

HVAC LEGEND		ABBREVIATIONS	
	UNIT CONTROLLED	AFF	ABOVE FINISHED FLOOR
	ROOM THERMOSTAT OR SENSOR	AHU	AIR HANDLING UNIT
	EQUIPMENT NUMBER	BTU	BRITISH THERMAL UNITS
	EQUIPMENT SYMBOL	CFH	CUBIC FEET PER HOUR
		CFM	CUBIC FEET PER MINUTE
		COND	CONDENSER
		CU	CONDENSING UNIT
		DN	DOWN
		E	EXISTING
		EF	EXHAUST FAN
		FC	FAN COIL UNIT
		FD	FIRE DAMPER
		FPM	FEET PER MINUTE
		FPS	FEET PER SECOND
		FSD	FIRE SMOKE DAMPER
		LS	LINEAR SLOT DIFFUSER
		LR	LINEAR RETURN DIFFUSER
		MBH	BTU PER HOUR (THOUSAND)
		MD	MOTORIZED DAMPER
		OSA	OUTSIDE AIR
		PSI	POUNDS PER SQUARE INCH
		RA	RETURN AIR
		RL	REFRIGERANT LIQUID LINE
		RS	REFRIGERANT SUCTION LINE
		SD	SMOKE DETECTOR
		SA	SUPPLY AIR
		SWE	SIDEWALL EXHAUST GRILLE
		SWS	SIDEWALL SUPPLY REGISTER
		SWR	SIDEWALL RETURN GRILLE
		SWT	SIDEWALL TRANSFER GRILLE
		TIE	TIE IN POINT
		TYP	TYPICAL
		VAV	VARIABLE VOLUME

CONSTRUCTION STANDARDS	
RECTANGULAR DUCT: 32"x32"x20"H	RECTANGULAR OFFSET LESS THAN 15'
ROUND DUCT: 20"x20"	RECTANGULAR OFFSET W/ STANDARD FITTINGS (30,45,60)
	ROUND WYE
	BELLMOUTH
	15" MAX.
	CONCENTRIC ROUND TRANSITION
	FLEXIBLE CONNECTION
	RECTANGULAR DUCT
	RECTANGULAR MAN WITH SIDEWALL GRD
	SIDEWALL GRILLE

LINE TYPES		
	WORK	(HWS) HEATING WATER SUPPLY
	EXISTING WORK	(HWR) HEATING WATER RETURN
	WORK	(HWR-C) HEATING WATER RETURN - RECIRC.
	REFRIGERANT	(CS) CONDENSER WATER SUPPLY
	CONDENSATE DRAIN	(CR) CONDENSER WATER RETURN
	GAS	(CHS) CHILLED WATER SUPPLY
		(CHR) CHILLED WATER RETURN

ROOFTOP UNITS														
MARK	MFG	MODEL	TONNAGE	HEATING CAPACITY (MBTU)	COOLING CAPACITY (MBTU)	EER (SEER)	SUPPLY CFM	ESP	OSA CFM	MCA/MOCP	MOTOR HP	VOLTAGE /PHASE	OPR WT (LB)	NOTES
RTU-1	CAMBRIDGE	S1200	-	1180	-	-	6650	0.82"	-	8 FLA	5	115/1	1175	1, 9, 11
RTU-2	CAMBRIDGE	S1200	-	1180	-	-	6650	0.82"	-	8 FLA	5	115/1	1175	1, 9, 11
RTU-3	CAMBRIDGE	S1200	-	1180	-	-	6650	0.82"	-	8 FLA	5	115/1	1175	1, 9, 11
RTU-4	CAMBRIDGE	S1200	-	1180	-	-	6650	0.82"	-	8 FLA	5	115/1	1175	1, 9, 11

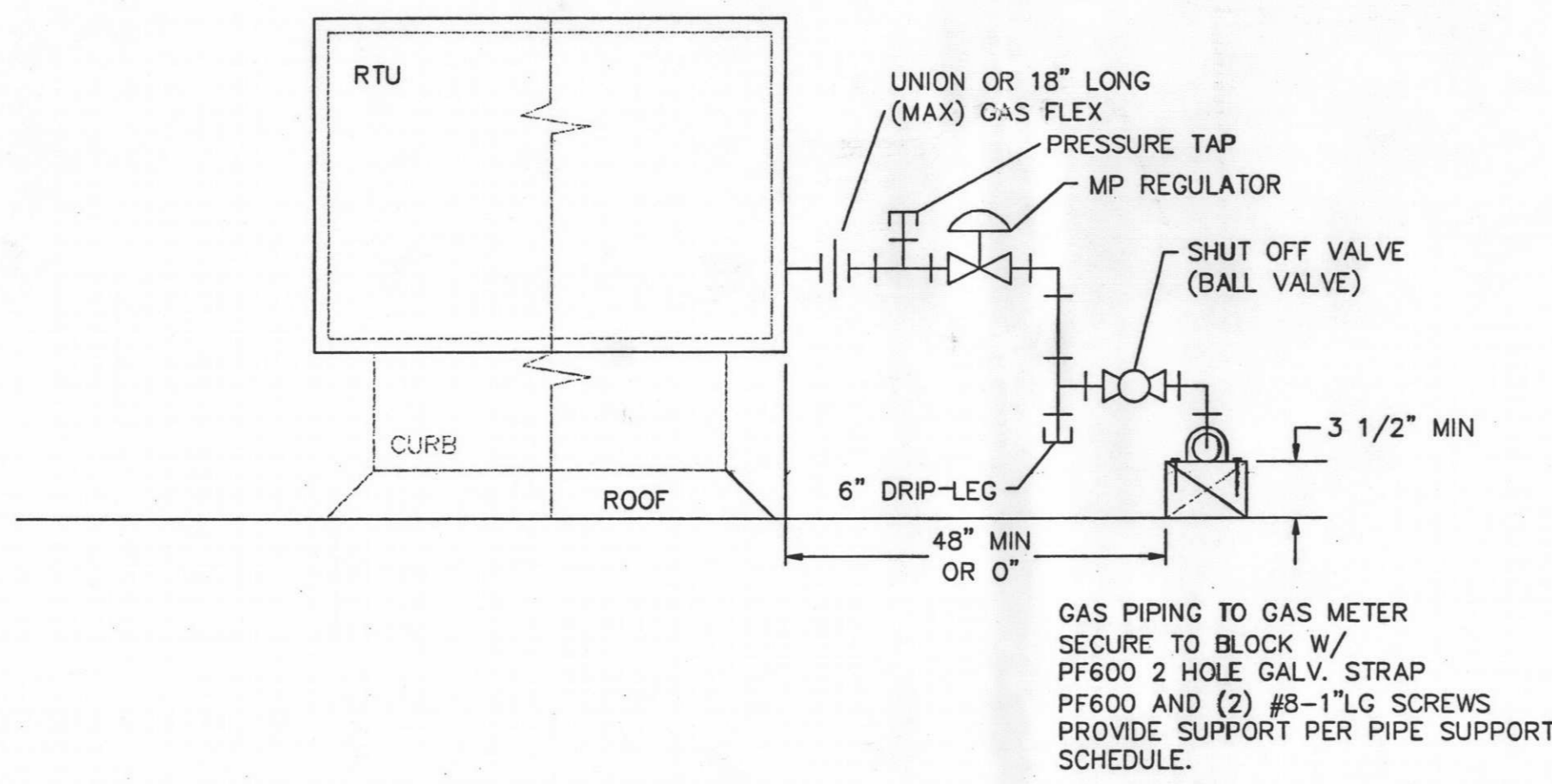
NOTES: 1) FACTORY CURB, 2) FACTORY ISOLATION CURB, 3) ECONOMIZER, 4) AIR SMOKE DETECTOR, 5) BAROMETRIC RELIEF, 6) POWER EXHAUST, 7) CO2 SENSOR, 8) 2-SPEED FAN, 9) OSA HOOD/DAMPER, 10) SINGLE POINT ELECTRICAL CONNECTION, 11) BIRTCHEER CONTROLS

HEATING CAPACITY= INPUT SEE GENERAL NOTE #20

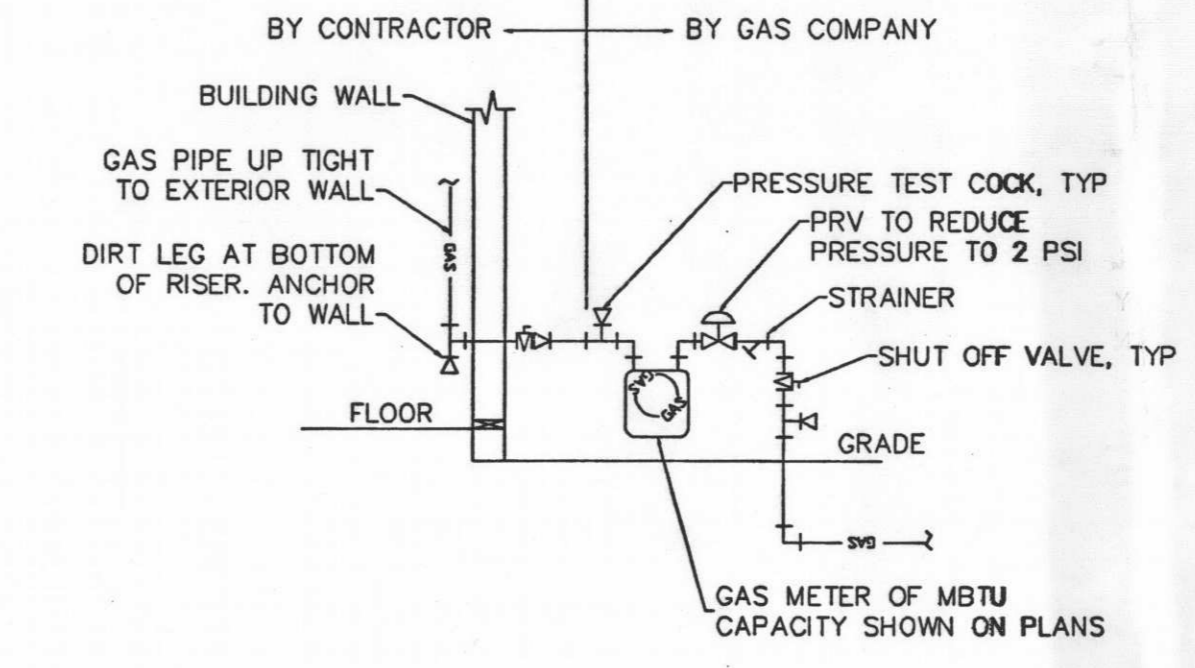
RELIEF HOODS						
MARK	MFG	MODEL	CFM	STATIC PRESSURE (IN-WC)	OPR WT (LB)	NOTES
GV-1	COOK	28X28GR	6000	0.079"	227	1, 2
GV-2	COOK	28X28GR	6000	0.079"	227	1, 2
GV-3	COOK	28X28GR	6000	0.079"	227	1, 2
GV-4	COOK	28X28GR	6000	0.079"	227	1, 2

