. Stainless Steel: ASTM A 666, AISI Type 302/304, with No. 4 finish (satin), in 0.034-inch

minimum nominal thickness, unless otherwise indicated.

- B. Brass: ASTM B 19, unleaded flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.
- C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.04-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.
- E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- F. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.
- G. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

SECTION 15010 – BASIC MECHANICAL REQUIREMENTS

The requirements of the "General Conditions", the "Supplementary Conditions", and "Division 1" sections of the Specifications, shall apply to this section of the Specifications.

PART I - GENERAL

1. Related Documents
 - A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
 - B. This Section includes general administrative and procedural requirements for mechanical installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 1:
 1. Submittals.
 2. Coordination drawings.
 3. Record documents.
 4. Maintenance manuals.
 5. Rough-ins.
 6. Mechanical installations.
 7. Cutting and patching.
2. Submittals
 - A. General: Follow the procedures specified in Division 1 Section "SUBMITTALS."
 - B. Increase, by the quantity listed below, the number of mechanical related shop drawings, product data, and samples submitted, to allow for required distribution plus two copies of each submittal required, which will be retained by the Mechanical Consulting Engineer.
 1. Shop Drawings - Initial Submittal: 1 additional blue- or black-line prints.
 2. Shop Drawings - Final Submittal: 1 additional blue- or black-line prints.
 3. Product Data: 1 additional copy of each item.
 - C. Additional copies may be required by individual sections of these Specifications.
3. Coordination
 - A. Prepare coordination drawings in accordance with Division 1 Section "PROJECT COORDINATION," to a scale of 1/8"=1'-0" or larger; detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 1. Indicate the proposed locations of piping, ductwork, equipment, and materials. Include the following:
 - a. Clearances for installing and maintaining insulation.
 - b. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - c. Equipment connections and support details.
 - d. Exterior wall and foundation penetrations.

- e. Fire-rated wall and floor penetrations.
- f. Sizes and location of required concrete pads and bases.
- g. Valve stem movement.

2. Indicate scheduling, sequencing, movement, and positioning of large equipment into building during construction.

3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, ceilings and their relationship to other penetrations and installations

4. Prepare reflected ceiling plans to coordinate and integrate installations outlets and inlets, light fixtures, communication systems, sprinklers, and other ceiling-mounted items.

4. Record Documents

A. Prepare record documents in accordance with the requirements in Division 1 Section "PROJECT CLOSEOUT." In addition to the requirements specified in Division 1, indicate the following installed conditions:

- 1. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
- 2. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Refer to Division 15 Section "Mechanical Identification."
- 3. Indicate actual inverts and horizontal locations of underground piping.
- 4. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
- 5. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
- 6. Contract Modifications, actual equipment and materials installed.

5. Maintenance Manual

A. Prepare maintenance manuals in accordance with Division 1 Section "PROJECT CLOSEOUT." In addition to the requirements specified in Division 1, include the following information for equipment items:

- 1. Description of function, normal operating characteristics and limitations, curves, engineering data and tests, and complete nomenclature and numbers of replacement parts.
- 2. Manufacturer's printed operating procedures to include start-up, break-in, and normal operating instructions; regulation, control, stopping, shutdown, emergency instructions; and summer and winter operating instructions.
- 3. Maintenance procedures for routine preventative maintenance and disassembly, repair, and reassembly; aligning and adjusting instructions.
- 4. Servicing instructions and lubrication charts and schedules.

6. Delivery, Storage and Handling

A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

PART II – PRODUCTS (NOT APPLICABLE)

PART III – EXECUTION

1. 3.1 Rough-in

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 2 through 16 for rough-in requirements.

2. Mechanical Installations

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
 - 9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
 - 11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "ACCESS DOORS" and Division 15 Section "BASIC MECHANICAL MATERIALS AND METHODS."
 - 12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3. Cutting and Patching

- Δ General: Perform cutting and patching in accordance with Division 1 Section "CUTTING PATCHING." In addition to the requirements specified in Division 1, the following requirements apply:
 - 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

- B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - 1. Uncover Work to provide for installation of ill-timed Work.
 - 2. Remove and replace defective Work.
 - 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 - 4. Install equipment and materials in existing structures.
 - 5. Upon written instructions from the Architect, uncover and restore Work to provide for Architect/Engineer observation of concealed Work.

- A. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

- B. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 - 1. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

 - 2. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

END OF SECTION 15010

SECTION 15055 - BASIC PIPING MATERIALS AND METHODS

The requirements of the "General Conditions", the "Supplementary Conditions", and "Division 1" sections of the Specifications, shall apply to this section of the Specifications.

PART 1 - GENERAL

1. Submittals
 - A. Submit product data on the following items:
 1. Escutcheons;
 2. Dielectric Unions and Fittings;
 3. Mechanical Sleeve Seals.
 - B. Submit welders' certificates specified on Quality Assurance below.
2. Quality Assurance
 - A. Welder's Qualifications: All welders shall be qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
 - B. Welding procedures and testing shall comply with ANSI Standard B31.1.0 - Standard Code for Pressure Piping, Power Piping, and The American Welding Society, Welding Handbook.
 - C. Soldering and Brazing procedures shall conform to ANSI B9.1 Standard Safety Code for Mechanical Refrigeration.
3. Pipe and Fittings
 - A. Refer to the individual piping system specification sections in Division 15 for specifications on piping and fittings relative to that particular system.
4. Joining Materials
 - A. Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
 - B. Brazing Materials: Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials appropriate for the materials being joined.
 - C. Soldering Materials: Refer to individual piping system specifications for solder appropriate for each respective system.
 - D. Gaskets for Flanged Joints: Gasket material shall be full-faced for cast-iron flanges and raised-face for steel flanges. Select materials to suit the service of the piping system in which installed and which conform to their respective ANSI Standard (A21.11, B16.20, or B16.21). Provide gasket materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

5. Piping Specialties
 - A. Escutcheons: Chrome-plated, stamped steel, hinged, split-ring escutcheon, with set screw. Inside diameter shall closely fit pipe outside diameter, or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings.
 - B. Unions: Malleable-iron, Class 150 for low pressure service and class 250 for high pressure service; hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends.
 - C. Dielectric Unions: Provide dielectric unions with appropriate end connections for the pipe materials in which installed (screwed, soldered, or flanged), which effectively isolate dissimilar metals, to prevent galvanic action, and stop corrosion.
 - D. Dielectric Waterway Fittings: Electroplated steel or brass nipple, with an inert and non-corrosive, thermoplastic lining.
6. Sleeves
 - A. Mechanical Sleeve Seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

1. Installations
 - A. Ream ends of pipes and tubes, and remove burrs. Bevel plain ends of steel pipe.
 - B. Remove scale, slag, and dirt for both inside and outside of piping and fittings before assembly.
 - C. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade of floors, unless indicated otherwise.
 - D. Install piping free of sags or bends and with ample space between piping to permit proper insulation applications.
 - E. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted, unless expressly indicated on the Drawings.
 - F. Install piping tight to slabs, beams, joists, columns, walls, and other permanent elements of the building. Provide space to permit insulation applications, with 1" clearance outside the insulation. Allow sufficient space above removable ceiling panels to allow for panel removal.
 - G. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.
 - H. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, and a short 3/4" threaded nipple and cap.

