

DPD

Director's Rule 5-2004

Applicant: City of Seattle Department of Planning and Development	Page 1 of 9	Supersedes: 8-2002
	Publication: 10/14/04	Effective: 12/1/04
Subject: Alteration and Repair of Unreinforced Masonry Chimneys	Code and Section Reference: Seattle Building Code (2003)	
	Type of Rule: Code Interpretation	
	Ordinance Authority: SMC 3.06.040	
Index: Seattle Building Code	Approved (signature on file)	Date 11/22/04 Diane M. Sugimura, Director, DPD

BACKGROUND:

In the 2001 Nisqually Earthquake, many unreinforced masonry chimneys were damaged, creating a falling hazard for people and property. This same type of chimney was also heavily damaged in California earthquakes. Some jurisdictions in California have reacted by requiring damaged chimneys to be torn down and replaced with factory-built metal chimneys. However, because earthquakes are less frequent in Seattle than in parts of California, DPD does not feel it is necessary to remove all unreinforced masonry chimneys.

Following the Nisqually Earthquake, DPD instituted a policy to mitigate this hazard by requiring that all damaged chimneys be reinforced, braced, removed, or replaced with a factory-built chimney. DPD believes that applying this rule to all alterations and repairs of existing chimneys will enhance life safety, since chimneys meeting these standards have performed relatively well in previous earthquakes.

WARNING- Chimneys may be used for venting more than one appliance. For example, the same chimney may vent both a gas water heater and a fireplace. Before capping or removing a chimney, it is important to verify that it is not needed to vent any other appliance.

RULE:

A. Policies for repairs and alterations

1. If the cost to the owner for chimney alterations or repairs is less than \$4,000, a permit is not required. However, even if a permit is not required, all work must conform to the requirements in this rule. See Seattle Building Code, Section 106.2

Exception: Minor patching does not require a permit, and need not comply with this rule.

2. Where chimney alterations or repairs extend below the top of the smoke chamber, the smoke chamber and the chimney must be entirely rebuilt in full compliance with current code requirements. A building permit is required regardless of the cost of work, and the permit and plan review fees will be based on the value of construction. If the chimney extends more than 12 feet above the roof line, a licensed engineer must design the chimney and its connections to the building.
3. All chimney alterations or repairs either must be done with reinforced masonry or the chimney must be replaced with a factory-built metal chimney.

Exceptions:

- 1) Where repair work is confined to the top 2 feet of the chimney, the repaired portion may be replaced in kind, provided that chimneys extending more than 12 feet in height above the roof must be externally braced to the roof structure.
- 2) Where the existing chimney is of a size that cannot be reinforced, it may be rebuilt using unreinforced masonry provided that chimneys more than 3 feet in height above the roof must be externally braced to the roof structure.
4. All chimneys that extend more than 3 feet in height above the roof must be supported at a minimum of two points, unless Exception 1 of Section A.3 of this Rule applies.
5. Any existing unreinforced masonry that is to remain must be inspected for damage or deterioration, and tuckpointed as needed.
6. If DPD standard details are used, or if an engineered design is used which has no correction comments, the permit fee shall be the minimum required for an ASC Counter Application (formerly called a Subject To Field Inspection, or STFI, permit). An additional plan review fee will be added if written correction comments are necessary on an engineered design.

B. Options for Repair and Alteration

Option 1- support at floor and roof lines. Demolish the existing chimney to the floor line below the roof. Rebuild from that point upward in reinforced masonry, in compliance with Attachment A "Typical Masonry Fireplace Chimney Repair" standard detail. New rebar shall be dowelled into the existing chimney at least 12 inches, or Attachment B "Concrete Bond Beam Anchorage Into Building" standard detail shall be used. Tie the reinforced portion to the building at the roof line and the floor line below the roof.

Option 2- support at top of smoke chamber, floors and roof. Demolish the existing chimney to the top of the fireplace smoke chamber. Rebuild from that point upward in reinforced masonry in compliance with Attachment A. New rebar shall be dowelled into the existing chimney at least 12 inches, or Attachment B shall be used. Tie the reinforced portion to the building at roof line and any floor line.