NOTES: 1) FACTORY CURB, 2) MOTORIZED DAMPER

SEE GENERAL NOTE #20



1 ROOFTOP CURB DETAIL  
M1 SCALE: DETAIL



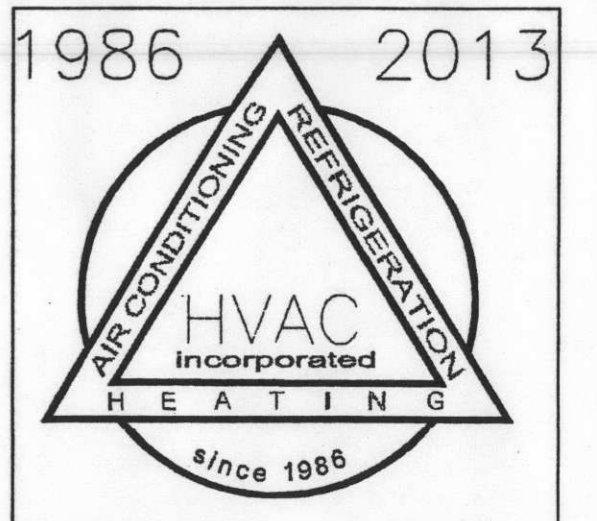
1 METER GAS SERVICE  
M1 SCALE: DETAIL

GENERAL NOTES

- DO NOT SCALE DRAWINGS. FIELD VERIFY DIMENSIONS PRIOR TO FABRICATION AND INSTALLATION OF COMPONENTS.
- DRAWINGS ARE DIAGRAMMATIC ONLY. ACTUAL SIZE AND LOCATION OF EQUIPMENT, DUCT WORK AND PIPING MAY VARY DUE TO MANUFACTURER OR FIELD CONDITIONS. COORDINATE INSTALLATION OF MECHANICAL SYSTEMS WITH OTHER TRADES TO PROVIDE ADEQUATE CLEARANCE AND ACCESSIBILITY AS REQUIRED BY MANUFACTURERS.
- INSTALLATION SHALL COMPLY WITH THE GOVERNING CODES AND REGULATIONS.
- CONCEAL ALL DUCTWORK INSIDE WALLS AND/OR ABOVE CEILINGS, UNO.
- ALL SHARP RADIUS (R<1.5) ELBOWS SHALL BE FURNISHED WITH TURNING VANES.
- DUCTWORK SHALL BE FABRICATED AND INSTALLED PER SMACNA STANDARDS. SUPPORT DUCT WORK PER OMSC 603.10. SEAL DUCTWORK PER RS-18, 1/2" SP TO 1" SP SEAL TRANSVERSE JOINTS.
- ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTS SHALL BE INSULATED AND SEALED PER 2010 OREGON ENERGY EFFICIENCY SPECIALTY CODE 503.2.7. INTERIOR DUCTS SHALL BE INSULATED ABOVE THE BUILDING BARRIER.
- INSTALL VOLUME DAMPERS IN ALL DUCT RUNS TO FINAL SUPPLY TERMINALS.
- ALL ROUND DUCTS SHALL BE RIGID, EXCEPT THE LAST 5' TO WHICH MAY BE FLEX ABOVE A T-BAR CEILING.
- ALL MOTORIZED OUTDOOR AND EXHAUST DAMPERS SHALL HAVE A MAXIMUM LEAK RATE OF 4 CFM PER SQFT @ 1" WG PER AMCA 500-1998, EXCEPT PACKAGED EQUIPMENT SHALL BE 20 CFM/FT @ 1" WG.
- ALL BRANCH DUCTS FEEDING INDIVIDUAL DIFFUSERS SHALL HAVE DAMPERS AT TAKE-OFFS FOR BALANCING. PROVIDE ACCESS PANELS TO DAMPERS.
- LINE FIRST 10 FT OF SUPPLY, RETURN AND EXHAUST DUCTS FOR SOUND.
- SMOKE DETECTORS SHALL BE INSTALLED IN RETURN DROP AND SHALL DEACTIVATE THE EQUIPMENT UPON SENSING SMOKE. INSTALL SMOKE DETECTOR IN SUPPLY AIR DUCT ONLY WHERE REQUIRED BY LOCAL AUTHORITY. SMOKE DETECTORS REQUIRED IN ALL SYSTEMS >2000 CFM. OMSC 606.2. ALL AIR MOVING SYSTEMS >2000 CFM SHALL BE EQUIPPED WITH AUTOMATIC SHUTOFF PER OMSC 606.2.1
- FIRE SMOKE DETECTOR INDICATOR SHALL BE INSTALLED WHERE SHOWN. INSTALL INNOVAIR SSK451 WITH PS40 AND PS12/24LSW. REQUIRED WHERE CFM >2000 AND NO BUILDING ALARM SYSTEM (B.A.S.) IS PRESENT. (OMSC 606.4.1)
- INSTALL HVAC UNITS ON LEVEL CURBS. SECURE ALL UNITS >400 LBS WITH SEISMIC RESTRAINT. SEE PLANS FOR DETAILS.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10 FT FROM EXHAUST FANS OR PLUMBING VENTS.
- PROVIDE PROTECTIVE GUARDS FOR ALL HVAC UNITS LOCATED WITHIN 10 FT OF A ROOF EDGE OR LEDGE GREATER THAN 30 INCHES FROM THE FLOOR.
- OUTDOOR AIR SUPPLY AND EXHAUST SYSTEMS SHALL HAVE MOTORIZED DAMPERS THAT CLOSE WHEN THE SYSTEM IS SHUT OFF. DURING BUILDING WARM-UP, COOL DOWN AND/OR SETBACK.
- ALL INDIVIDUAL HVAC SYSTEMS SHALL HAVE (1) HONEYWELL VISION PRO 8000 PROGRAMMABLE THERMOSTAT UNLESS NOTIFIED OTHERWISE. MOUNT STAT AT 48" A.F.F., EXCEPTIONS:
- 19A) FOR TEMP HEAT UNITS (SHELL BUILDINGS) USE HONEYWELL T810D1136;
- 19B) FOR UNIT HEATERS (FREEZE PROTECTION ONLY) USE TEMP STAT MODEL T341 SET AT 41 DEG F AND MOUNTED NO LOWER THAN THE UNIT HEATER.
- ELECTRICAL CONTRACTORS SHALL COORDINATE ELECTRICAL REQUIREMENTS WITH THE MOST RECENT REVISION OF THESE PLANS AND THE SUBMITTALS PRIOR TO CONSTRUCTION. HVAC INC SHALL NOT BE RESPONSIBLE FOR ELECTRICAL CONTRACTORS FAILURE TO REVIEW AND CLARIFY ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.

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PROJ MGR *Hadme*

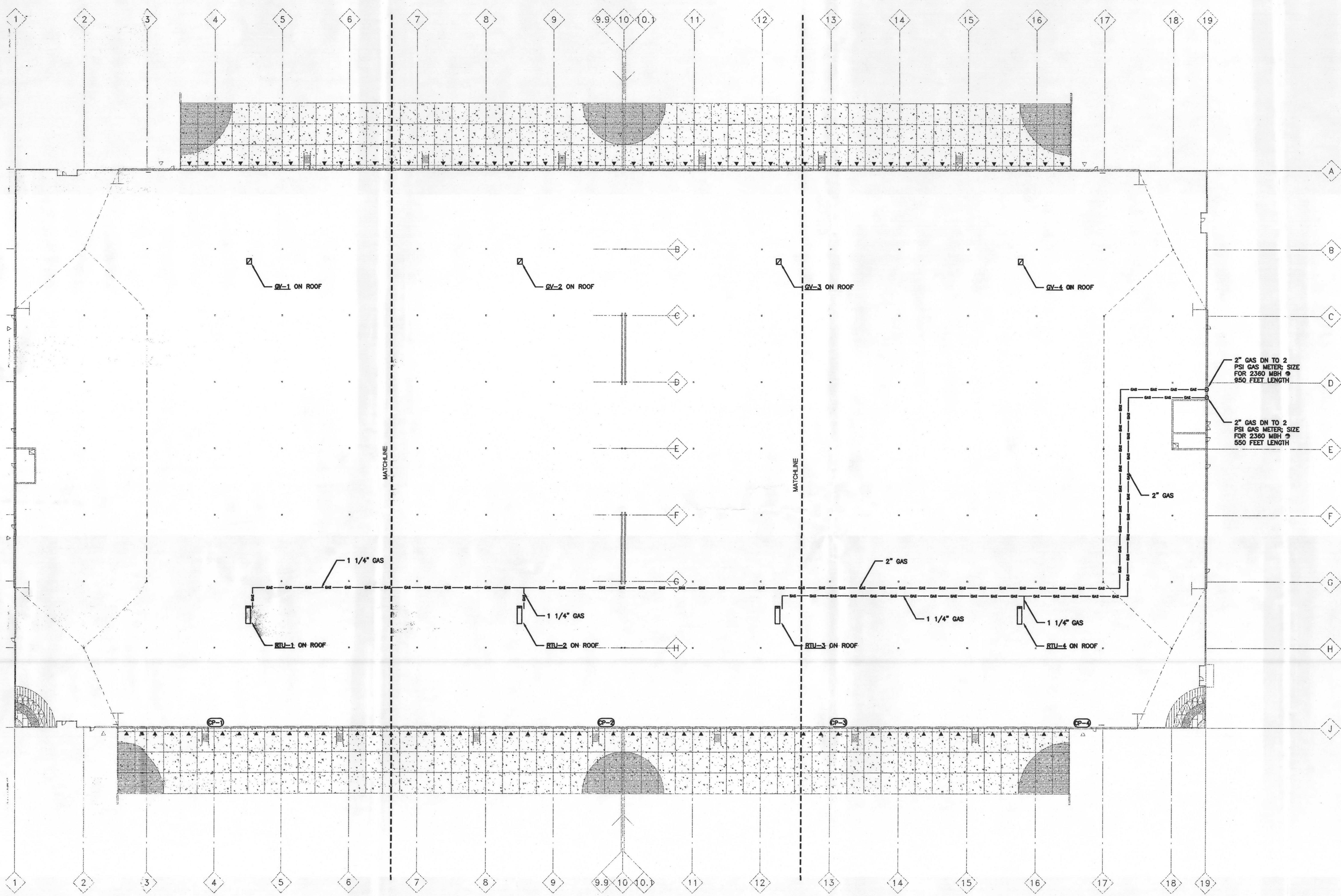
**Capstone Building**  
9555 NE Alderwood Rd  
Portland, OR 97220  
13.229.550.MT



5188 INTERNATIONAL WAY  
MILWAUKIE, OR 97222  
FAX: (503) 462-6555  
PHONE: (503) 462-4822  
OR CCB # 50897  
WA HVAC # \* 125J6

FILE NAME:	5410 CAPSTONE
PROJECT MANAGER:	GARDNER
ENGINEER:	FROELKE
DATE:	10/08/13
SHEET TITLE:	SCHEDULES, DETAIL
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A