- I. Exterior Wall Penetrations: Seal pipe penetrations through exterior walls using sleeves and mechanical sleeve seals. Pipe sleeves smaller than 6" shall be steel; pipe sleeves 6" and larger shall be sheet metal.
 - J. Fire Barrier Penetrations: Where pipes pass through fire rated walls, partitions, ceilings, or floors, the fire rated integrity shall be maintained. Refer to Division 7 for special sealers and materials.
2. Fittings and Specialties
- A. Use fittings for all changes in direction and all branch connections.
 - B. Remake leaking joints using new materials.
 - C. Install unions adjacent to each valve, and at the final connection to each piece of equipment and plumbing fixture having 2" and smaller connections, and elsewhere as indicated.
 - D. Install dielectric unions to connect piping materials of dissimilar metals in dry piping systems (gas).
 - E. Install dielectric fittings to connect piping materials of dissimilar metals in wet piping systems (water).
3. Joints
- A. Steel Pipe Joints:
 - 1. Pipe 2" and Smaller: Thread pipe with tapered pipe threads in accordance with ANSI B2.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint lubricant or sealant suitable for the service for which the pipe is to be used on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
 - 2. Pipe Larger Than 2": Weld pipe joints for steel pipe (except for exterior water service pipe) in accordance with ASME Code for Pressure Piping, B31.
 - 3. Weld pipe joints of steel pipe for exterior water service pipe in accordance with AWWA C206.
 - 4. Install flanges on all valves, apparatus, and equipment. Weld pipe flanges to pipe ends in accordance with ASME B31.1.0 Code for Pressure Piping. Clean flange faces and install gaskets. Tighten bolts to torque specified by manufacturer of flange and flange nuts and bolts, to provide uniform compression of gaskets.
 - B. Non-ferrous Pipe Joints:
 - 1. Brazed And Soldered Joints: For copper tube and fitting, braze joints in accordance with ANSI B31.1.0 - Standard Code for Pressure Piping, Power Piping; ANSI B9.1 - Standard Safety Code for Mechanical Refrigeration.
 - 2. Mechanical Joints: Flared compression fittings may be used for refrigerant lines 3/4" and smaller.
 - C. Joints for other piping materials are specified within the respective piping system sections.
4. Field Quality Control
- A. Testing: Refer to individual piping system specification sections.

END OF SECTION

SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Bidding and Contract Requirements, and General Requirements of the Contract Documents, shall form part of this section of the specifications. Refer thereto for instructions.
- B. All applicable provisions of description of work and other sections of these specifications are to be adhered to.
- C. Provide all labor, materials, tools, equipment and supervision required for the furnishing and installing of all work herein described and/or shown on the Drawings.
- D. The work involved in the Electrical Trades is specified under the following Sections:

16010 Electrical General Provisions
Specifications provided on drawings

2. REGULATIONS

- A. All workmanship, materials and methods of installation shall be governed by the requirements of these specifications, the National Election Code, latest revision, local codes and OSHA.

3. STANDARDS OF MATERIALS AND WORKMANSHIP

- A. All materials shall be new. The electrical and physical properties of all materials, and the design, performance characteristics and methods of construction of all items of equipment, shall be in accordance with the latest issue of the various applicable Standard Specifications of the following recognized authorities:

N.E.C.	– National Electrical Code
A.N.S.I.	– American National Standards Institute
I.E.E.E.	– Institute of Electrical Electronics Engineers
A.S.T.M.	- American Society for Testing Materials
I.P.C.E.A.	- Insulated Power Cable Engineers Association
N.E.M.A.	- National Electrical Manufacturer's Association
U.L.	- Underwriters' Laboratories, Inc.

- B. All work shall be performed in first class and workmanlike manner, in accordance with the latest accepted standards and practices for the Trades involved. None but experienced persons in the work to be performed shall be allowed to do the work. This applies particularly to items such as cable splicing, control work, systems connection, etc.

4. BARRIER FREE AND AMERICAN DISABILITIES (ADA) DESIGN

- A. The Contractor shall review installation requirements for conforming to the Handicapped Barrier Free and ADA regulations. In particular, mounting heights of outlets and accessibility of controls shall be complied with.

5. INSPECTION OF SITE

- A. The Contractor shall visit the site, examine and verify the conditions under which his work must be conducted before submitting a proposal. The submitting of a proposal implies that the Contractor has visited the site and is conversant with all site conditions.

6. CODES, PERMITS AND FEES

- A. Obtain and pay for all permits, licenses, inspections, approvals and fees required, and insure that the entire electrical installation conforms to codes and regulations required by authority of agency having jurisdiction over the installation, alteration or construction of work included. All fees shall be included in the Base Proposal.

7. COORDINATION WITH OTHER TRADES

- A. Install work so as to avoid interferences with the work of other Trades, including Architectural and Mechanical Trades. The Electrical Trades shall be responsible for removing and relocating any work, which in the opinion of the Architect- Engineer, causes and interference with other Trades.

8. CHASES, RECESS AND SLEEVES

- A. Chases and recesses required shall be provided by the Architectural Trades, but this Trade shall be responsible for their accurate location.
- B. Provide conduit sleeves where conduits pass through poured-in-place concrete. Sleeves shall be rigid galvanized steel conduit. Aluminum conduit shall not be used. Where specific sizes are not indicated on the Drawings, sleeves shall be sized to provide one-half (1/2") inch clearance around the outside surface of the istem for which they are installed. They shall be cut flush with wall surfaces, and shall extend as directed, above finished floor levels. The space between conduit and sleeves shall be packed with fiberglass or other approved non-combustible packing material to prevent passage of air, liquid or fumes from one area to another. The filler material shall be rated at least equal in fire resistance to the construction being penetrated. Sealant shall have U.L. fire rating approval.

9. CUTTING, PATCHING AND DAMAGE TO OTHER WORK

- A. See General Conditions.
- B. Provide all cutting and patching necessary for the installation of electrical work. All cutting and patching shall be done in a neat and workmanlike manner, satisfactory to the Architect.
- C. Each Contractor will be held responsible for all damage to other work, caused by his work or through the neglect of his workmen.
- D. All patching and repairing of damaged work will be done by the Contractor who normally performs the work, as directed by the Architect, but shall be paid for by the Contractor for whom the work is done.

10. STRUCTURAL DIFFICULTIES

- A. Should any construction conditions prevent the installation of switches, conduit, outlet boxes, junction boxes, conductors, lighting fixtures and/or other related equipment at locations shown on drawings, minor deviations may be permitted and shall be made without any additional cost to the Owner.

11. CONDUIT INSTALLATION

- A. All work shall be concealed in walls or above ceiling in finished areas, unless otherwise noted. Exposed work shall be installed perpendicular or parallel to walls, ceiling and structural members and coordinated with mechanical ducts, pipes, lighting fixtures and equipment.
- B. All work in finished rooms without ceilings, the conduit shall be run exposed as noted above. Conduit drops for outlets, switches, etc., shall be run concealed in the wall construction and shall enter the wall high as possible.

12. EXPANSIONS

- A. Expansion fittings shall be provided in all conduit runs that cross building expansion joints, both in concrete slabs and where exposed.

13. ACCESS DOORS

- A. Access doors, where required, shall be furnished by the Electrical Trades and installed by the Architectural Trades. Access doors in the walls and ceiling shall be Milcor Type "L" or "M", as required to make all controls, electrical boxes and equipment accessible. Minimum size 12" X 12", others as required. Areas with lay-in or accessible ceilings will not require access doors.

14. EQUIPMENT FOUNDATIONS, SUPPORTS AND BASES

- A. Equipment foundations, supports and bases shall be as required.
- B. For equipment suspended from ceilings or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required.

15. EQUIPMENT CONNECTIONS AND LOCATIONS

- A. Connections to mechanical equipment, motors, lighting fixtures, etc., shall be made in accordance with shop drawings and rough-in measurements furnished by the manufacturers of the particular equipment furnished. Any and all additional connections not shown on the plans, but called for by the equipment manufacturer's shop drawings or required for the successful operation of the particular equipment furnished, shall be installed by the Contractor as part of his Contract with no additional charge.
- B. Refer to Mechanical Plans for exact location of motors, etc.

16. MATERIALS

- A. All materials and equipment shall be new and shall be U.L. listed and show their label, wherever standards have been established.
- B. Where a specific manufacturer or trade name is mentioned in the specifications, it is to establish a standard of quality. All equipment shall be specification grade or similar as approved.
- C. The Architect-Engineer reserves the right to require the Contractor to submit samples of any or all articles or materials to be used under these specifications.
- D. All equipment or the same or similar systems shall be of the same manufacturer.