Option 3- brace to roof and support at roof line. Demolish the existing chimney to just below the roof line. Rebuild from that point upward in reinforced masonry in compliance with Attachment A. New rebar shall be dowelled into the existing chimney at least 12 inches, or Attachment B shall be used. Tie the chimney to the building at roof line, and provide an external brace in the upper portion of the chimney in accordance with Attachment C "Typical Masonry Chimney Roof Brace" standard detail. Where the existing chimney is of a size that cannot be reinforced, it may be rebuilt using unreinforced masonry. Unreinforced masonry chimneys less than 3 feet in height above the roof need not be braced.

Option 4- replacement with factory-built metal chimney. Demolish the existing chimney to the top of the smoke chamber. Add a UL or equivalent listed metal chimney transition assembly and a factory-built metal chimney above in accordance with Attachment D "Transition from Masonry Fireplace to Metal Chimney" and Attachment E "Adapter Kit, Transition from Masonry Fireplace to Metal Chimney" standard details. Tie the metal chimney at the roof level and brace the upper portion back to the roof for extensions according to the manufacturer's recommendations. A metal stud chase may be built to enclose the metal chimney, as shown in Attachment F "Steel Stud Chase" standard detail.

Option 5- engineered design. Engineered designs may be submitted for the entire chimney or portions of the chimney, including bracing.

C. Inspections of Chimney Work Under a Building Permit.

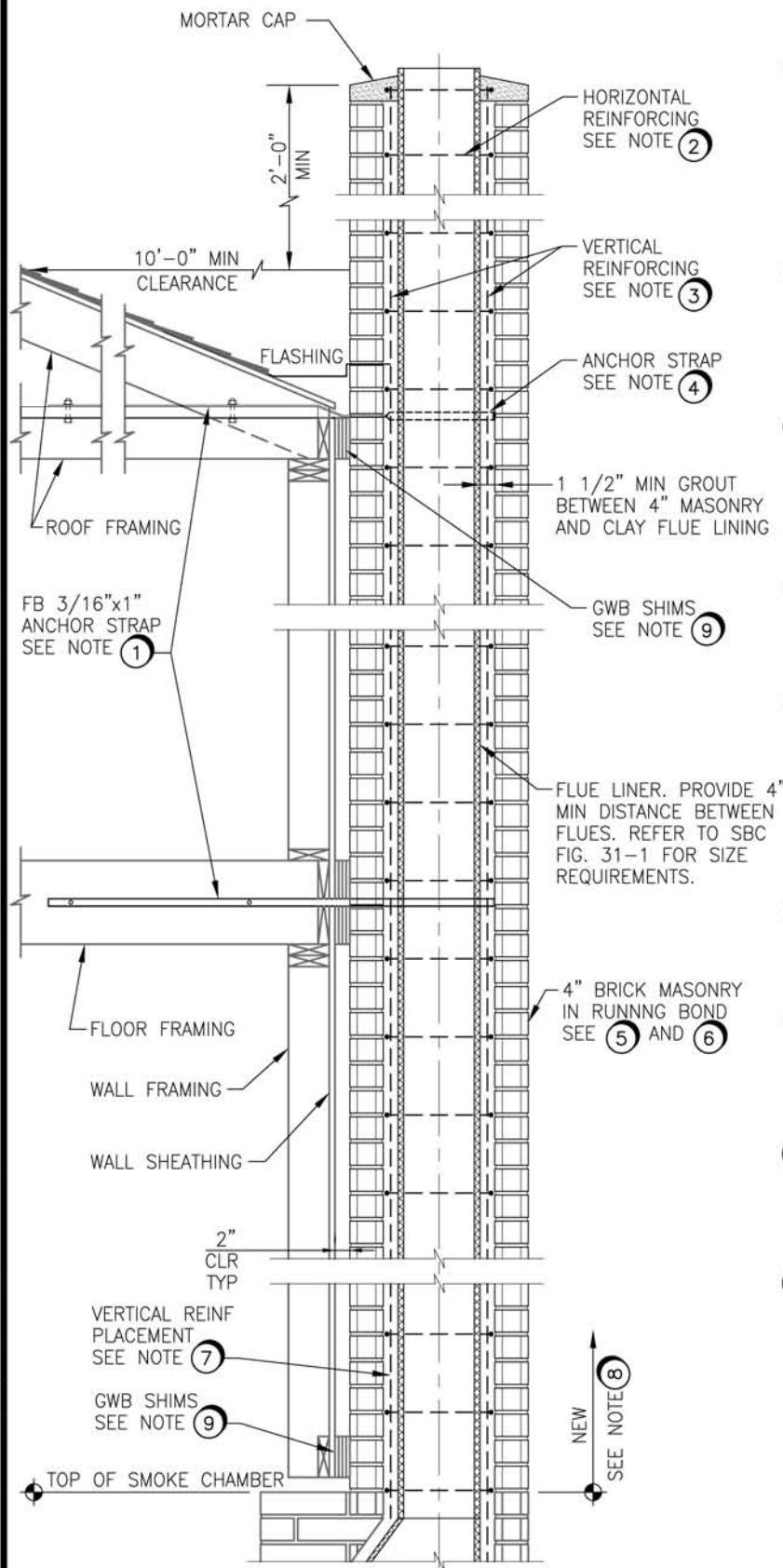
The owner or contractor must call DPD for inspections at the following times:

1. When the chimney demolition is completed and the contractor is ready to start;
2. Prior to placing concrete for the bond beam (Attachment B); and
3. When the work is complete.



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REPAIR NOTES:

- ① EACH STRAP SHALL BE FASTENED TO STRUCTURAL FRAMEWORK OF THE BUILDING W/ (2) 1 1/2"Ø BOLTS PER STRAP. WHERE THE JOISTS DO NOT HEAD INTO THE CHIMNEY, THE ANCHOR STRAP SHALL BE CONN. TO 2x4 TIES CROSSING A MINIMUM OF 4 JOISTS. THE TIES SHALL BE CONNECTED TO EACH JOIST W/ (2) 16d NAILS. SEE ATTACHMENT B FOR ALTERNATE CONNECTION.
- ② VERTICAL BARS SHALL BE TIED HORIZ. AT NOT MORE THAN 9" INTERVALS, WITH NOT LESS THAN 1 1/4"Ø STEEL TIES OR 4" STD. WT. MASONRY JOINT REINFORCEMENT. HORIZ. REINFORCEMENT SHALL BE PROVIDED AT ALL FLOOR AND CEILING LINES AS WELL AS IN THE CHIMNEY CAP.
- ③ (4) #4 FULL-LENGTH BARS FOR CHIMNEY UP TO 60" WIDE. ADD (2) #4 BARS FOR EACH ADD'L 60" (OR FRACTION THEREOF) OF WIDTH OR EACH ADD'L FLUE. VERTICAL BARS SHALL HAVE A MIN. COVER OF 1/2" OF GROUT OR MORTAR TEMPERED TO A POURING CONSISTENCY.
- ④ CONNECT ANCHOR STRAP AROUND THE NEAREST VERT. BARS WITH A 180° BEND OR A 90° BEND WITH AN EXTENSION OF AT LEAST 6" INTO THE GROUT SPACE.
- ⑤ MASONRY CHIMNEYS MAY BE OFFSET AT A SLOPE OF NOT MORE THAN 4 UNITS VERTICAL IN 24 UNITS HORIZONTAL (16.7% SLOPE), BUT NOT MORE THAN ONE THIRD OF THE DIMENSION OF THE CHIMNEY, IN THE DIRECTION OF THE OFFSET. THE SLOPE OF THE TRANSITION FROM THE FIREPLACE TO THE CHIMNEY SHALL NOT EXCEED 2 UNITS VERTICAL IN 1 UNIT HORIZONTAL (200% SLOPE).
- ⑥ MASONRY CHIMNEYS SHALL NOT CHANGE IN SIZE OR SHAPE WITHIN 6" ABOVE OR BELOW ANY COMBUSTIBLE FLOOR, CEILING, OR ROOF COMPONENT PENETRATED BY THE CHIMNEY.
- ⑦ BARS SHALL EXTEND FROM THE TOP OF THE SMOKE CHAMBER TO THE CHIMNEY CAP IN A FIREPLACE AND THE FULL HEIGHT OF THE CHIMNEY NOT SERVING A FIREPLACE AND SHALL BE SPLICED 20".
- ⑧ EXTEND VERTICAL REINF 12" MIN BELOW TRANSITION. FILL VOID SPACE AROUND THE EXISTING SMOKE BOX WITH GROUT BOX AS REQ'D. CHIMNEYS THAT EXTEND MORE THAN 12'-0" ABOVE THE EAVE MUST BE DESIGNED BY A STRUCTURAL ENGINEER.
- ⑨ COMBUSTIBLE MATERIALS SHALL NOT BE PLACED WITHIN 2 INCHES OF FIREPLACE, SMOKE CHAMBER, OR CHIMNEY WALLS.