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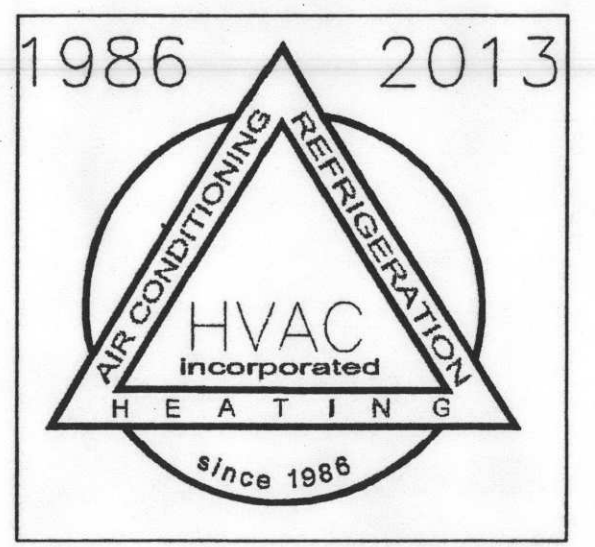
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RELEASED FOR PERMIT

PROJ MGR *Gardner*

**Capstone Building 1**  
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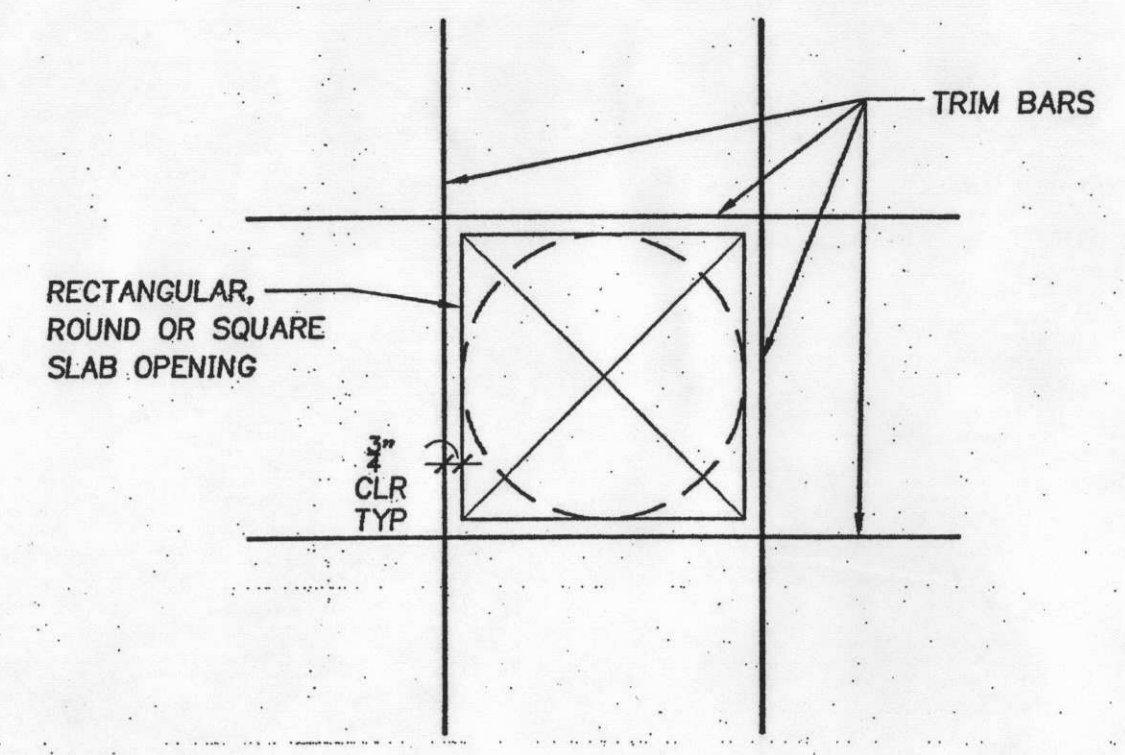


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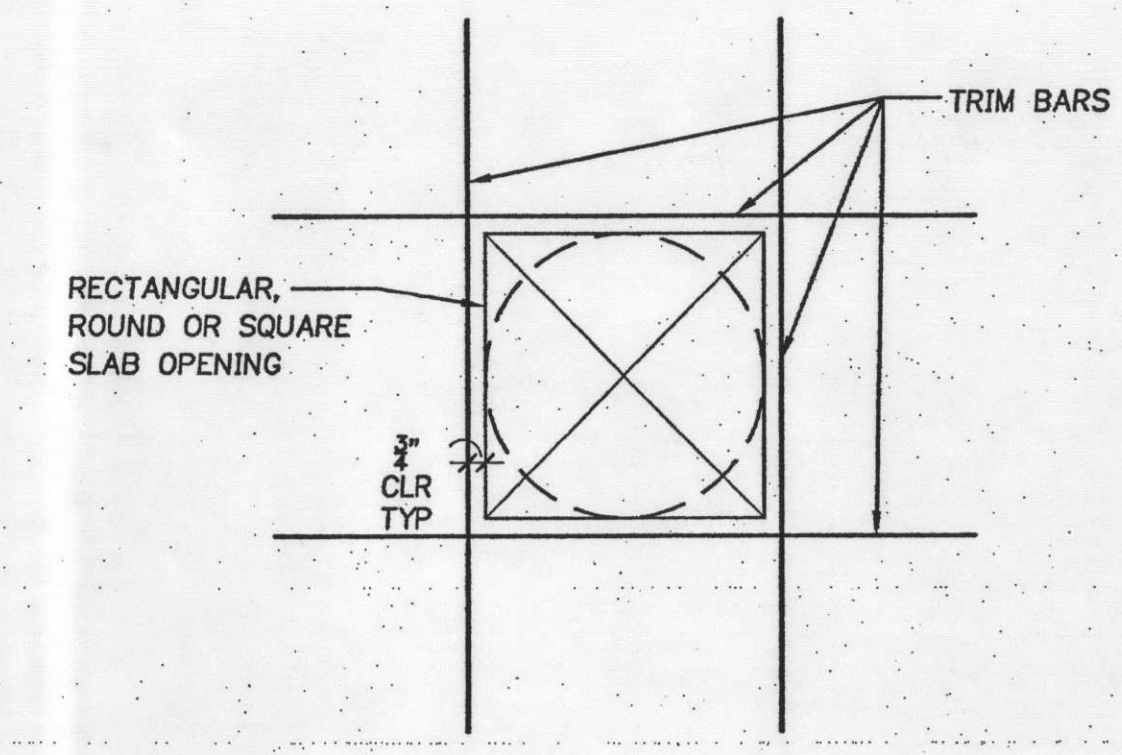
FILE NAME:	5410 CAPSTONE
PROJECT MANAGER:	GARDNER
ENGINEER:	FROELKE
DATE:	10/08/13
SHEET TITLE:	BUILDING 1 HVAC PLAN
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A
REVISION:	N/A

**1 BUILDING 1 HVAC PLAN**  
 M2 SCALE: 1/32"=1'-0"

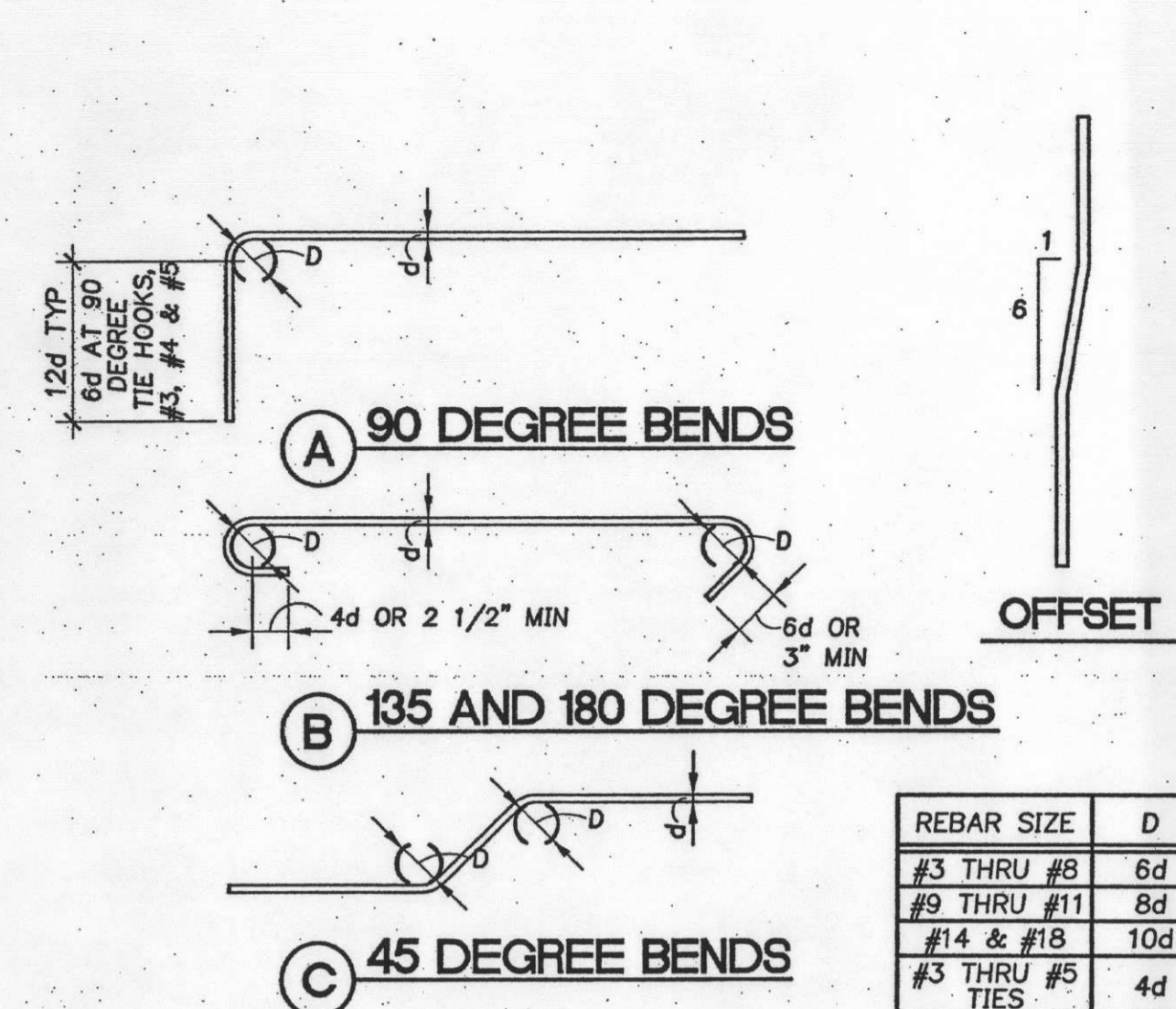
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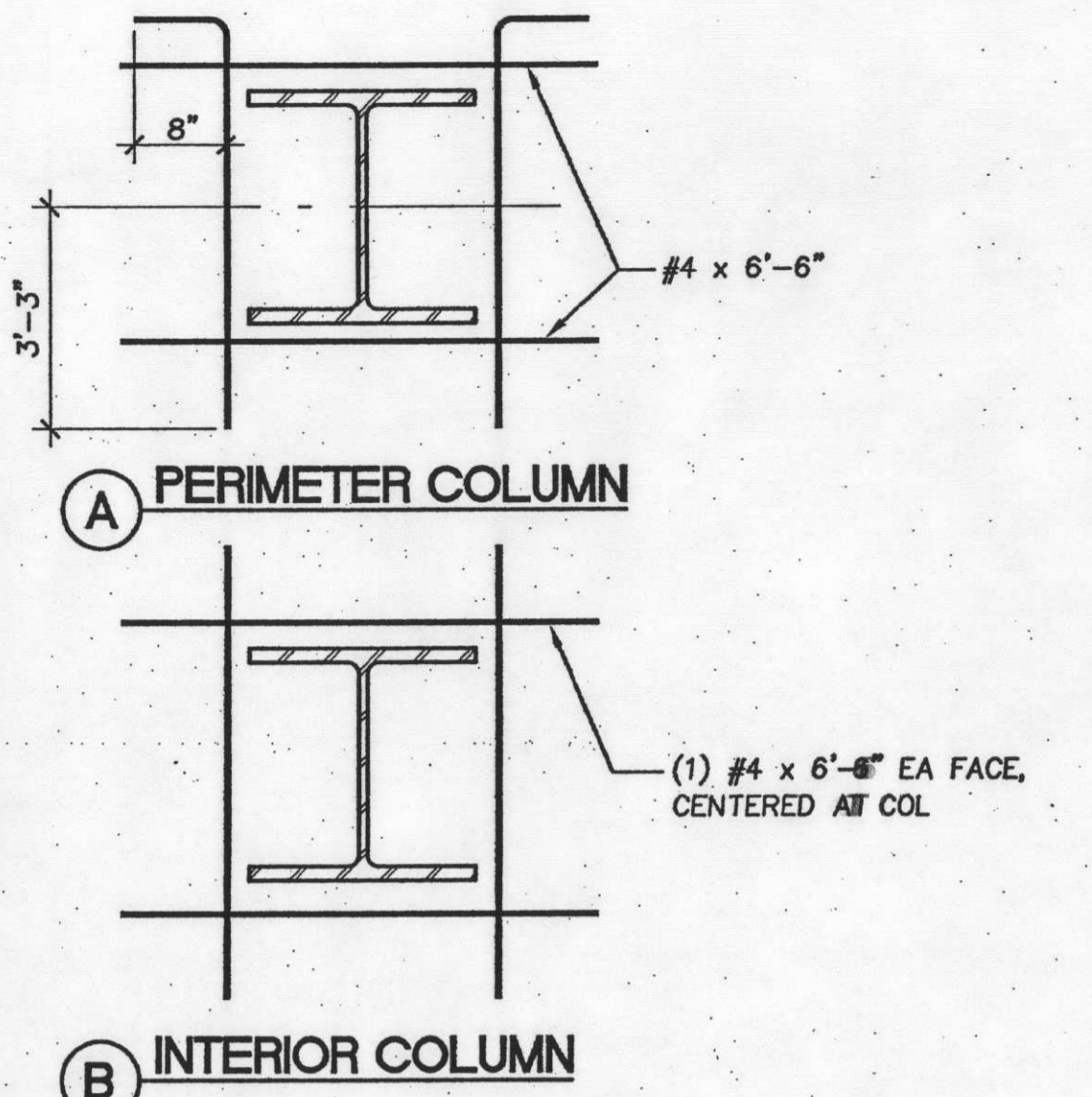
**1 TRIM BARS**  
FOR ISOLATED SLAB AND WALL OPENINGS  
1 1/2"-1'-0"