17. SUBSTITUTIONS AND AVAILABILITY OF SPECIFIED ITEMS

- A. Substitution of Materials, Products, Equipment and Methods before execution of Contract:
 - 1. The Contract is based on the materials, products, equipment and methods described in the Contract Documents. Bidders shall include only specified materials, products, equipment and methods within their proposals, as described under "List of Materials and Equipment" and "Substitutions", in the General Requirements. Do not substitute materials, products, equipment and methods unless such substitution has been specifically approved by the Architect/Engineer for this work.
 - a. Waives all claim for additional costs under the "General Conditions" for costs not included in the request, which subsequently become apparent.
 - b. Will coordinate the installation of the accepted substitute into the work, making such changes in the work of the various Trades as may be required to provide a completed condition.

2. Requests for substitutions will not be considered if:
 - a. They are indicated or implied on shop drawings, product data and/or samples submitted without prior approval, as required above.
 - b. Implementation will require a major revision of the Contract Documents, in order that their use may be accommodated.
 - c. The submittal request is incomplete.
3. No materials, products, equipment or systems substituted by the Contractor without the written approval of the Architect/Engineer, will be accepted and may be required to be removed and replaced with approved materials, products, equipment or systems, at no additional cost to the Owner.
4. Full responsibility for the performance of a substituted item shall rest with the Contractor, regardless of any action taken by the Architect/Engineer, as a result of the Contractor's substitution request. If, during guarantee period, a substitute product fails, the Contractor shall replace it, and shall also replace any other related work damaged as a result of the failure and/or replacement of the subject product, at no additional cost to the Owner.
5. The Owner and the Architect/Engineer shall review all proper requests for substitutions, and their decisions will be final. The Contractor will be notified if the substitution is accepted or not accepted by the Architect/Engineer. If accepted, the substitution will be confirmed by a Bulletin or Change Order.
6. No work involving substitutions shall proceed until a final Change Order has been approved and signed by the Owner.
7. Requests for substitutions submitted after thirty (30) days from the Contract date, will be considered only on the basis of merit and benefit to the project, as determined by the Architect/Engineer. The decision by the Architect/Engineer, in such cases, shall be final.

B. Availability of Specified Items:

1. The Contractor shall verify, prior to bidding, that all specified items will be available in time for installation during orderly and timely progress of the work.
2. In the event specified items or items will not be so available, the Contractor shall so notify the Architect/Engineer prior to his submittal of a Proposal.
3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be backcharged to the Contractor as necessary and shall not be borne by the Owner.

18. PHASING

- A. Wire and cable for feeders and branch circuits for general power and lighting shall be identified with a visual color code as an integral part of the outer jacket or as a printed color coding the entire length of the insulation in accordance with the N.E.C. Submit color code schedule for approval.

19. ASSEMBLY OF EQUIPMENT

- A. The drawings and specifications make mention of numerous items to be purchased and installed and are noted by a manufacturer's name, catalog number and/or brief description. The catalog number as mentioned may not be complete to designate all the accessory parts and appurtenances required for the particular use or function. Arrange with the manufacturer for the purchase of all items required for the complete installation and efficient operation.

20. USE OF EQUIPMENT

- A. The use of equipment, or any part thereof, for purposes other than testing, even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor shall it be construed to obligate the Owner in any way to accept improper work or defective materials.

21. PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

- A. Be responsible for the care and protection of equipment until it has been fully tested and accepted.
- B. Protect equipment and materials against theft, injury or damage during construction.
- C. Protect materials with permanent factory finish from damage, by covering.
- D. Protect conduit openings with temporary plugs or caps.
- E. Provide adequate storage space for all electrical equipment, conduit and materials delivered to the job site under a weather-protected enclosure. Location of the space will be designated by the Architect-Engineer's Field Representative. Equipment set in place in unprotected areas must be provided with temporary protection.

22. DRAWINGS AND MEASUREMENTS

- A. The drawings show the location and general arrangement of all equipment and shall be followed as closely as actual building construction and work of other Trades will permit. Investigate the structural and finish conditions affecting work and arrange work accordingly.
- B. Field Measurements: Verify the dimensions governing work at the building site.
- C. The Architectural drawings take precedence in all matters pertaining to the building structure; Mechanical Trades; and Electrical drawings take precedence in all matters pertaining to Electrical Trades installation. Refer to Architectural Reflected Ceiling Plans for exact location of electrical equipment.
- D. Outlets connected by lines show switch control or circuiting only and are not actual runs of conductors. All light and receptacle outlets are lettered and numbered; the letter indicates the panel from which the circuit is to be controlled. All outlets bearing the same letter and number shall be connected to the same circuit.

23. MATERIAL LIST

- A. Submit a complete list of all materials and equipment, and their manufacturer's, for approval within two (2) weeks after award of contract, prior to submittal of shop drawings.

24. SHOP DRAWINGS

- A. Before any materials of this section are fabricated or delivered to the job site, submit complete shop drawings to the Architect/Engineer for approval.
- B. Submit manufacturer's shop drawings of all major electrical systems and/or equipment, including, but not limited to the following:
 - Disconnect Switches
 - Emergency Lighting Fixtures
 - Fire Alarm Devices
 - Motor Starters
- C. Furnish and deliver to the Owner a manual of all shop drawings pertaining to this contract when work is complete. The manual shall consist of a standard hard cardboard, cloth covered, 3-ring binder, letter size 8 1/2" x 11". Shop drawings shall be folded and punched. All items and/or pages shall be numbered and typewritten, with index inserted at front of manual for ready reference.

- D. Provide two (2) complete operating instructions, operating manuals, and repair parts lists for the Owner's personnel. Instruct Owner's personnel in the operation of all systems.

25. "AS-BUILT" DRAWINGS

- A. Keep an accurate record of set of all deviations from the approved design drawings and specifications, which may occur in the work as actually constructed. Maintain in the field office an accurate, current and progressive record of the actual work installed. Submit to the Architect at completion of the work, a complete set of drawings on reproducible media (sepias, transparencies, etc.) and complete information.
 - 1. Record all data on these drawings, particularly all concealed runs. All concealed work must be dimensioned. Concealed branch circuit runs above removable ceiling panels need not be shown.
 - 2. Indicate on each drawing (sheet) that it represents the "as-built" condition.
 - 3. The "as-built" drawings shall include the followings:
 - a. Location of all fixtures, junction boxes, etc., as installed.
 - b. Conduit runs shown in their relative locations, not merely lines connection outlets.
 - c. Conduit sizes, wire sizes and number of wires for each conduit run.
 - d. Complete detailed riser diagram for special systems.
 - e. Fixture schedule, including catalog number and manufacturer.
 - f. Indications distinguishing between conduits in floor , ceiling and exposed.
- B. Obtain sepias of original electrical drawings from the Architect. Neatly and accurately revise these sepias.

26. NAMPLATES

- A. Provide nameplates on each individual motor starter, panels, safety switches, etc., indicating device controlled. Nameplates shall be black laminate plastic with white scribed letters securely fastened to device. Submit schedule for approval. Example: L.P.-"G" – 120/208 volt, 3 phase, 4 wire.

27. TESTING AND ACCEPTANCES

- A. When the systems are completed, the Contractor shall operate equipment as directed by the Architect-Engineer, replace all faulty equipment and make necessary adjustments before final acceptance. Upon final acceptance of the work, the Contractor shall give the Owner a written guarantee that he will make good any defects in materials or workmanship which may develop within one (1) year from date of final acceptance, at no cost to the Owner. Tests shall include distribution equipment, branch circuits, lighting fixtures, fire alarm system, etc.
- B. Perform all tests required by State, City, County and/or other agencies having jurisdiction.
- C. Provide all materials, equipment, etc., and labor required for tests.