ATTACHMENT A
TYPICAL MASONRY FIREPLACE CHIMNEY REPAIR



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JOISTS PERPENDICULAR TO EXTERIOR WALL

3/16"x1"x REQ'D STEEL ANCHOR STRAP WITH 180° BEND
OR 90° BEND PLUS 6" EXTENSION STRAP ACROSS (4)
JOISTS WITH (1) 16d NAIL INTO EACH JOIST, TYP.

#4 VERT. PER ATTACHMENT A, TYP.

SEC

2x BLOCKING

NEW FLUE LINER

PLAN

1/4"Ø STEEL TIES OR 4"
STD. WT. MASONRY JOINT
REINFORCEMENT @ 9" OC.

#4 BAR, EMBED 9" INTO
BOND BEAM

STRAP TO FLOOR/ROOF

FLOOR/ROOF

NEW REINF. CONC.
BOND BEAM, DEPTH
AS REQ'D FOR
9" EMBEDMENT
OF VERT. BARS

OPTIONAL
BRICK VENEER,
1" MAX.
THICKNESS

NEW REINF. MASONRY
WITH FLUE LINER
9"
MAX

EXIST. MASONRY
(VERIFY COND.)

BEND AS REQ'D, 6 $\frac{1}{2}$ " MAX, TYP.