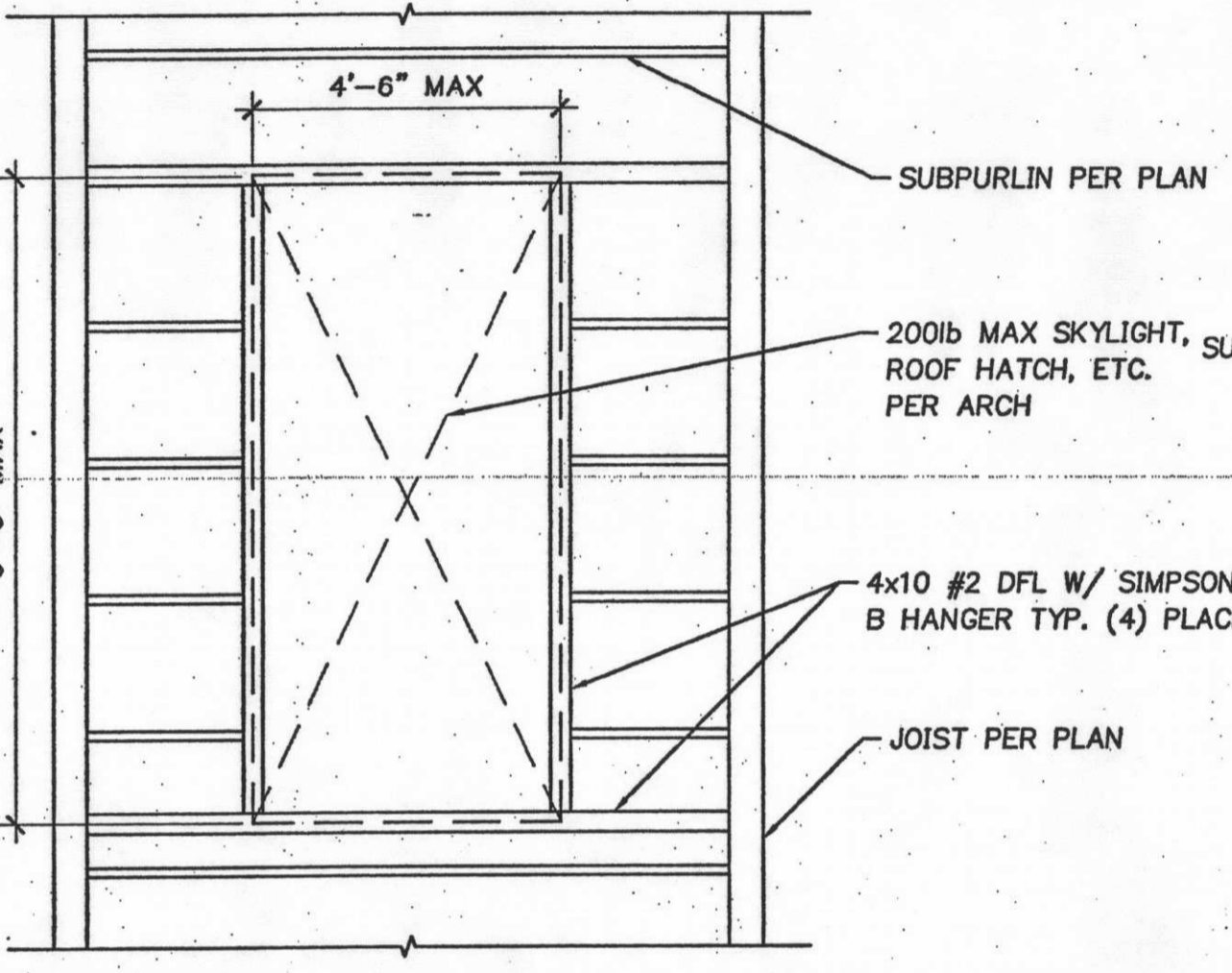
**2 TRIM BARS**  
FOR ISOLATED SLAB AND WALL OPENINGS  
1 1/2"-1'-0"



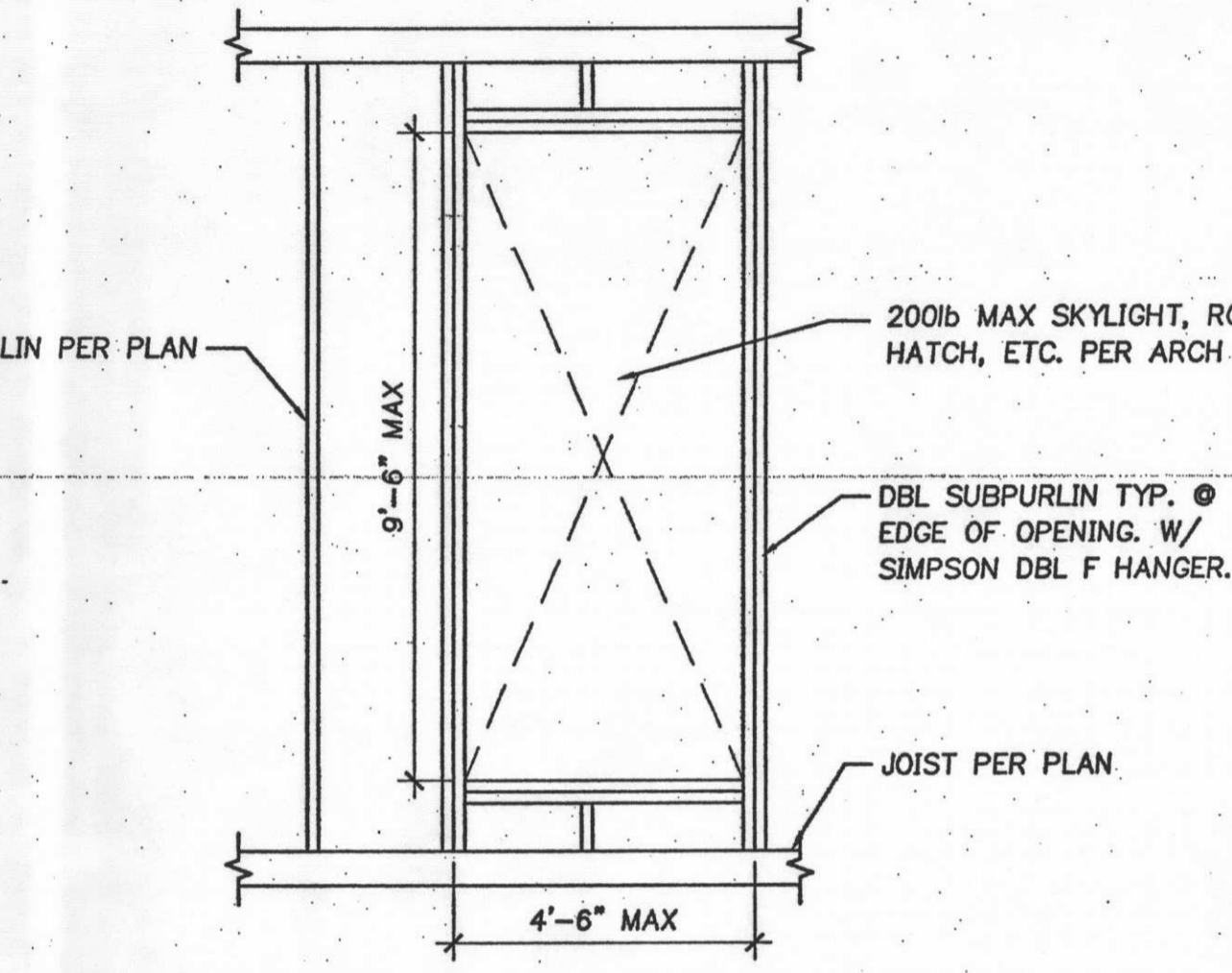
**4 TYPICAL REINFORCING BAR BENDS**  
1 1/2"-1'-0"