28. TESTING DUCTS AND CONDUITS FOR OBSTRUCTIONS

- A. Ducts and conduits which are installed underground or concealed in concrete floor slab, foundations, etc., shall be cleared of foreign material and obstructions after installation and before conductors or pull-wires are drawn-in, by wire brushing, swabbing and employing an iron or hardwood mandrel which is 1/4"

smaller in diameter than the internal diameter of the duct or conduit. Pull-in wires shall be left in all empty conduits.

29. MOUNTING HEIGHTS

- A. Unless otherwise indicated, mounting heights shall be based on measurement from finished floor to centerline of outlet device junction box or where applicable, to top/bottom of equipment. Refer to architectural elevations. Mounting heights shall be as follows, or as otherwise directed, or shown on Architectural elevations:

Emergency/Exit Lighting	High as possible (Field verify)
Motor starters, Safety	5'-6" to Top (Interior)

30. CLEAN UP

- A. The Electrical Trades shall be responsible for keeping the premises free from accumulation of his waste materials and rubbish. At completion of work, remove all rubbish from and about the building and site, and leave the electrical systems and equipment clean and ready for use.

30. PARTS RECEIPT

- A. Retain all portable and detachable portions of the installation, such as keys, tools, manual, etc., until the completion of the work and then turn them over to the Owner and obtain itemized receipt. This receipt shall be attached to the "Final Application" for payment.

31. PAINTING

- A. All factory finished equipment shall be cleaned at completion of job. Equipment showing rust or mars shall be given one coat of enamel paint. Color shall match original finish. "Touch-Up" painting of factory finished equipment shall be by this Contractor.

32. CERTIFICATE OF APPROVAL

- A. Upon completion of the building, provide Architect-Engineer with Certificate Of Approval from Local Electrical Inspection Authority.

33. TEMPORARY FACILITIES

- A. See Temporary Facilities section of General Requirements.

END OF SECTION

SECTION 31 00 00 - EARTHWORK

PART 1 - GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

2. SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for slabs-on-grade.
 - 4. Subbase course for concrete walks and pavements.
 - 5. Subsurface drainage backfill for walls and trenches.

3. DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.

- 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

- 2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations.

- 1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. (0.76 cu. m) for bulk excavation or 3/4 cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) wide, short-tip-radius rock bucket; rated at not less than 120-hp (89-kW) flywheel power with bucket-curling force of not less than 25,000 lbf (111 kN) and stick-crowd force of not less than 18,700 lbf (83 kN); measured according to SAE J-1179.2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp (157-kW) flywheel power and developing a minimum of 45,000-lbf (200-kN) breakout force; measured according to SAE J-732.
- I. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. (0.57 cu. m) or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches (97 blows/50 mm).J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.K. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.M. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

PART 2 - PRODUCTS

1. SOIL MATERIALS
 - A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
 - D. Backfill and Fill: Satisfactory soil materials.E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (38-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and

natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.I. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

PART 3 - EXECUTION

1. PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

2. DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3. EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Classified Excavation: Excavation to subgrade elevations classified as earth and rock. Rock excavation will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
2. Rock excavation includes removal and disposal of rock.
 - a. Do not excavate rock until it has been classified and cross-sectioned by Architect.

4. EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

5. EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.6 APPROVAL OF SUBGRADE

- A. Notify Architect when excavations have reached required If
 Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

7. UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

8. STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile

soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

9. BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

10. FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.

11. COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
- D. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 92 percent.
 3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 85 percent.

12. GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
 - 2. Walks: Plus or minus 1 inch (25 mm).
 - 3. Pavements: Plus or minus 1/2 inch (13 mm).
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

13. SUBSURFACE DRAINAGE

- A. Drainage Piping: Drainage pipe is specified in Division 2 Section "Foundation Drainage Systems."
 - B. Subsurface Drain: Place a layer of drainage fabric around perimeter of drainage trench as indicated. Place a 6-inch (150-mm) course of filter material on drainage fabric to support drainage pipe. Encase drainage pipe in a minimum of 12 inches (300 mm) of filter material and wrap in drainage fabric, overlapping sides and ends at least 6 inches (150 mm).
 - 1. Compact each course of filter material to 95 percent of maximum dry unit weight according to ASTM D 698.
- C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches (300 mm) of final subgrade. Overlay drainage backfill with one layer of drainage fabric, overlapping sides and ends at least 6 inches (150 mm).
 - 1. Compact each course of filter material to 95 percent of maximum dry density according to ASTM D 698.
 - 2. Place and compact impervious fill material over drainage backfill to final subgrade.

14. SUBBASE AND BASE COURSES

- A. Install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - B. Under pavements and walks, place subbase course on separation fabric according to fabric manufacturer's written instructions and as follows:
 - C. Under pavements and walks, place subbase course on prepared subgrade and as follows:
 - 1. Place base course material over subbase.
 - 2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
 - 3. Shape subbase and base to required crown elevations and cross-slope grades.
 - 4. When thickness of compacted subbase or base course is 6 inches (150 mm) or

less, place materials in a single layer.⁵ When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

- D. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

15. DRAINAGE COURSE

- A. Under slabs-on-grade, install drainage fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends. Place drainage course on drainage fabric and as follows:
 - B. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
 - 1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
 - 2. When compacted thickness of drainage course is 6 inches (150 mm) or less, place materials in a single layer.
 - 3. When compacted thickness of drainage course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

16. PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
 - B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

17. DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
 - B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
 - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1. SECTION INCLUDES
 - A. Removal of surface debris.
 - B. Removal of paving, curbs and sidewalks.
 - C. Clearing site of plant life and grass.
 - D. Removal of trees and shrubs.
 - E. Removal of root system of trees and shrubs.
 - F. Topsoil excavation.
2. REGULATORY REQUIREMENTS
 - A. Conform to applicable code for disposal of debris and use of herbicides.
 - B. Coordinate clearing Work with utility companies.

PART 2 - PRODUCTS

1. MATERIALS
 - A. Herbicide: Dalpon or approved equal (i.e. soil sterilization for pavement subsurfaces)

PART 3 EXECUTION

1. PREPARATION
 - A. Verify that existing plant life designated to remain is tagged or identified.
2. PROTECTION
 - A. Locate, identify, and protect utilities that remain from damage.
 - B. Protect trees, plant growth, and features designated to remain as final landscaping.
 - C. Protect bench marks and existing structures from damage or displacement.
3. CLEARING
 - A. Clear areas required for access to site and execution of Work.
 - B. Remove paving, curbs and sidewalks as required on drawings.

- C. Remove trees and shrubs indicated. Remove stumps, root system to a depth of 6 inches.
 - D. Clear undergrowth and deadwood without disturbing subsoil.
4. REMOVAL
- A. Remove debris, rock and extracted plant life from site unless otherwise noted.
5. TOPSOILEXCAVATION
- A. Excavate topsoil from areas to be further excavated, re-landscaped or re-graded.
 - B. Stockpile in area designated on site to depth not exceeding 8 feet. Protect from erosion.

END OF SECTION 31 10 00

SECTION 31 22 00 – GRADING

PART 1 - GENERAL

1. SUMMARY

- A. Provide all materials, labor, equipment, and services necessary to complete all site grading as indicated in this Construction Documents. The work consists of, but is not limited to:
- B. Stripping, stockpiling, and removal of Topsoil.
- C. Earth moving and land balance required to meet proposed subgrades.
- D. Subgrade preparation of building slabs, walks, and pavements.
- E. Compaction of all areas in native soil, cut or fill.
- F. Stockpiling and removal of suitable and unsuitable material other than Topsoil.