#4 TIES, TOP & BOTTOM OF BOND BEAM

SEC

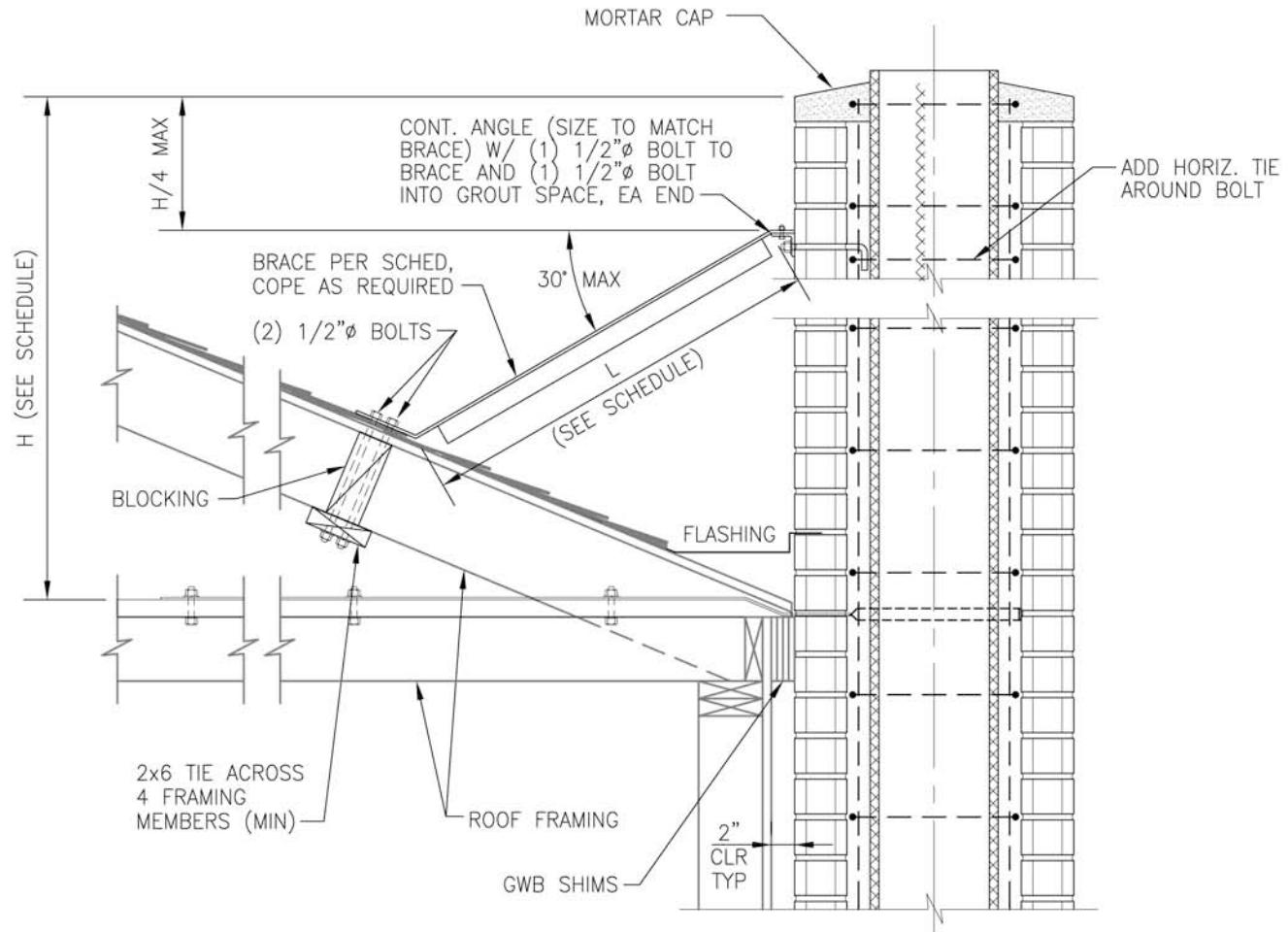
SECTION – PARTIAL CHIMNEY REBUILD

ATTACHMENT B CONCRETE BOND BEAM ANCHORAGE INTO BUILDING



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BRACE SCHEDULE			
HEIGHT ABOVE EAVE (H)	LENGTH OF BRACE (L)	BRACE SIZE	NO. OF BRACES
6'-0" MAX	6'-0" MAX	L 2 x 2 x 1/4	1 (CENTERED)