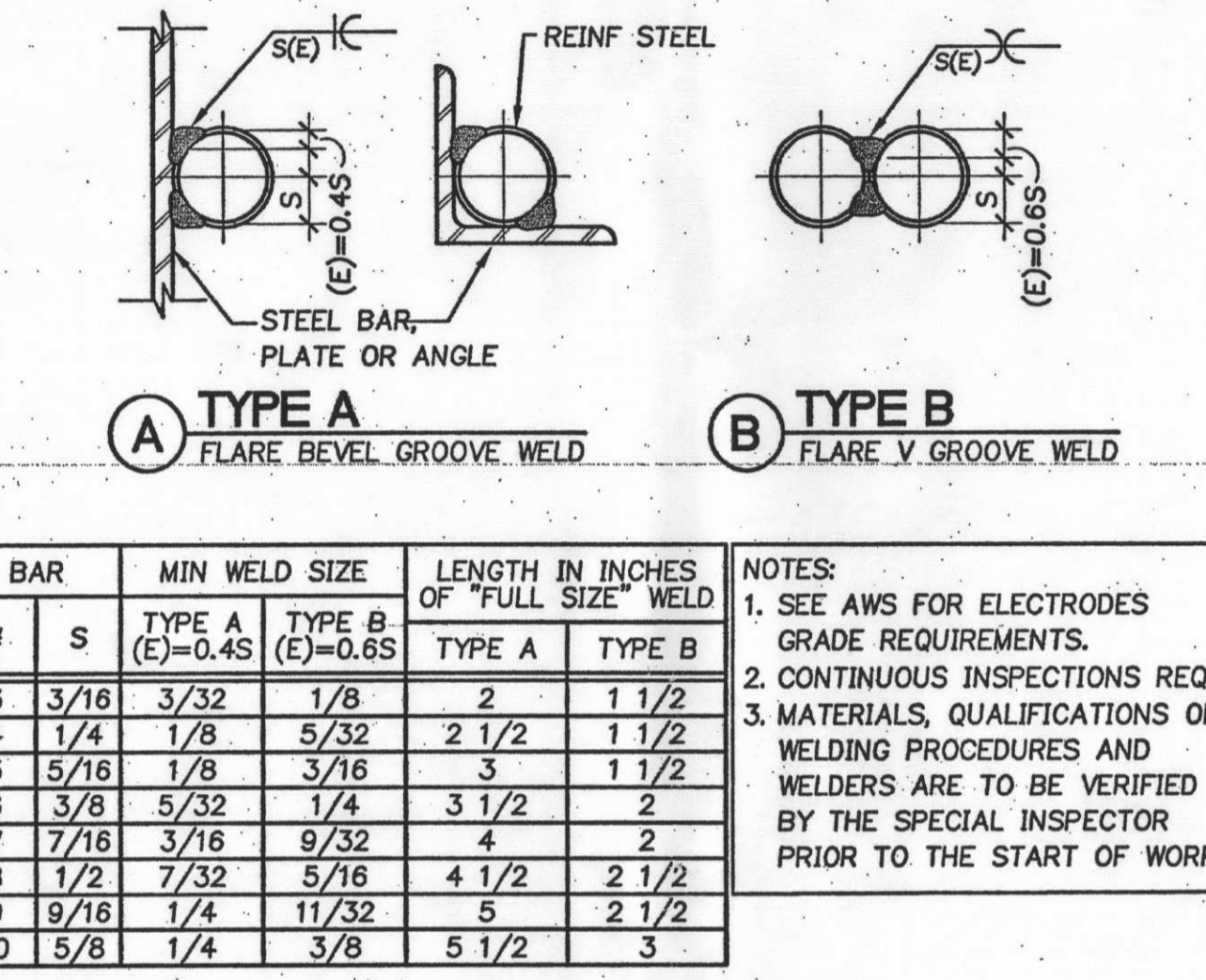
**5 ADDITIONAL REINFORCING**  
AT COLUMN PENETRATIONS  
1 1/2"-1'-0"



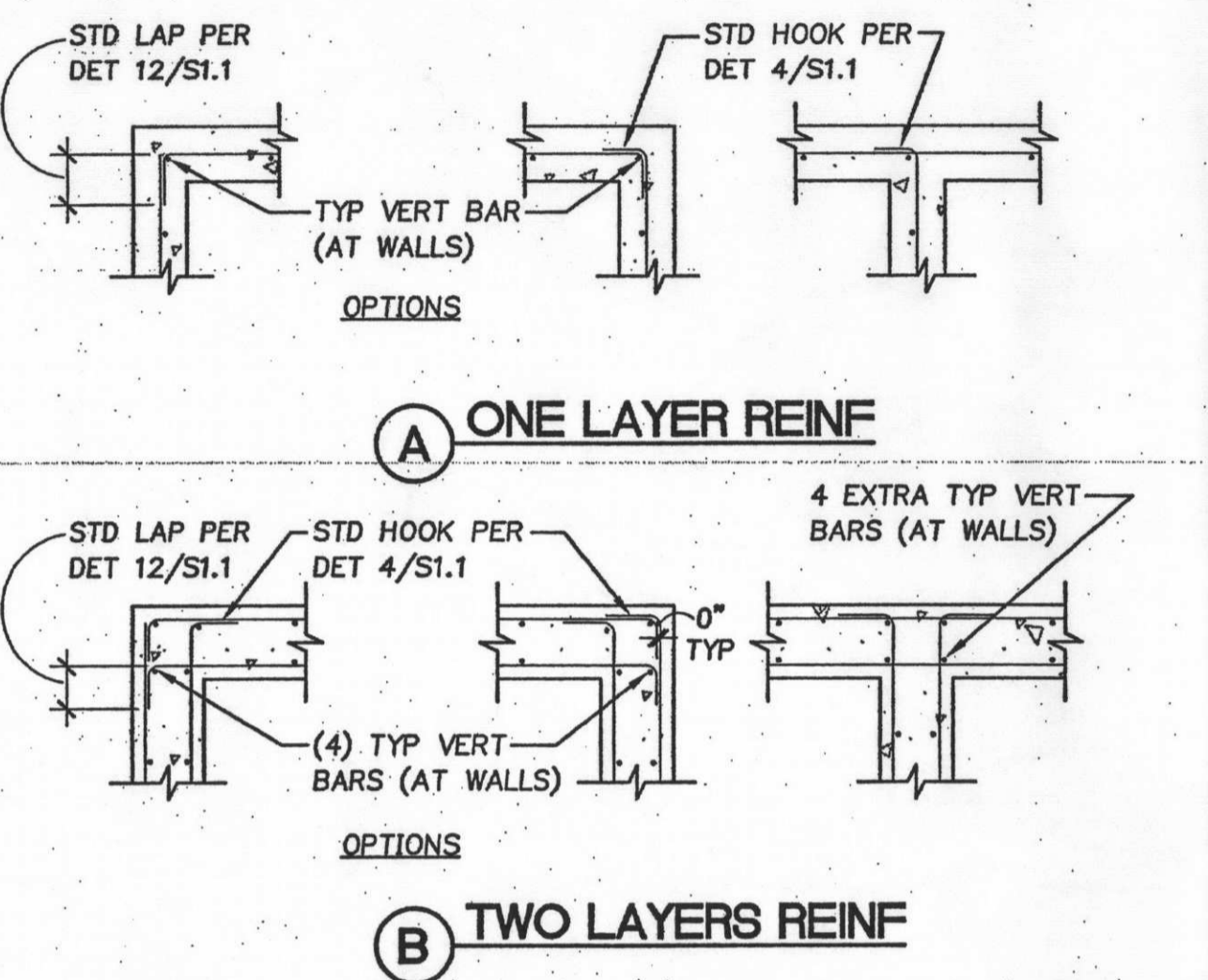
**6 OPENING IN WOOD ROOF**  
3/8"-1'-0"



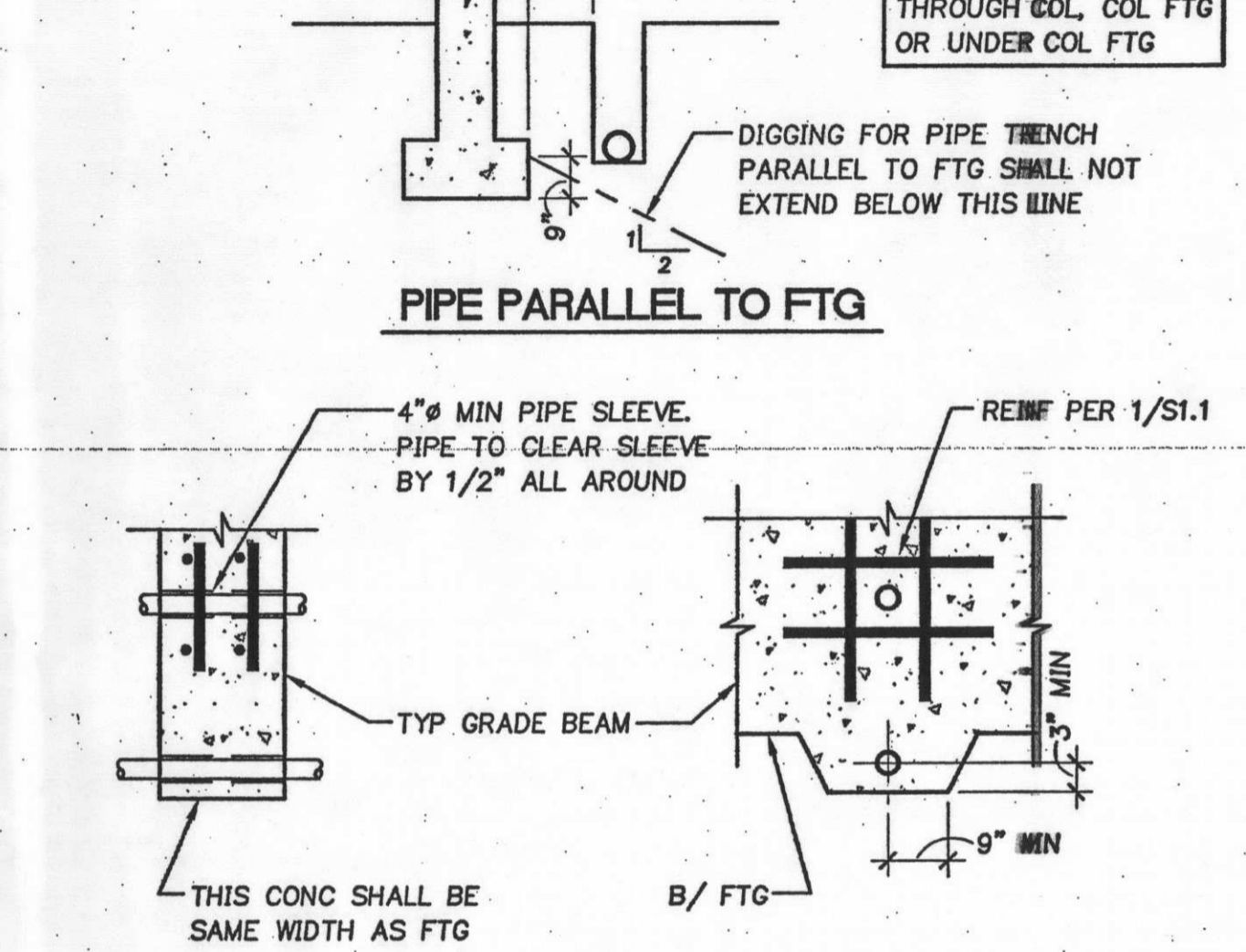
**7 OPENING IN WOOD ROOF**  
3/8"-1'-0"