2. QUALITY ASSURANCE

- A. If required, the services of a Soils Engineer and Soils Laboratory will be retained by the Owner, to observe earthwork operations, analyze soil materials and perform applicable laboratory and field tests.
- B. The Contractor shall arrange and pay for any other test or required inspections needed to meet the requirements set forth in these Construction Documents.
- C. As a minimum the Soils Engineer shall perform the following tests:
 - 1. The soils laboratory shall analyze all native or imported fill and backfill material and topsoil proposed for use to determine the suitability for use and compliance with the Contract Documents.
 - a. Fill and backfill material shall be examined as to soil classification and tested to determine the plasticity index, optimum moisture content and dry density.
 - b. After rough grading and prior to spreading of topsoil, the topsoil in lawn areas and the topsoil to be placed in and subgrade in planting beds shall be examined for organic content, acidity and soil composition.
 - 2. All natural grades to be retained, all areas of cut, and all areas of controlled fill shall be field tested by the Soils Engineer for moisture content and percent of compaction for compliance with specified values.

a. The number of tests performed shall be at the discretion of the Soils Engineer. Except that the number of field tests performed shall not be less than the minimum described below.

1) Within the building area perform one (1) test for every 500 cubic yards of fill and backfill or in areas of natural grade or cut one (1) test for every 10,000 square feet, except that such tests must be located as to give equal coverage to all portions of the building subgrade.

2) Within the paved areas of the site, except trench excavations perform one (1) test for every 2000 cubic yards of fill or in areas of natural grade or cut one (1) test for every 40,000 square feet.

D. Emphasis should be given to the aesthetic appearance and functioning of berming and swales, as directed by the Landscape Architect or Owner's Representative. The Contractor shall employ skilled personnel and any necessary equipment to insure that finish grading is smooth, aesthetically pleasing, drains well and is ideal for receiving sod and plant materials.

3. SUBMITTALS

A. The Soils Engineer shall submit the following reports directly to the Owner or Owner's Representative, with a copy to Contractor:

1. Classification and suitability of borrow material.

2. Field reports; in-place soil density tests.

B. Compaction Results

1. The Soils Engineer shall advise the Contractor and Owner or Owner's Representative immediately of any compaction tests failing to meet specified minimum requirements. The contractor shall take appropriate steps to meet the compaction requirements. No additional lift is to be placed onto a soil with any portion failing to meet compaction requirements.

4. DEFINITIONS

A. EXCAVATION: Consists of removal of material encountered to subgrade elevations indicated on the Plans, Specifications, Addenda, Change Orders or other written direction by the Owner.

- B. **UNAUTHORIZED EXCAVATION:** Consists of removal of materials beyond indicated elevations or dimensions. Unauthorized excavation will be restored as indicated below at no expense to the Owner.
1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when approved by Soils Engineer.
 2. In locations other than those above, backfill and compact unauthorized excavations with material approved by the Soils Engineer.

5. **JOB CONDITIONS**

- A. The Contractor shall visit the site and acquaint himself with all existing conditions. The Contractor shall be responsible for his own subsurface investigations, as necessary, to satisfy requirements of this Section. All subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Owner's Representative.
- B. **SITE INFORMATION:** The data provided regarding subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions made by the Contractor. Subsurface data may be provided by the Owner.
- C. It will be the responsibility of the Contractor to coordinate and schedule the Site grading operations with the excavation and Site Utility Contractors so as to provide for a smooth and orderly progression of the Work.
- D. The Owner shall provide the services of a Registered Land Surveyor to establish all lines, levels, grades, bench marks and measurements required to lay out the Work.
- E. Construction stakes becoming misaligned are to be checked before proceeding with the Work. Any re-staking required will be performed by the owner's surveyor and backcharged to the contractor.
- F. **EXISTING UTILITIES:** Locate existing underground utilities in areas of Work. If utilities are to remain in place, provide means of support and protection during earthwork operations.
1. Before starting site operations verify that the earlier Contractors have disconnected all temporary utilities which might interfere with the fine grading work.
 2. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from

- damage, remove or relocate as indicated, specified or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of active utilities.
3. Should pipes, conduit, or other utilities be encountered during excavation, consult Utility Owner immediately for directions. Cooperation with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Utility Owner.
 4. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.
 - a. Provide minimum of 48-hours notice to the Owner and receive written notice to proceed before interrupting any utility.
 5. Demolish and completely remove from Site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- G. Protect bench marks, utilities, structures, fences, sidewalks, paving, curbs and other facilities from earthwork equipment. In the event of damage, immediately make all repairs, replacements and dressings to damaged plants necessary. Contractor shall incur all cost for the replacement of damaged objects and vegetation.
- H. Natural features which are not subject to changes by reason of the Drawings and Specifications shall not be defaced or injured in any manner.
- I. The Contractor shall guard against movement or settlement of adjacent buildings or structures, and provide bracing, as necessary. He shall be responsible for safety and support of such buildings or structures, and be liable for any movement or settlement. If at any time any adjacent buildings or structures appear to be endangered or unsafe, he should cease operations, and take precautions to support such buildings or structures. Once building or structures have been stabilized, the Contractor should notify the local Building Inspector and the Engineer. Operations shall be resumed only after permission has been granted. If the Engineer or Building Inspector considers additional bracing or shoring necessary to safeguard, or prevent movement or settlement, such bracing or shoring should be installed. If the Contractor fails to comply promptly with such order, such bracing and shoring may be placed by the Owner, at no expense to the Owner.
- J. Dust control: Use all means necessary to prevent dust from construction operations from being a nuisance to adjacent property owners and from damaging finish surfaces on adjacent building, paving, etc. Methods used for dust control are subject to approval by the Landscape Architect of Owner's Representative.

PART 2 - PRODUCTS

1. FILL MATERIAL

- A. Materials for fill required to achieve design grades shall be either on- or offsite soils which are free of organic matter and debris. Refer to plan details for appropriate fill materials.
- B. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

PART 3 - EXECUTION

1. TOPSOIL STRIPPING / REMOVAL

- A. Excavate or strip topsoil in all cut-and-fill areas and stockpile for later use in connection with finish grading / landscape restoration. Excavate topsoil to the depths required to remove all organic material from subgrade, but not less than 2-in. Transport and deposit topsoil in stockpiles at designated locations in a manner convenient for spreading and finish grading.
- B. Any excavated or stripped topsoil for later use in connection with finish grading shall be screened of all debris prior to reuse.
- C. It shall be the responsibility of the contractor to dispose of any unused topsoil offsite in a legal manner.

2. STOCKPILING

- A. Contractor may be allowed to stockpile excavated topsoil, separate from other excavated materials for later use. Stockpile area shall be cleared and grubbed prior to placing any topsoil. Keep stockpile free of all undesirable materials. Make stockpiles neatly shaped, and free to drain. Place stockpiles at locations shown on Drawings or as directed by Owner.

3. PROOF ROLLING

- A. Do all cutting or site grading work required to meet indicated subgrades. After completion of the earthwork operation, the subgrade area not receiving fill material shall be proof rolled in place and then compacted as specified under "Compaction Density" for a particular area classification. The subgrade area receiving fill material shall be proof rolled prior to placement of fill.
 - 1. During the performance of site grading operations, the subgrade shall be examined critically; and any areas discovered which, in the opinion of the Owner's Representative or Soils Engineer, are soft and unstable, shall be excavated to such depths as may be necessary to insure satisfactory supporting properties. These areas of excavation shall be backfilled

immediately and shall be brought back to the elevation of the surrounding areas with approved fill material and in accordance with the earth fill construction procedure.

2. If pockets of unstable ground are encountered, notify the Owner's Representative or Soils Engineer to determine course of action. Do not proceed in area until authorization is granted.