10'-0" MAX	10'-0" MAX	L 2 1/2 x 2 1/2 x 3/8	2 (1 EACH END)

NOTES:

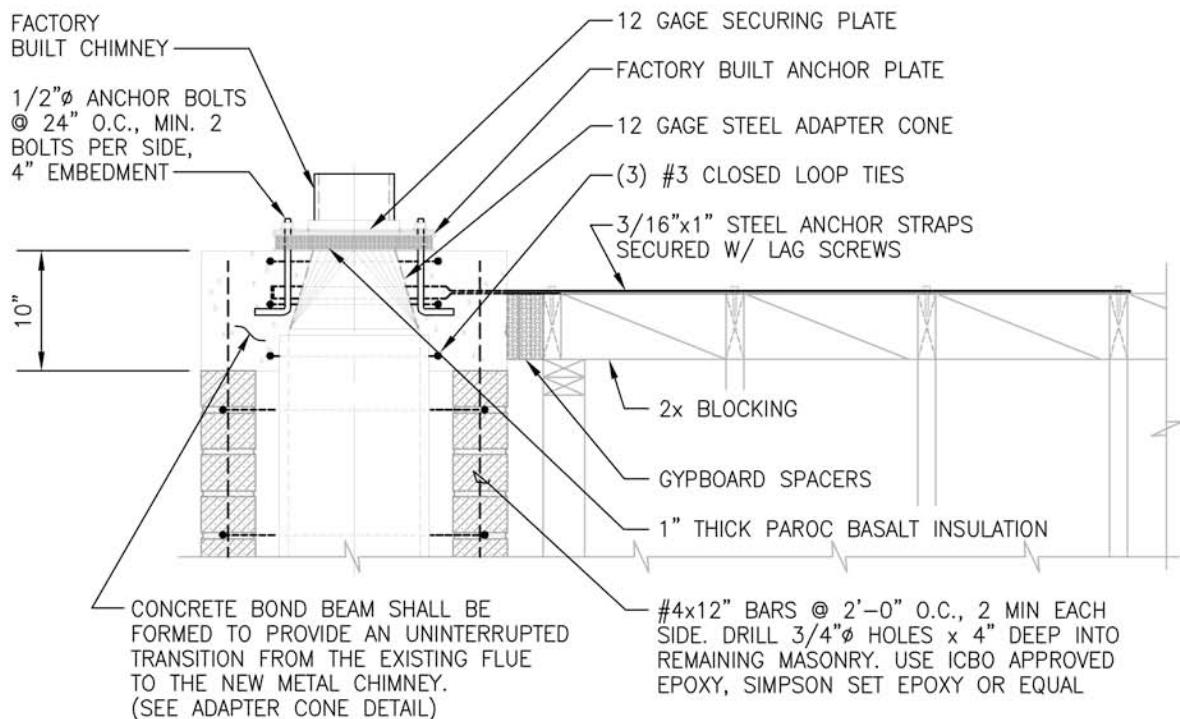
1. THIS DETAIL APPLIES TO CHIMNEYS WITH CROSS-SECTIONAL AREA \leq 720 SQ. IN. (36" x 20").
2. FOR CHIMNEYS WITH CONDITIONS IN EXCESS OF THAT SHOWN, BRACES SHALL BE DESIGNED BY A STRUCTURAL ENGINEER.
3. SEE ATTACHMENT "A" FOR INFORMATION NOT SHOWN.