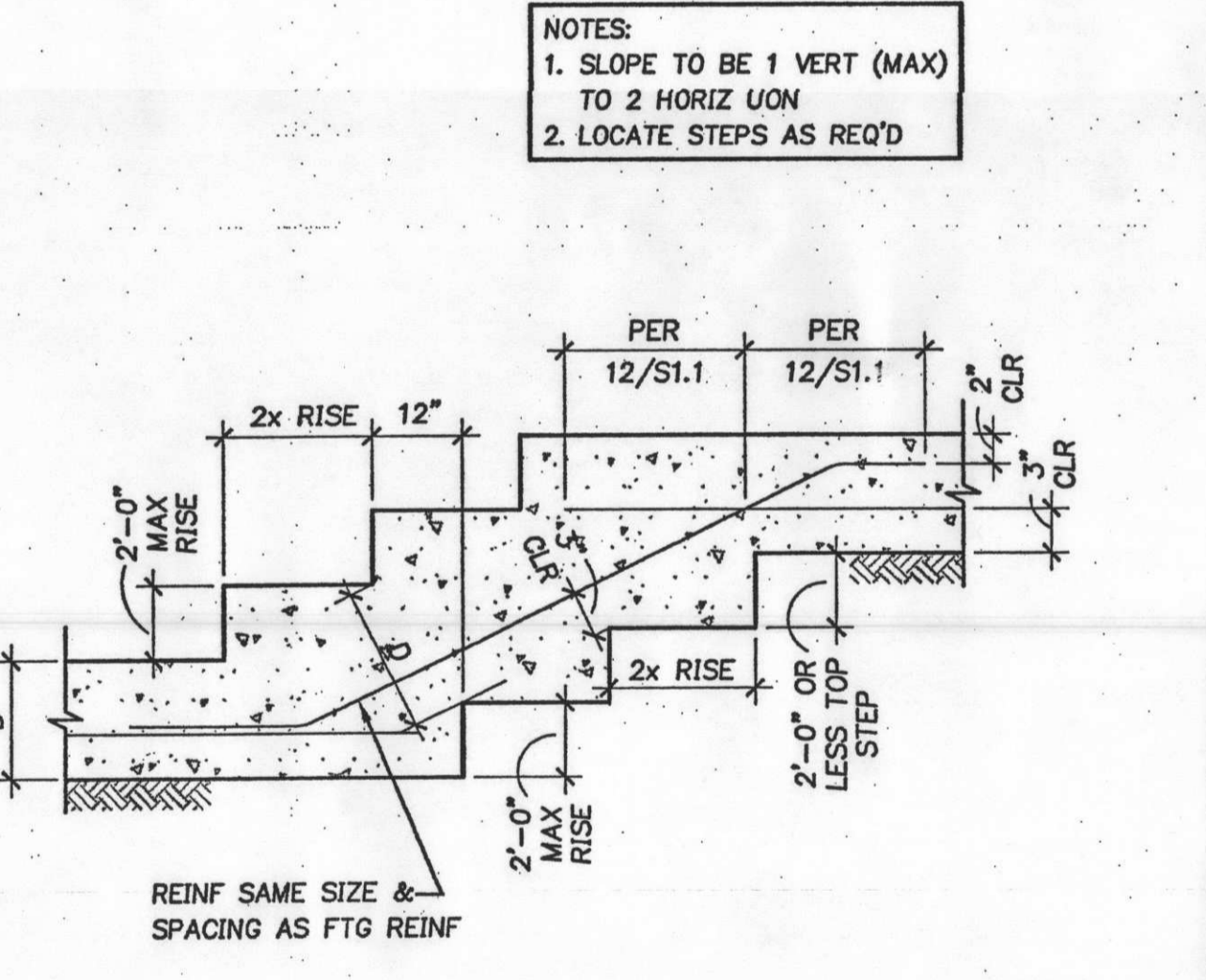
**8 WELDING OF REINFORCING STEEL**  
1 1/2"-1'-0"



**9 REINF AT CONCRETE WALL AND FOOTING INTERSECTIONS**  
1 1/2"-1'-0"



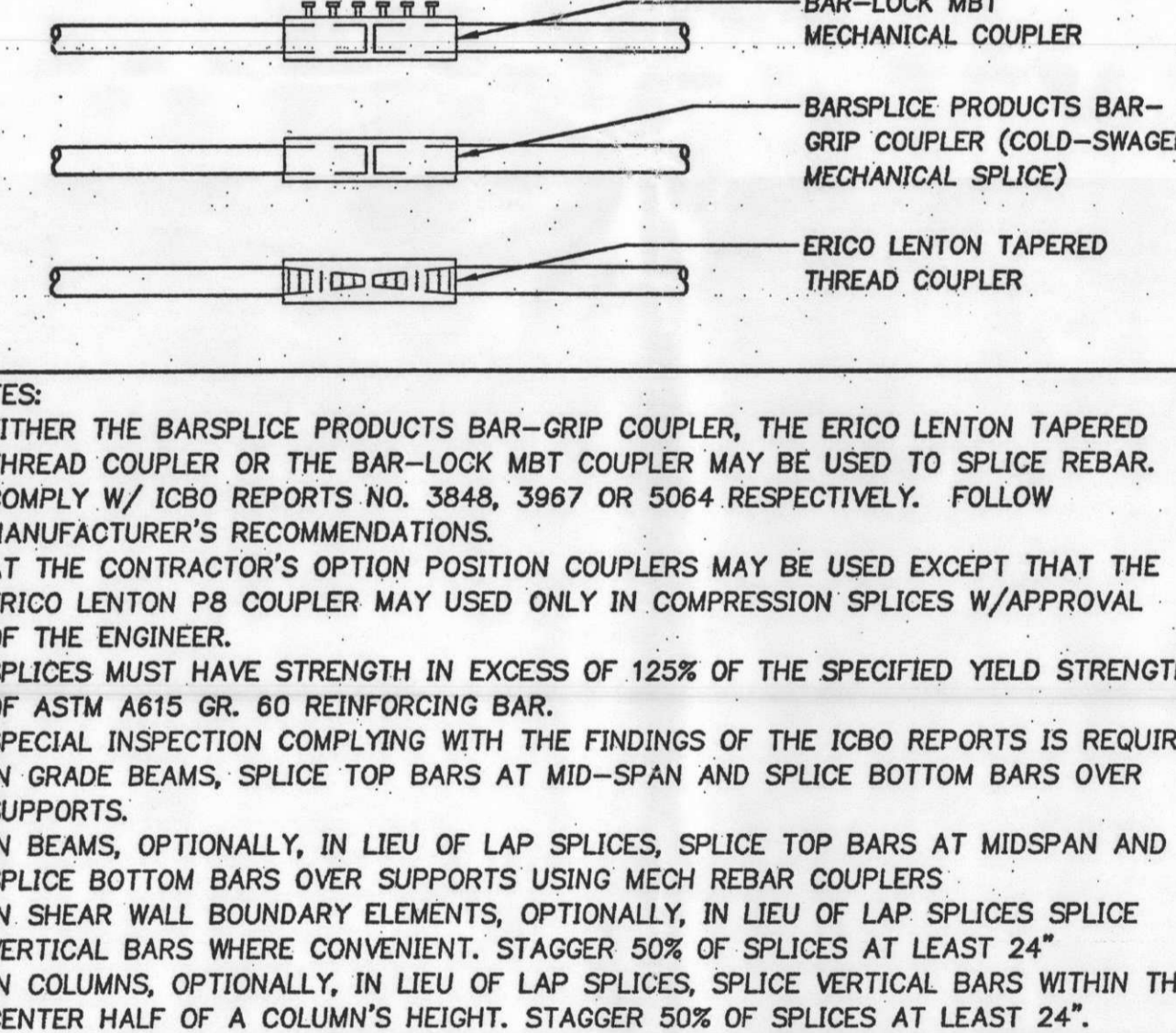
**10 PIPING AT GRADE BEAMS AND FOOTINGS**  
1 1/2"-1'-0"



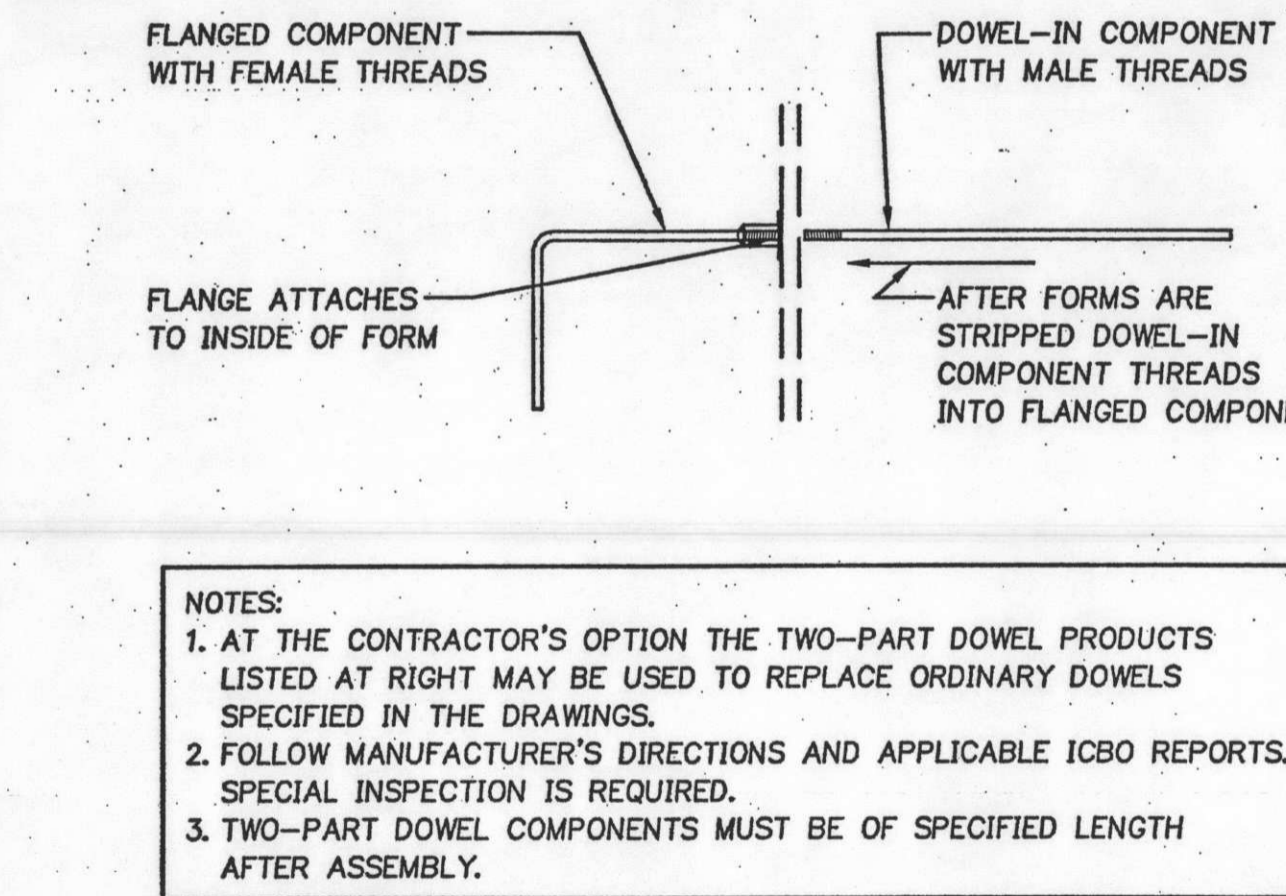
**11 TYPICAL STEP IN WALL FOOTING**  
1 1/2"-1'-0"