4. PLACEMENT

- A. Prior to grading operations, Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.\
- B. Fill all areas as required to meet indicated subgrades. Fill material shall conform to the requirements of these Specifications and shall be approved by the Soils Engineer prior to placement.
 1. The surface of all areas shall be scarified by means of a disc or harrow to a minimum depth of 4-6 inches. An initial three inch (3") layer of fill material shall then be spread over the scarified surface and the entire area compacted per the "Compaction Density" requirements.
- C. Fill shall be deposited in 9-in. loose layers for material compacted by heavy compaction equipment, and not more than 4" layer when compacted by hand-operated tampers.
 1. No frozen material should be used as fill nor shall any fill be placed on surfaces that are frozen, or contain frost or ice.
 2. When the fill meets the natural grade of a slope, a bench shall be cut in the existing slope. These cuts are to serve as keys to connect the existing grades with a newly-placed fill.
- D. The moisture content of fill material shall not deviate from the optimum by more than 2 percent. Moisture content shall not exceed the optimum of any material which displays pronounced deformation under construction equipment. Drying of wet soil shall be expedited by the use of plows, discs, harrows, or other approved methods. If additional water is required, it should be uniformly distributed through the use of approved water wagons and shall be thoroughly incorporated into the material by means of discs or other suitable mixing equipment. Care shall be taken to avoid trapping water within the fill.
 1. If soft, yielding material is encountered in cuts or in fills as a result of trapping water, and cannot be satisfactorily stabilized by moisture control and compaction, the unstable material shall be excavated to the depth required by the Soils Engineer. The excavation shall then be filled with suitable material and compacted.

- E. If sufficient approved native fill material is not available to achieve indicated subgrade elevations, the Contractor shall obtain additional material from off-site borrow pits.

5. FINISH GRADING

- A. Perform topsoil installation within contract limits, including adjacent transition areas, to new elevations, levels, profiles, and contours indicated. Provide uniform levels and slopes between new elevations and existing grades.
- B. Regardless of finish grading elevations indicated, it is intended that grading be such that proper drainage of surface water will be directed away from buildings and that no low areas are created to allow ponding. Contractor to consult with Owner or Landscape Architect regarding minor variations in grade elevations before rough grading is completed.
- C. Supply and spread topsoil to a uniform depth as noted on the plans, or indicated in the landscape restoration section of the contract documents.
- D. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture ready to accept seed or sod.
- E. Provide earth crowning where indicated on drawings.
- F. Crowning/mounding to be free flowing in shape and design, as indicated, and to blend into existing grades gradually so that toe of slope is not readily visible. Engineer to verify final contouring before planting.
- G. The surface will be graded smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of +1/10 of a foot when tested with a 10' straightedge.

6. LAND BALANCE

- A. A balanced grading plan is **NOT** provided for this project. All removal of material from the site or fill material necessary to bring the site to the indicated elevations shall be the Contractor's responsibility as part of the base bid. The Contractor is responsible to make his own determination of the quality of required fill or surplus material.

7. UNNECESSARY GRADING

- A. Unnecessary Grading: The expense of grading of materials outside of limits indicated or ordered in writing by the Engineer and the correction thereof to the satisfaction of the Engineer shall be borne by the Contractor.
- B. Unnecessary grading under footings: Either deepen footings to bear on actual subgrade elevation without changing top elevations or place concrete fill up to required elevation, as required by the Engineer.
- C. Unnecessary grading other than under footings: Either place compacted fill or otherwise correct conditions, as required by the Engineer.

- D. When required by the architect due to the unforeseen presence of unsatisfactory materials or other factors, perform additional grading and replace with approved compacted fill material in accordance with the Owner's instructions.
- E. Payment for unforeseen additional work will be made in accordance with established unit prices or, if none, in accordance with provisions for changes in the work. No payment will be made for correction of subgrades improperly protected against damage from freeze-thaw or accumulation of water, or for correction of otherwise defective subgrades.

8. COMPACTION / DENSITY

- A. Compact to at least the following percentage of maximum density, as determined by ASTM D-1557 (Modified Proctor). No deviation from these compaction densities will be allowed unless specifically approved by the Soils Engineer:

<u>Material</u>	<u>% of Maximum Density</u>
Fill under building (extending 5' beyond footings at a slope of 1 on 1)	98%
Fill under pavement or sidewalks, and within a 1:1 slope	95%
Fill placed under or behind retaining walls	95%
All other fill	90%

- B. No backfill shall be placed against any masonry or other exposed building surface until permission has been given by the Owner's Representative, and in no case until the masonry has been in place seven days.
- C. Compaction in limited areas shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than four inches thick. The hand tampers used shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent any wedging action against masonry or other exposed building surfaces.
- D. Place backfill and fill materials in layers not more than 9 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

9. MAINTENANCE

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

- D. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill

material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent Work, and eliminate evidence of restoration to greatest extent possible. No additional payment will be made.

10. FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM D1557.
- B. If tests show Work does not meet specified requirements, remove Work, replace and retest.
- C. Frequency of Tests: Every 50 feet apart or as specified by the Engineer.

11. CORRECTION OF GRADE

- A. Bring to required grade, areas where settlement, erosion, or other grade changes occur. Adjust grades as required to carry drainage away from buildings and to prevent ponding around the buildings and on pavements.
- B. Remove all rock or objectionable material larger than 1 inch prior to commencing landscaping.
- C. Contractor shall be responsible for stabilizing grades by approved methods prior to landscaping, and shall be responsible for correction of grades as mentioned above, and clean up of any wash outs or erosion.

12. DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Contractor is to completely remove from site all waste material, including unacceptable excavated material, trash and debris, in a legally established method.

END OF SECTION 31 22 00

SECTION 31 23 16 – EXCAVATION

PART 1 - GENERAL

1. SECTION INCLUDES

- A. Excavating for site element foundations.
- B. Excavating for slabs-on-grade, paving and landscaping.
- C. Excavating for site structures.

2. REFERENCED SECTIONS

- A. Section 01 40 00- Quality Requirements
- B. Section 31 23 23.13 - Backfill.

3. FIELD MEASUREMENTS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

4. UNIT PRICES

- A. For bid purposes, it was assumed that ten inches of material would be excavated throughout the project.
- B. For construction, the Engineer will provide a centerline profile. Excavation will be calculated based on the compacted in place excavation quantities.
- C. The final design may reflect significantly less excavation than that indicated on the proposal.
- D. The bid quantity is for bidding purposes only. Contractor should refer to soils report for information pertaining to excavation. It was assumed that any topsoil stripped from the construction area can be screened and reused in accordance with the landscaping specifications and details for this project. The Contractor should fully understand that the bid quantity is only an estimation and all additional excavating/embankment required to construct the project in accordance with the plans is the responsibility of the contractor and will not be paid for separately.

PART 2 PRODUCTS

2.01 MATERIALS

Not used

PART 3 EXECUTION

1. PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag location of known utilities. Notify Miss Dig and utility companies 72 hours before starting excavating operations.
- C. Notify utility company to remove and relocate utilities.
- D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- E. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

2. EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Excavate subsoil required to accommodate pump station foundations, slabs-on-grade paving and site structures, and construction operations.
- C. Machine slope banks to angle of repose or less, until shored.
- D. Do not excavate within 1 vertical to 1 horizontal slope of foundation.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. Hand trim excavation. Remove loose matter.
- G. Remove lumped subsoil, boulders and rock up to 1/3 cu y measured by volume.
- H. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- I. Correct areas over-excavated in accordance with Section 31 23 23.13.
- J. Stockpile excavated material in area designated on site and remove excess material not being reused from site.
- K. Over-excavate and place layer of stone fill in wet areas, as directed by Engineer, to maintain stable platform for equipment and to maintain stable excavation bottom.

3. FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 40 00.
- B. Provide for visual inspection of bearing surfaces.

4. PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect bottom of excavations, and soil adjacent to and beneath foundation, from freezing.
- C. Protect excavation from accumulating water. Provide and maintain dewatering system to remove water from excavated areas.

END OF SECTION 31 23 16

SECTION 31 23 23.13 – BACKFILL

PART 1 - GENERAL

1. SECTION INCLUDES

- A. Site filling and backfilling
- B. Fill under slabs on grade
- C. Fill under paving and parking lot
- D. Consolidation and compaction as scheduled
- E. Fill for over-excavation

2. REFERENCED SECTIONS

- A. Section 01 31 00- Project Management and Coordination
- B. Section 01 14 00 - Quality Requirements
- C. Section 01 50 00.- Temporary Facilities And Controls
- D. Section 31 05 13 - Soils for Earthwork
- E. Section 31 05 16 - Aggregates For Earthwork
- F. Section 03 30 00 - Cast-In-Place Concrete

3. RELATED INFORMATION

- A. Document: Geotechnical reports; bore hole locations and findings of subsurface materials.