ATTACHMENT C TYPICAL MASONRY CHIMNEY ROOF BRACE

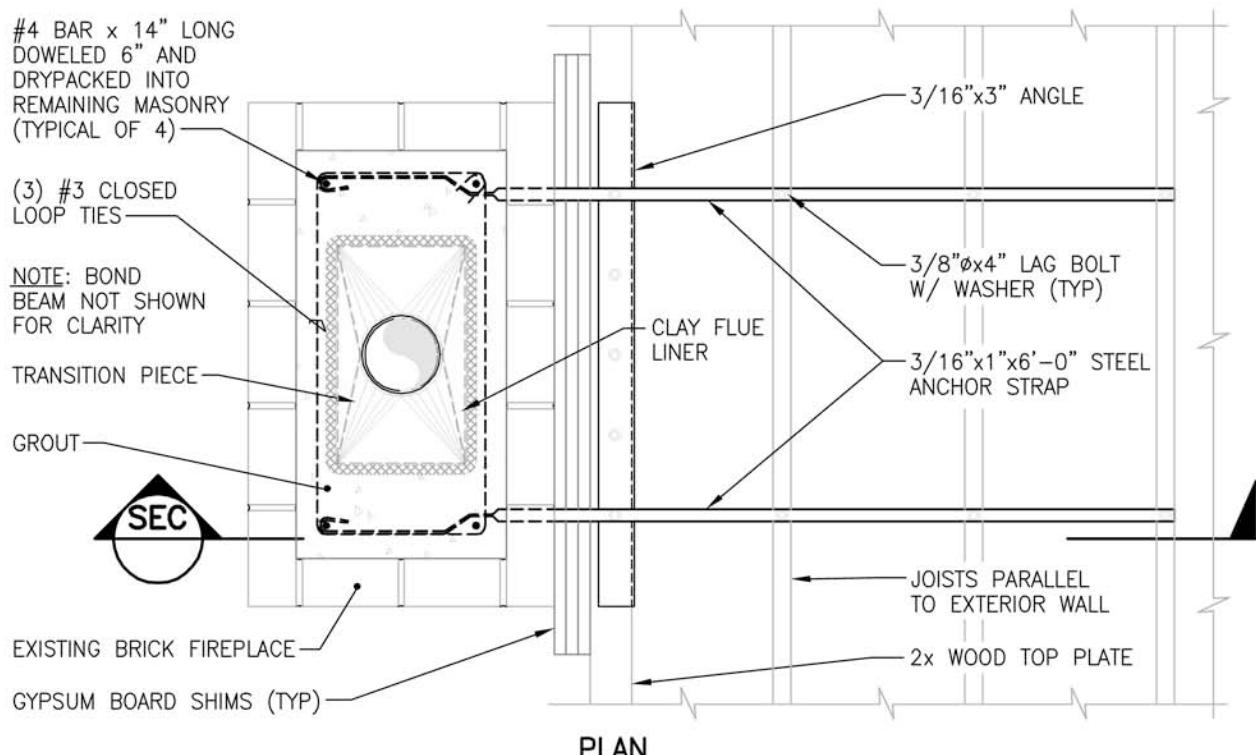


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SECTION AT BOND BEAM

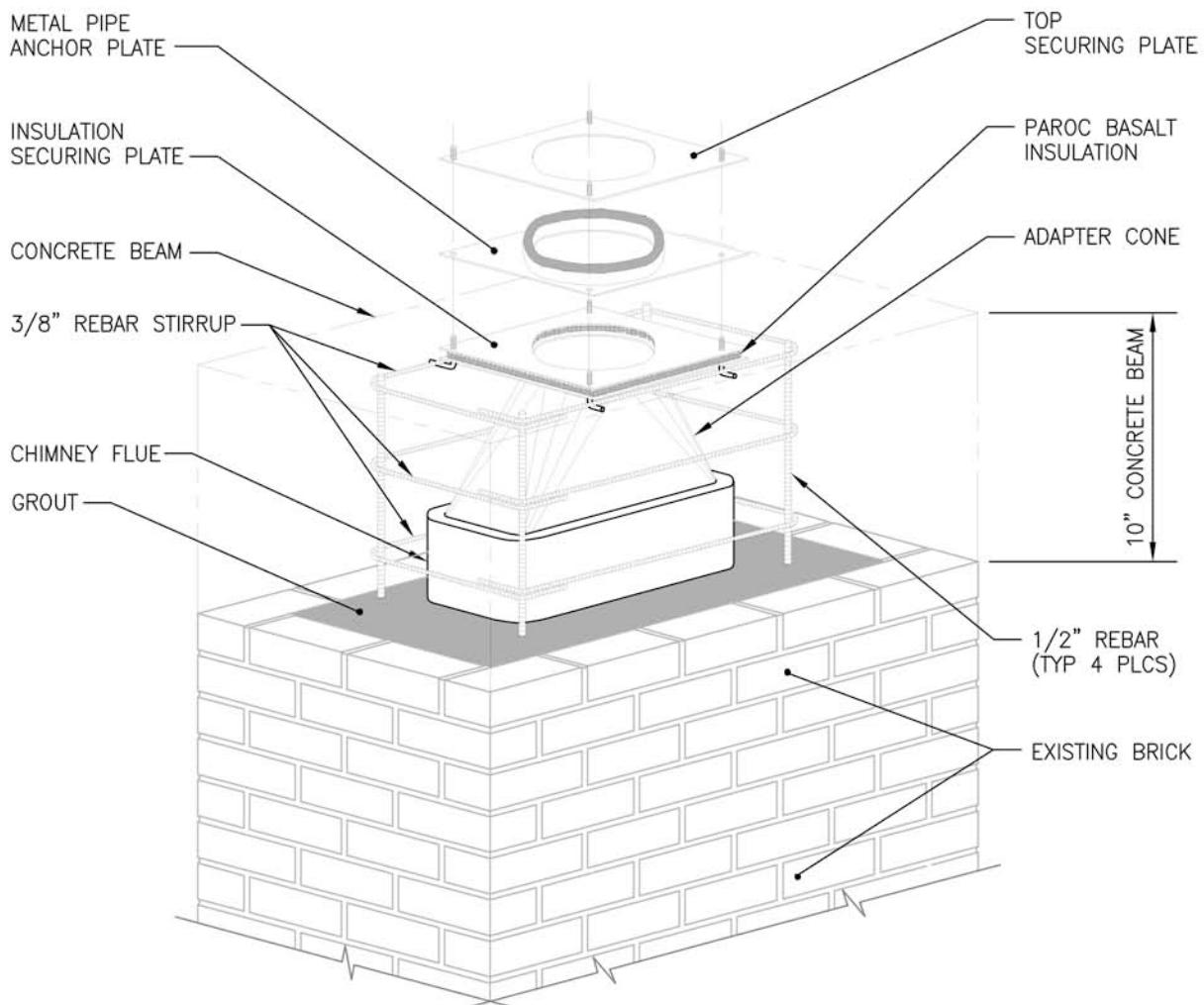


ATTACHMENT D TRANSITION FROM MASONRY FIREPLACE TO METAL CHIMNEY



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NOTE:

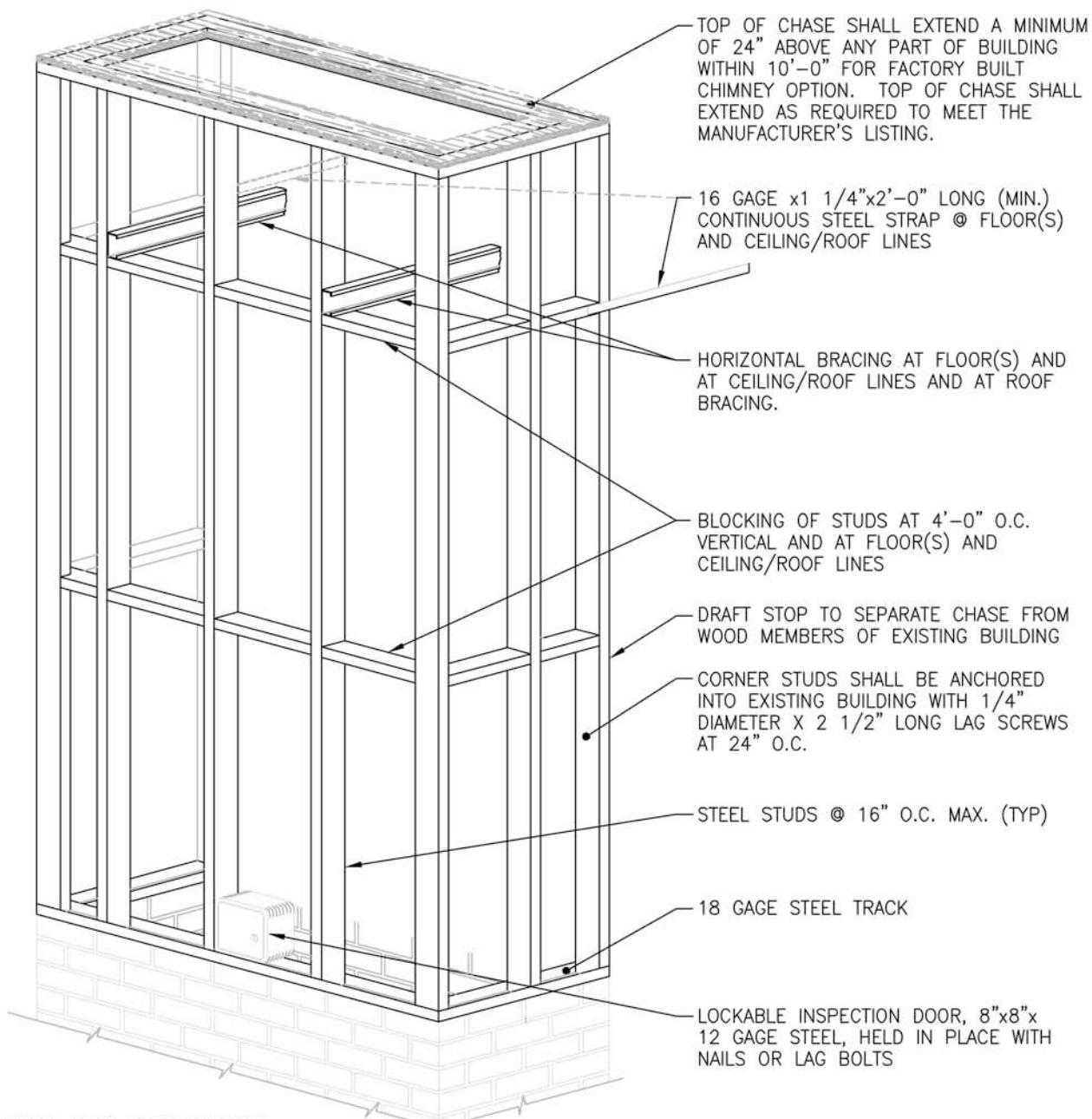
REFER TO DETAIL A1 FOR ADDITIONAL INSTALLATION REQUIREMENTS.

ATTACHMENT E
ADAPTER KIT, TRANSITION FROM
MASONRY FIREPLACE TO METAL CHIMNEY



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STEEL STUD SPECIFICATIONS:

- ALL STEEL STUDS SHALL BE EITHER GALVANIZED OR FACTORY PAINTED "C" TYPE GALVANIZED STUDS
- 3 1/2" WIDE x 18 GAGE MINIMUM, Fy = 33 KSI (MIN)

COVERING:

- WOOD STUD CHASE MAY BE COVERED WITH STUCCO OR ADHERED VENEER.

COVERING MATERIAL:

- LATHS FOR STUCCO: NO. 8 x 5/8" SHEET METAL SCREWS AT 6" O.C.
- PLYWOOD: NO. 6 BULGE HEAD SCREWS AT 6" O.C. AT CHASE AND 12" O.C. AT INTERIOR EDGES AND FIELDS.

NOTE:

ADHERED VENEER SHALL BE A MAXIMUM OF 1" THICK WITH PLYWOOD BACKING (3/8" MINIMUM) AND SHALL BE INSTALLED PER UBC CHAPTER 14 AND MANUFACTURER'S LISTING.