BAR	LENGTH (L) IN INCHES		
	F <sub>c</sub> =3000 PSI	F <sub>c</sub> =4000 PSI	F <sub>c</sub> =5000 PSI
#3	21	18	16
#4	28	24	22
#5	35	30	27
#6	42	36	33
#7	49	42	38
#8	56	51	46
#9	74	64	58
#10	94	82	75
#11	118	100	90

**12 TYPICAL LAP SPLICE**  
1 1/2"-1'-0"



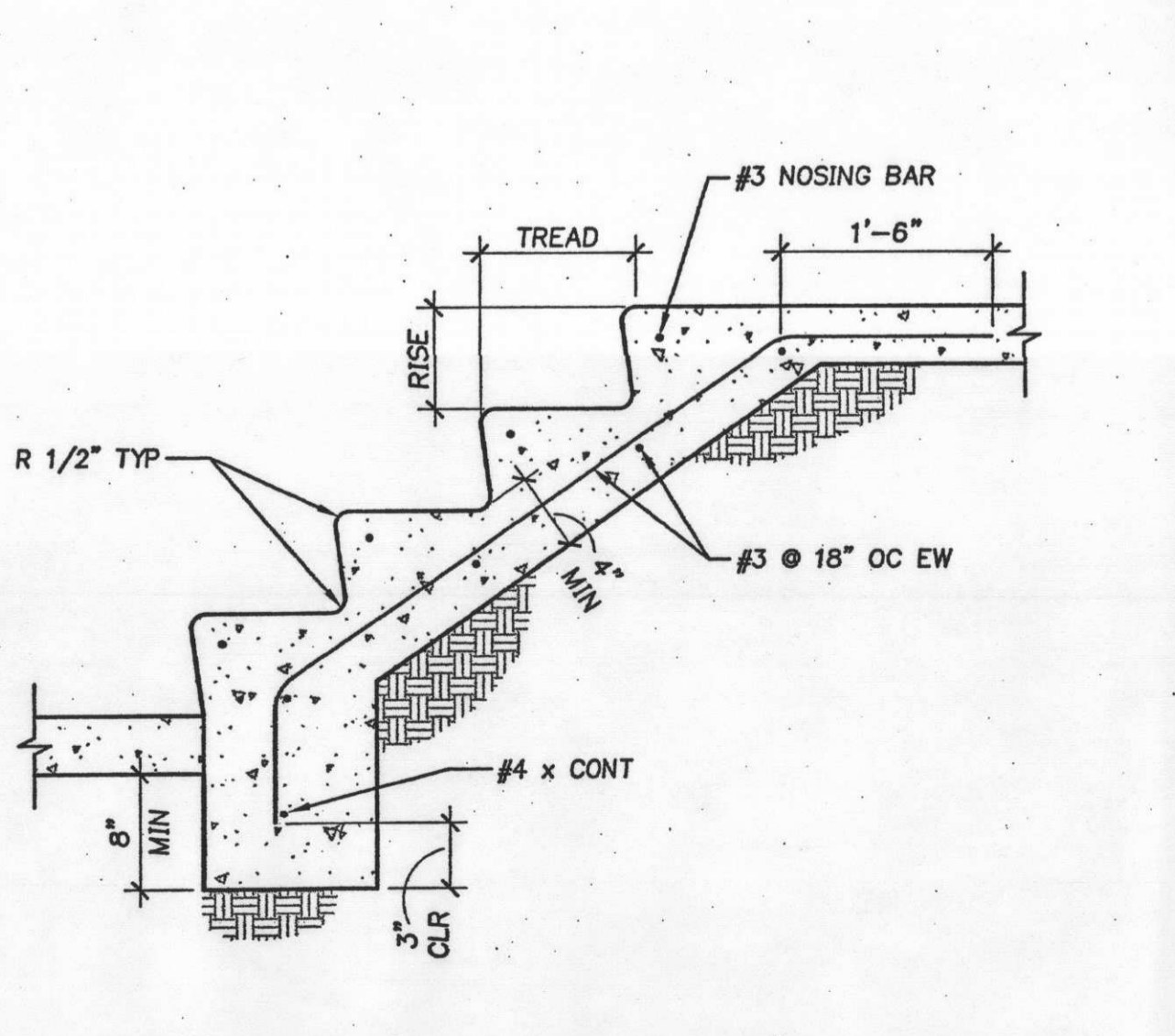
**13 MECHANICAL REBAR COUPLERS**  
1 1/2"-1'-0"



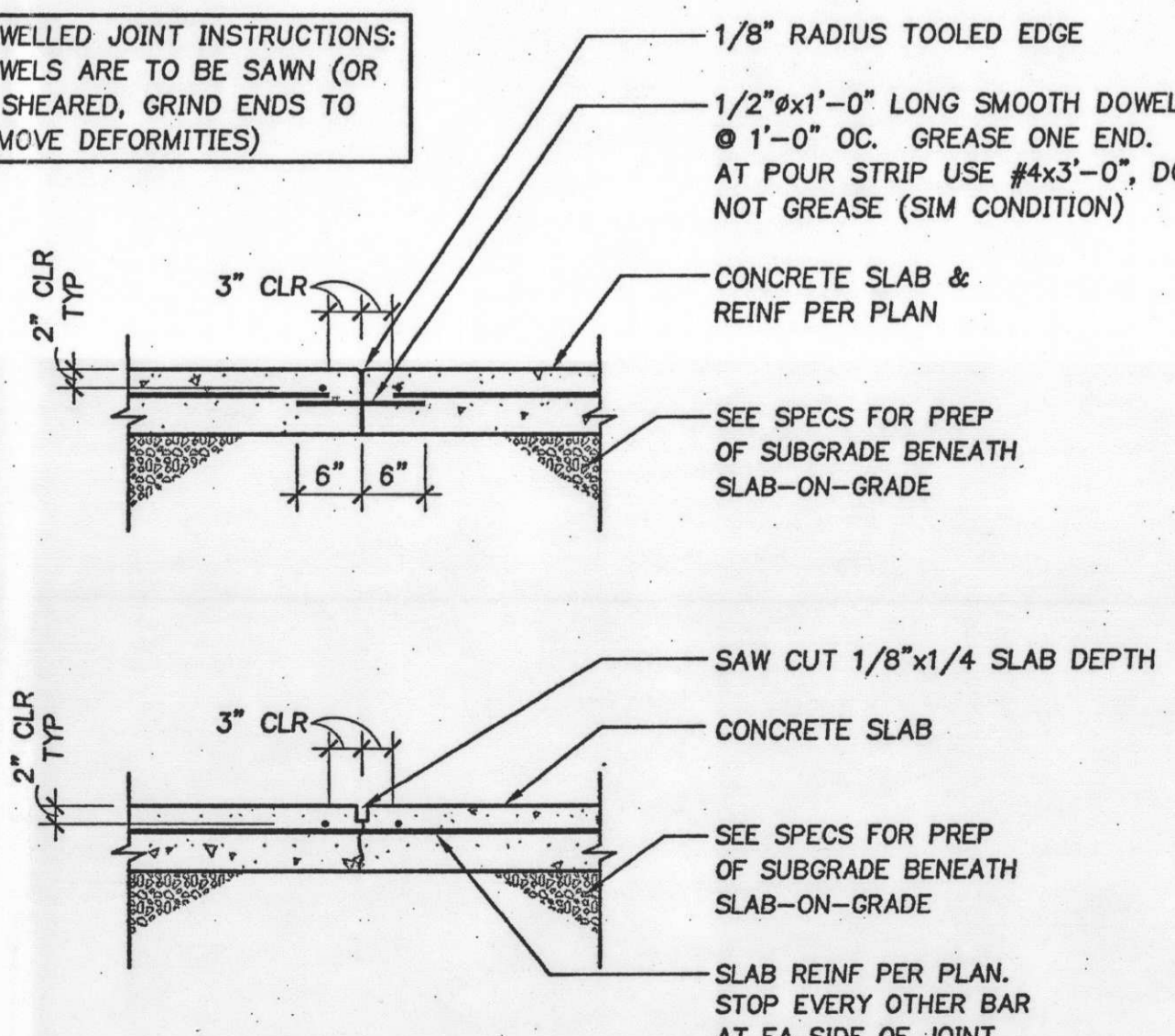
**14 TWO PART DOWEL SYSTEM**  
1 1/2"-1'-0"

MANUFACTURER AND BRAND NAME	SPECIFIED SIZE FOR REBAR					
	#4	#5	#6	#6	#6	#7
RICHMOND DOWEL BAR SUBSTITUTION	#4	#4	#5	#5	#6	#6
LENTON FORM SAVER	#4	#4	#5	#5	#6	#6
DAYTON-SUPERIOR D-50 DOWEL BAR REPLACEMENT	#5	#5	#6	#6	#7	#7

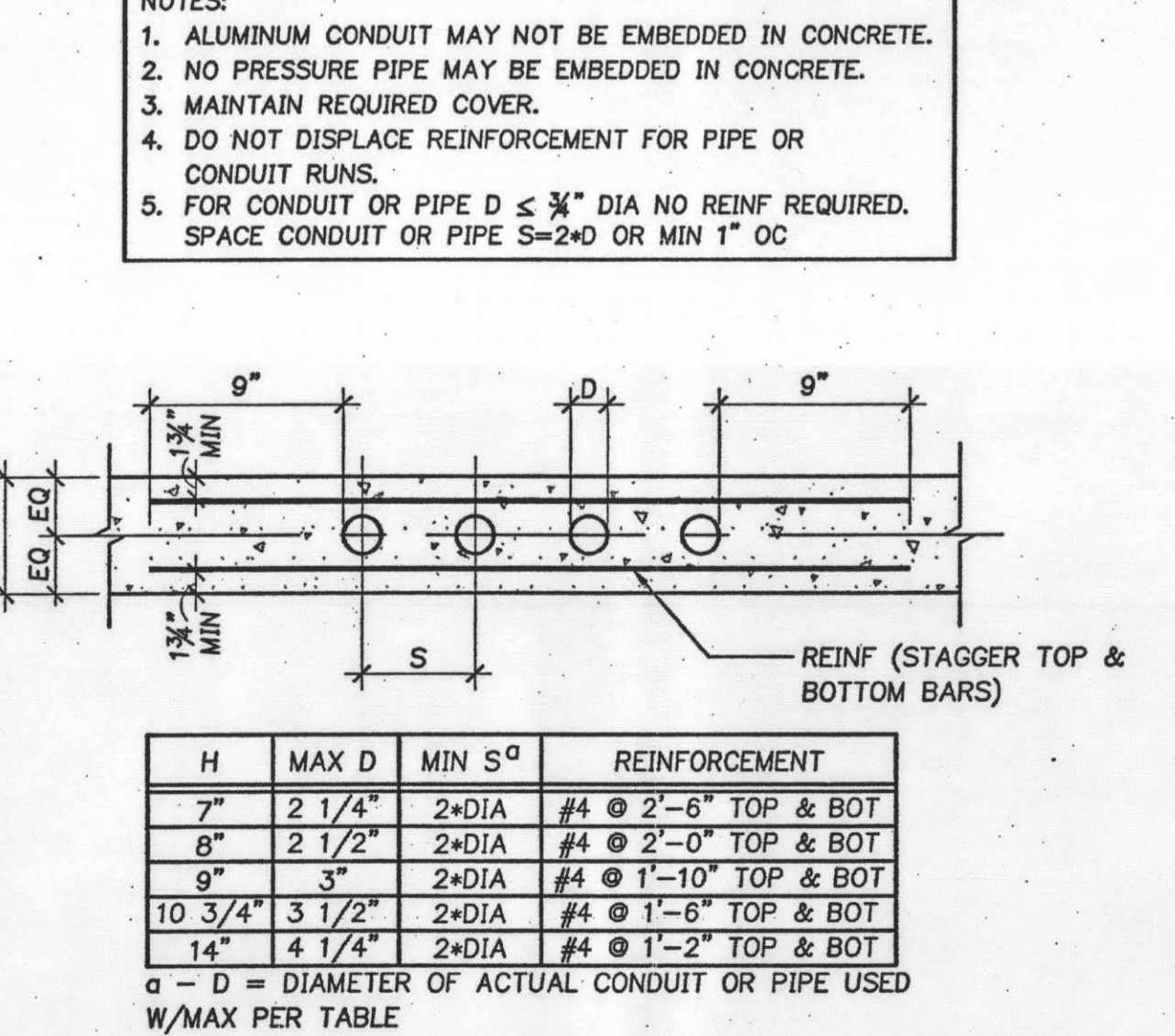
**15 TYPICAL CONCRETE STAIR ON GRADE**  
NO SCALE