4. REFERENCES

ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

- 1. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- 2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- 3. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- 4. ASTM D2922 - Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow depth).

PART 2 PRODUCTS

1. FILL MATERIALS

- A. Earth Backfill: As specified in Section 31 05 13.
- B. Structural Fill: Class II material as specified in Section 31 05 16..
- C. Concrete: Lean concrete, structural concrete conforming to Section 03 30 00 with a compressive strength of 2000 psi.

PART 3 EXECUTION

1. EXAMINATION

- A. Where backfill will place unequalized horizontal loading on concrete structure, verify that concrete has attained 70 percent of its design strength.

2. PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with fill as specified in Schedule at end of this section.

3. BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Structural Fill: Place and compact materials in continuous layers not exceeding 8 inches compacted depth.
- D. Earth Backfill: Place and compact material in continuous layers not exceeding 8 inches compacted depth.
- E. Employ a placement method that does not disturb or damage other work.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density. Backfill against supported foundation walls and slabs. Do not backfill against unsupported foundation walls.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from building minimum 2 inches in 10 feet unless noted otherwise.
- I. Make gradual grade changes. Blend slope into level areas.
- J. Leave fill material stockpile areas free of excess fill materials.
- K. Remove surplus backfill materials from site.

4. TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

5. FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 40 00.
- B. Compaction testing will be performed in accordance with ASTM D1557.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: Every 50 feet
- E. Proof roll compacted fill surfaces under slabs-on-grade and paving, as required by Engineer.

6. PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.
- B. Reshape and re-compact fills subjected to vehicular traffic.

7. SCHEDULE

- A. Fill under grass areas.
 - 1. Earth backfill to 3 inches below finished grade, compacted to 85% modified proctor.
- B. Fill under asphalt paving.
 - 1. Earth backfill to bottom of aggregate base course placed in 8 inch lifts and compacted to 95% modified proctor.
- C. Fill to correct over excavation. Lean concrete with minimum compressive strength of 2000 psi.

END OF SECTION 31 23 23.13

SECTION 32 1313 – CONCRETE PAVING

PART 1 - GENERAL

1. SECTION INCLUDES:

- A. Concrete Pavement
- B. Concrete Sidewalk, Ramps, and Steps
- C. Concrete Driveways / Drive Approaches
- D. Concrete Dumpster Pads

2. REFERENCES

A. American Concrete Institute (ACI)

- 1. ACI 301 - Specifications for Structural Concrete.
- 2. ACI 302 - Guide for Concrete Floor and Slab Construction.
- 3. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- 4. ACI 305R - Hot Weather Concreting.
- 5. ACI 306R - Cold Weather Concreting.
- 6. ACI 308 - Standard Specification for Curing Concrete.
- 7. ACI 318 - Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary.

B. ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

- 1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
- 2. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- 3. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars
- 4. ASTM B221 - Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

5. ASTM C33 - Concrete Aggregates.
 6. ASTM C94 - Ready-Mixed Concrete.
 7. ASTM C150 - Portland Cement.
 8. ASTM C260 - Air Entraining Admixtures for Concrete.
 9. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 10. ASTM C494 - Chemicals Admixtures for Concrete.
 11. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 12. ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
 13. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- C. Concrete Reinforcing Steel Institute (CRSI)
1. Manual of Standard Practice
- D. Michigan Department of Transportation - MDOT
1. 2003 Standard Specifications for Construction.
- E. Americans with Disabilities Act (ADA)
3. DESCRIPTION
- A. Provide all materials, labor, equipment, and services necessary to complete the concrete improvements as indicated in the Construction Documents.
4. QUALITY ASSURANCE
- A. Installer shall be qualified with at least 3 years in business and has completed pavement work similar in material, design, and extent to that indicated for this Project.
 - B. Manufacturer shall be certified in the production of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - C. Submit concrete mix designs for proposed slabs on grade.

- D. Submit shop drawings and certified copies of mill report of reinforcement materials analysis.
- E. Concrete quality assurance testing, as required, will be performed by the owner/ construction engineer in accordance with Sections 604 and 605 of the 2003 MDOT Standard Specifications for Construction.
- F. Submit, to the Owner, two copies of materials certificates signed by Material Producer and Contractor. Certificates shall state that each material item meets specified requirements.
- G. Submit, to the Owner, job-mix formulas for each required cement-aggregate mixture. Mix designs shall be within allowable tolerances as specified for the particular application.

5. TRAFFIC CONTROL

- A. Maintain vehicle and pedestrian traffic during paving and repair operations in such a manner as to not disrupt normal traffic activities unless special notification has been distributed.

6. WEATHER LIMITATIONS

- A. Construct pavement surface course only when ground temperature is above 40 degrees F. and base is dry. Base course may be laid when temperature is above 40 degrees F. and rising. Do not place pavement when base or surface is wet or frozen.
- B. Cold Weather Protection: When the temperature of the atmosphere is 40-degrees F. and below, the concrete shall be protected by heating, insulation covering, housing or combination thereof as required to maintain the temperature of the concrete at or above 50-degrees F. and in a moist condition continuously for the concrete curing period. Cold weather protection shall meet the requirements of ACI 306R "Cold Weather Concreting."
- C. Hot Weather Protection: When the temperature of the atmosphere is 90-degrees F. and above, or during other climatic conditions which will cause too rapid drying of the concrete, the concrete shall be protected by windbreaks, shading, fog spraying light-colored moisture-retaining covering, or a combination thereof as required to maintain the temperature of the concrete below 80-degrees F. and in a moist condition continuously for the concrete curing period. Hot weather protection shall meet the requirements of ACI 305R "Hot Weather Concreting."

7. SUBMITTALS

A. Concrete Mix Designs

- 1) Prior to any concrete pavement placement the contractor shall submit a design mix for approval by the engineer for each pavement mix proposed. Include

alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

- 2) Proportion mixes to provide concrete for pavement and gutter and spillways with the following properties.
 - (1) Compressive Strength (28 days) : 4,000 psi, unless otherwise indicated
 - (2) Maximum Aggregate Size : 1.5 inches
 - (3) Slump : 3 inches (for formed concrete), 1.5 inches (for slipform placement)
 - (4) Total Air Content by Volume : 5% to 8%

PART 2 - PRODUCTS

1. MATERIALS

- A. All materials used in concrete pavement and spillway construction shall be in accordance with Section 801.02 of the MDOT 2003 Standard Specifications for Construction.
- B. The fine aggregate shall meet all requirements of the MDOT 2003 Standard Specification for No. 2NS Natural Sand.
- C. The coarse aggregate shall meet of requirements of the MDOT 2003 Standard Specification for No. 6AA Coarse Aggregate.
- D. Water used in concrete shall be clean, free from oil, acids strong alkalies or vegetable matter and potable. If City water is used in the concrete, all necessary permits shall be obtained from the City Water Department.
- E. Joint and waterproofing materials for use in concrete pavement shall conform to Section 904 of the MDOT 2003 Standard Specifications for Construction
- F. The curing compound shall be white membrane type and conform with ASTM C- 309, Type 2.

2. READY-MIXED CONCRETE MANUFACTURER'S QUALIFICATIONS

- G. All ready-mixed concrete suppliers must be approved by the Owner. Concrete shall be manufactured and delivered to the job Site by a ready-mixed concrete manufacturer meeting the requirements of the National Ready Mixed Concrete Association (NRMCA) certification program.