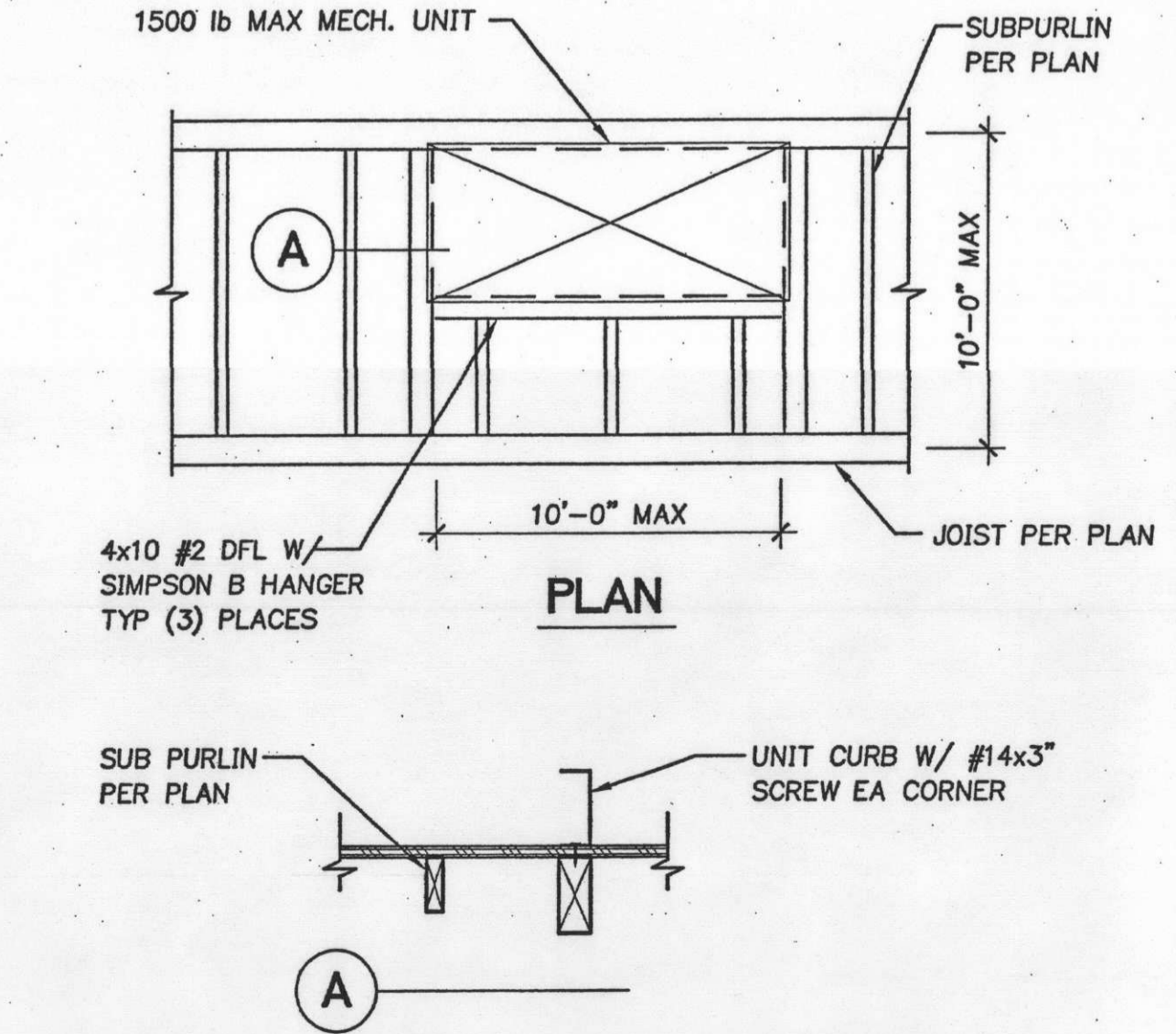
**16 TYPICAL CONCRETE STAIR ON GRADE**  
NO SCALE



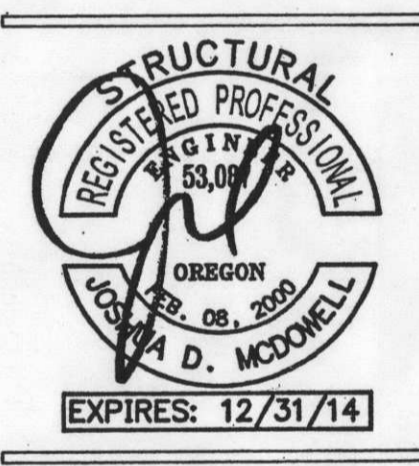
**17 CONTROL/CONSTRUCTION JOINTS**  
NO SCALE



**18 IN-SLAB EMBEDMENT**  
FOR PIPES OR CONDUITS  
NO SCALE



**19 MECHANICAL UNIT SUPPORT**  
NO SCALE



REVISIONS:  
NO. REVISIONS REVISION DATE  
1 05/21/2013  
2 06/19/2013  
3 09/04/2013

SHEET TITLE:  
**TYPICAL DETAILS**

DRAWN BY: AGW  
CHECKED BY: RRB  
SHEET

**S11**  
JOB NO. 2120167.00

13.229550.MT



# MECHANICAL PERMIT APPLICATION

## City of Portland, Oregon - Bureau of Development Services

1900 SW 4th Avenue, Portland, Oregon 97201 • 503-823-7363 • TTY 503-823-6868 • www.portlandoregon.gov/bds

Type of work	
<input checked="" type="checkbox"/> New construction	<input checked="" type="checkbox"/> Addition/alteration/replacement
<input type="checkbox"/> Demolition	<input type="checkbox"/> Other:
Category of construction	
<input type="checkbox"/> 1 & 2 family dwelling	<input checked="" type="checkbox"/> Commercial/industrial
<input type="checkbox"/> Multifamily	<input type="checkbox"/> Master builder
<input type="checkbox"/> Accessory building	<input type="checkbox"/> Other:
Job site information and location	
Job no.:	Job address: 9555 NE Alderwood Rd
City/State/ZIP:	Port OR 97220
Suite/bldg./apt. no.:	Project name: Capstone Bldg 1
Cross street/directions to job site:	
Subdivision:	Lot no.
Tax map/parcel no.	
Description of work (example: upstairs bath fan/dryer exhaust)	
Add 4 Cambridge Rooftop Units	
Provide RS permit no. 13-183866-CO	
Property owner	
Name:	E-mail:
Address:	
City/State/ZIP:	
Phone:	FAX:
Owner installation: This installation is being made on property that I own, which is not intended for sale, lease, rent, or exchange.	
Owner signature:	Date:
Contractor	
Business name: HVAC INC	E-mail: jodyd@hvaccncorp.wa
Address: 5188 NE Int'l way	
City/State/ZIP: Milwaukie 97222	
Phone: 5034626555	FAX: 5034626555
Lic. no.	CCB lic. no. 50897
Authorized signature:	Date: 11/19/13
Print name: Jody Deben	
Applicant	
Business name: HVAC INC	
Contact name:	
Address: SAME	
City/State/ZIP:	
Phone:	FAX:
E-mail:	

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete.

Commercial Fee Schedule - Use Checklist			
Mechanical permit fees* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar of all mechanical materials, equipment, labor, overhead and profit).			
Value: \$ <del>87000</del> = 87000			
Residential Equipment / Systems Fees			
For special information use checklist			
Description	Qty.	Fee	Total
<b>Heating / cooling</b>			
Air conditioner (site plan required)		\$26	
Furnace / burner including duct work / vent / liner		\$55	
Heat pump (site plan required)		\$51	
Air handling unit		\$26	
Hydronic hot water system		\$32	
Residential boiler (radiator or hydronic) includes piping		\$32	
Unit heaters (fuel type, not electric) in-wall, in-duct, suspended, etc.		\$26	
Vent for appliance other than furnace		\$22	
Alteration of existing HVAC system		\$32	
<b>Other fuel appliances</b>			
Decorative gas fireplace		\$26	
Flue vent for water heater or gas fireplace		\$22	
Wood / pellet stove		\$57	
Gas or wood fireplace / insert		\$57	
Chimney / liner / flue / vent		\$22	
Other:		\$32	
<b>Environmental exhaust and ventilation</b>			
Range hood / other kitchen equipment		\$14	
Clothes dryer exhaust		\$14	
Single-duct exhaust (bathrooms, toilet compartments, utility rooms)		\$14	
Attic / crawl space fans		\$14	
Other:		\$32	
<b>Gas fuel piping</b>			
\$14 for the first four, \$2.57 for each additional. Please indicate number of fuel gas piping outlets below:			
Furnace, etc.			
Gas heat pump			
Wall / suspended / unit heater			
Water heater / boiler			
Fireplace			
Range			
Barbecue			
Clothes dryer			
Other:			
<b>Other appliances</b>			
Including oil tanks, gas and diesel generators, gas and electric kilns, gas appliances / equipment not included above		\$32	
<b>Mechanical permit fees</b>			
			Subtotal
			Minimum permit fee (\$95)
			Commercial plan review (60% of permit fee)
			State surcharge (12% of permit fee)
			<b>TOTAL PERMIT FEE</b>

RS Permit/No Fees Due

Residential Combo permit subcontractor submittals only can be faxed to 503-823-7693 or e-mailed to BDSCombInspSec@portlandoregon.gov.