3. READY-MIXED CONCRETE

- H. All production, handling of materials, and distribution of ready-mixed concrete shall meet the requirements set forth in Section 601 of the MDOT 2003 Standard Specifications for Construction.
- I. Ready-mixed concrete shall be mixed and delivered to the point of discharge at the job by means of a ready-mix concrete truck. Delivery tickets in accordance with Section 16 of ASTM C94 for each concrete load delivered to and used at the site shall be signed by the owner's designated representative. The delivery tickets shall provide at minimum the following information:
 - Date
 - Name of ready mix concrete plant Contractor
 - Job location
 - Type (Standard or H.E.S.) and brand of cement Cement
 - content in bags per cubic yards of concrete Truck
 - number
 - Time dispatched and time unloaded Amount
 - of concrete in load in cubic yards Admixtures
 - in concrete
 - Maximum allowable slump in inches
 - Amount of water added at job in gallons, if any
- J. No water from the truck water system or elsewhere shall be added after the initial introduction of the mixing water for the batch. Under no circumstances shall the approved maximum water content be exceeded nor shall the slump exceed the maximum specified.
- K. Discharge of the concrete shall be completed in compliance with Table 601-1 of the MDOT 2003 Standard Specifications for Construction.
- L. Concrete delivered in cold weather (air temperature 45-degrees F. and lower) shall have a temperature not less than 60-degrees F. at the point of discharge at job, and in compliance with ACI 306 R "Cold Weather Concreting". Concrete placing will not be permitted when the air temperature is 35-degrees F. or lower.
- M. Concrete delivered under hot weather conditions contributing to quick stiffening of concrete, or in air temperature of 80-degrees F. and over, shall have a temperature between 60- and 80-degrees F. at the point of discharge at job, and in accordance with ACI 305 R "Hot Weather Concreting."

4. REINFORCEMENT MATERIALS

- N. Reinforcing Bars: ASTM A615-84A, Grade 60 Deformed Billet-Steel Bars.
- O. Epoxy-Coated Reinforcement Bars: ASTM A775 with ASTM A615, Grade 60, deformed bars.
- P. Plain Steel Welded Wire Fabric: ASTM A185 plain type, flat sheet fabrication.

- Q. Reinforcing Steel Bar and Rod Mats: ASTM A704, ASTM A615, Grade 60, deformed bars
- R. Epoxy-Coated Joint Dowel Bars: ASTM A615 with ASTM A615, Grade 60, plain steel bars.
- S. Hook Bolts per ASTM A307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- T. Tie Wires to be black, annealed steel wire, not less than 16-gauge.
- U. Supports for Reinforcements: Bar supports conforming to "Bar Support Specifications" contained in ACI "Manual of Standard Practice". Provide chairs, spacers and other devices suitable for proper spacing, supporting and fastening reinforcing bars.
- V. Shop fabricate reinforcing bars to conform to the shapes and dimensions shown on the reviewed Shop Drawings and in accordance with ACI "Manual of Standard Practice," current edition.

2.06 FORMS

- W. All forms shall extend 1" deeper than full depth of the proposed pavement section and cleaned before each use.
- X. Fixed forms shall be of sufficient strength to resist springing during concrete-placing operations, and of an approved section with flat surface on top.
- Y. Flexible form materials may consist of plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
- Z. A commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces shall be applied to the forms before concrete installation.

PART 3 - EXECUTION

1. GRADING

- A. All new pavement shall be placed on a prepared subgrade, smoothed and leveled to the grades indicated on the Plans.
- B. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction and repair as required. In clay soils the subgrade shall be excavated 4 inches below the sidewalk base and filled with approved sand meeting MDOT Class II granular fill.

- C. Grade all sidewalk ramps to achieve current ADA and barrier free requirements.

2. SETTING FORMS

- A. Compact and cut-to-grade subgrade under forms so that forms when set will be uniformly supported for the entire length. Securely stake and brace or tie forms to prevent leakage of concrete. Bracing with piles of earth will not be permitted.
- B. Coat surfaces of forms to be in contact with concrete with a light clear paraffin oil or parting compound which will not stain the concrete.
- C. Before start of concrete placing, form Work shall be complete and approved by the Soils Engineer.
- D. Hardened concrete, debris and foreign material shall be removed from interior of forms.

3. PLACING REINFORCEMENT

- A. Provide reinforcement for concrete slabs on grade as shown on the Drawings. Reinforcement shall be kept clean and free from objectionable rust. Bends or kinks in reinforcing bars shall be corrected before placing. All reinforcement shall be accurately located in forms and securely held in place, before and during concrete placing, by supports adequate to prevent displacement during the course of construction.
- B. Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

4. CONTRACTION JOINTS

- A. Provide contraction joints in concrete sidewalk T/4 inch deep by 3/16 inches wide at 5 foot intervals, unless a more detailed jointing pattern is called for.
- B. For other contraction joints form by tooling or sawing a 1/4 inch wide joint T/4 inches deep in a checkerboard pattern. In no case shall the joints be greater than 10 feet in any direction. Joints shall be cut perpendicular to the surface and

at right angles to the edge of pavement, unless a more detailed jointing pattern is called for.

5. EXPANSION (OR ISOLATION) JOINTS

- A. Provide expansion joints for concrete sidewalks and ramps at tangent points, radius returns, at intersections, and in straight runs at uniform intervals not exceeding 100 linear feet.
- B. Separate slabs on grade from vertical surfaces with $\frac{3}{4}$ inch thick joint filler.
- C. Provide expansion joints between concrete pavement and adjacent rigid structures not specified herein before.

6. CONCRETE PLACING

- A. Unless indicated otherwise, concrete slabs on grade shall comprise of the following thickness:
 - sidewalks: 4 inches thick
 - sidewalks across drives: 6 inches thick
 - sidewalk ramps: 6 inches thick residential
 - driveways: 6 inches thick
 - commercial/industrial driveways: 8 inches thick dumpster
 - pads: 8 inches thick
- B. Concrete shall be handled from the point of delivery and to concrete conveying equipment, and to the location of final deposit by methods, which will prevent segregation and loss of concrete mix materials and in a manner which will assure that the required quality of concrete is maintained.
- C. Before placing pavement, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- D. Cold-Weather concrete placement shall comply with ACI 306.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- E. Hot-Weather concrete placement shall be according to recommendations in ACI 305R when hot-weather conditions exist.
- F. Equipment for Conveying Concrete:
 - 1. Runways for wheeled concrete conveying equipment shall be provided for the ready-mix concrete delivery point to the locations of final deposit.

2. The interior surfaces of concrete conveying equipment shall be maintained free of hardened concrete, debris, water, snow, ice and other deleterious materials.
- G. When the temperature of steel forms is greater than 120-degrees F., the steel surfaces shall be sprayed with water just prior to placing the concrete.
- H. Concrete shall be deposited continuously. Concrete which has partly hardened or has been contaminated by foreign materials shall not be placed; such concrete shall be properly disposed of in a approved manner.
- I. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

7. CONCRETE FINISHING

- A. Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float pavement surface by hand floating. Cut down high spots, and fill low spots.
- C. Apply a light broom finish in a longitudinal direction to concrete slabs on grade

8. CURING CONCRETE

- A. Apply curing compound uniformly in continuous operation by power spray.
- B. Newly placed concrete shall be protected as required to maintain the temperature of the concrete at not less than 50 degrees F. nor more than 80 degrees F. and in a moist condition continuously for a period of time necessary for the concrete to cure. Changes in temperature of the concrete during curing shall be as uniform as possible and shall not exceed 5 degrees F. in any one hour, nor 50 degrees F. in any 24 hour period.

9. REMOVAL OF FORMS

- A. All forms, rails and stakes shall be removed within 48-hours after placing the pavement.
- B. Any and all "honey combing" noticed upon removal of the forms shall be hand grouted.

- C. Upon removal of the forms, the remaining excavated area shall be backfilled with approved material, compacted thoroughly, and left in a neat condition.

10. CLEANUP

- A. After completion of concrete curing in an area, remove all weather protection materials and rubbish and debris resulting from specified Work. Sweep concrete pavements clean.
- B. In no case shall the mixer or truck be flushed out onto the street pavement, in a catch basin or sewer manhole, or in any public right-of-way.

END OF SECTION 32 13 13