Residential Engineering Services, P. A.
204 W. Main Street Gibsonville, NC 27249 Phone:(336)-449-0505 • Fax:(336)-449-0508
Structural Layouts • Jobsite Inspections

Joshua Rountree
c/o Patrick Morgan
#774 E. King Street, Suite A
Boone, North Carolina 28607

March 21, 2009

Dear Mr. Rountree,

The purpose of this letter is to address five structural items noted on the home inspection report prepared by ERI Inspection Services (dated 3/6/09) for the property you are purchasing at #293 Pinewood Circle in Fleetwood, North Carolina. A field inspector from our company visited the property on March 19th to visually inspect, measure, and photograph the areas of concern.

The first item is item #10 from the home inspection report regarding cracks in the bottom surface of the fireplace. Inside the firebox of the fireplace, several cracks in the masonry from 1/16" to 1/8" in width are visible. There is a maximum 1/8" crack visible between the hearth and the hearth and the fireplace. The brick at the top of the fireplace opening has a 1/16" hairline crack.

Inspection of the chimney and supporting foundation construction revealed that the chimney is adequately supported. These cracks are likely the result of minor settlement and/or high heat in the firebox as the chimney appears to have been used extensively to burn wood. I do not recommend any repairs in this area. The cracks may be sealed cosmetically if desired with mortar or other approved masonry sealant.

The second item is item #11 from the home inspection report regarding movement of the chimney. The chimney is 16' in height at the tall end. Our measurement of the vertical level of the chimney finds that it is out of plumb approximately 1/8" in 2' on the worst case faces (maximum 2" for the full height of the chimney). The 1-1/2" gap between the brick and wood siding on the left side has been filled with foam. The right side has a wood filler that covers any possible spacing. At the top right of the chimney-house intersection, there is a 1-1/2" gap from brick to siding, but this is protected by the soffit overhang and a wood brace.

This lean is likely due to minor settlement of the chimney base or may have been constructed in this manner. Due to the age of the home (30+ years), I do not recommend a repair for this issue.

The third item is item #15 from the home inspection report regarding a hole and cracks in the foundation walls. There is a 3-1/4"x 6-1/4" hole in the foundation at the southwest corner of the home (see enclosed field sketch). There is also are

1/16" to 1/8" crack in the masonry foundation near this hole that has been covered or parged. At the southeast corner of the house, a 1/16" to 1/8" crack is visible in the masonry foundation wall and the head joint above one block has fallen ½". A sewer line and a newly installed hose bib run through the wall at this location.

The cracks in the southwest corner are of little concern and may be cosmetically repaired as desired. The cracks in the southeast corner of the home are of greater concern. I recommend excavating this area down to the footing to visually check that the footing has not been cracked. If so, the footing should be reinforced with a set of helical piers installed by a reputable foundation repair company or repaired by removing and replacing the cracked footing (ensuring that the new footing is properly tied into the old footing with drilled and epoxied rebar – 2 ea. #4 bars x 12" (half in/half out)). Regardless of the footing condition, the masonry blocks that are cracked should be removed and rebuilt. Masonry block of the same dimension filled with concrete is recommended.

The fourth item is item #16 from the home inspection report regarding soil being removed from the crawl space in proximity to piers and foundation walls. A previous owner excavated soil from the interior crawl space in order to gain head height and create some useable space (see enclosed field sketch). During this process a ledge was created adjacent to one pier and two foundation walls.

An 8x16 masonry pier next to the cut was added along with a second pier to support a dropped 4x6 girder added to the bottom of the floor joists – presumably to dampen some vibration or deflection in the floor above. Since these joists are 2x8 members spaced at 16"o.c. spanning a maximum of 12', these piers and girder are not structural necessities. Therefore, the soil cut beside this pier is not a concern.

However, soil cuts should not be deeper than the horizontal measurement from the cut to the adjacent footings. Two sections of the foundation wall (north and west) violate this rule. There are several possible methods to repair this situation. First, compacted soil or gravel may be added back to the excavated areas to restore the stability to the adjacent footing. Second, the cuts may be reinforced by adding 8" masonry block retaining walls on top off 8"x16" concrete footings. Finally, the cuts may be reinforced with 8" poured concrete walls on 8"x16" monolithic footings if you plan to pour an additional concrete slab in the excavated area.

The final item is item #18 from the home inspection report regarding the unsupported joints in the main support girders. Apparently, a previous homeowner removed two masonry piers supporting the main girder during the excavation of the crawl space. These piers were replaced with 82" 4-1/2" round tall steel columns, but the columns were not located directly under the spliced ends of the 3-ply 2x8 girder. This is a serious structural concern.

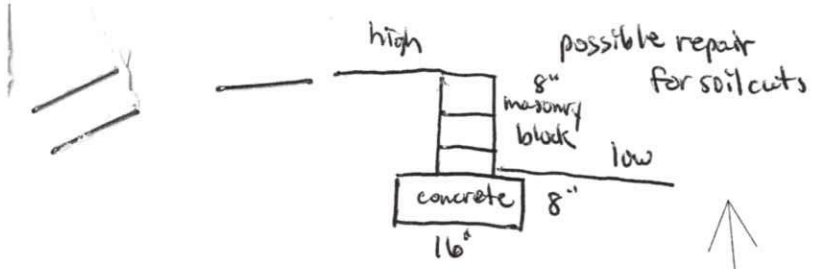
I recommend excavating and pouring two new 24"x24"x8" concrete footings directly below the joints in the 3-ply 2x8 girder. A U-shaped steel saddle should

be added around the joints for stability (Simpson LCC4.5-4 or equivalent). The steel columns should then be relocated to support the joints and bear on the new concrete footings.

I hope that this information is sufficient for your needs. Please feel free to contact me at the number above with any questions regarding this matter.

Sincerely,

Brooke T. Carpenter, P.E.
Structural Engineer



Field Sketch
Rick Smith - Inspector
3-19-09

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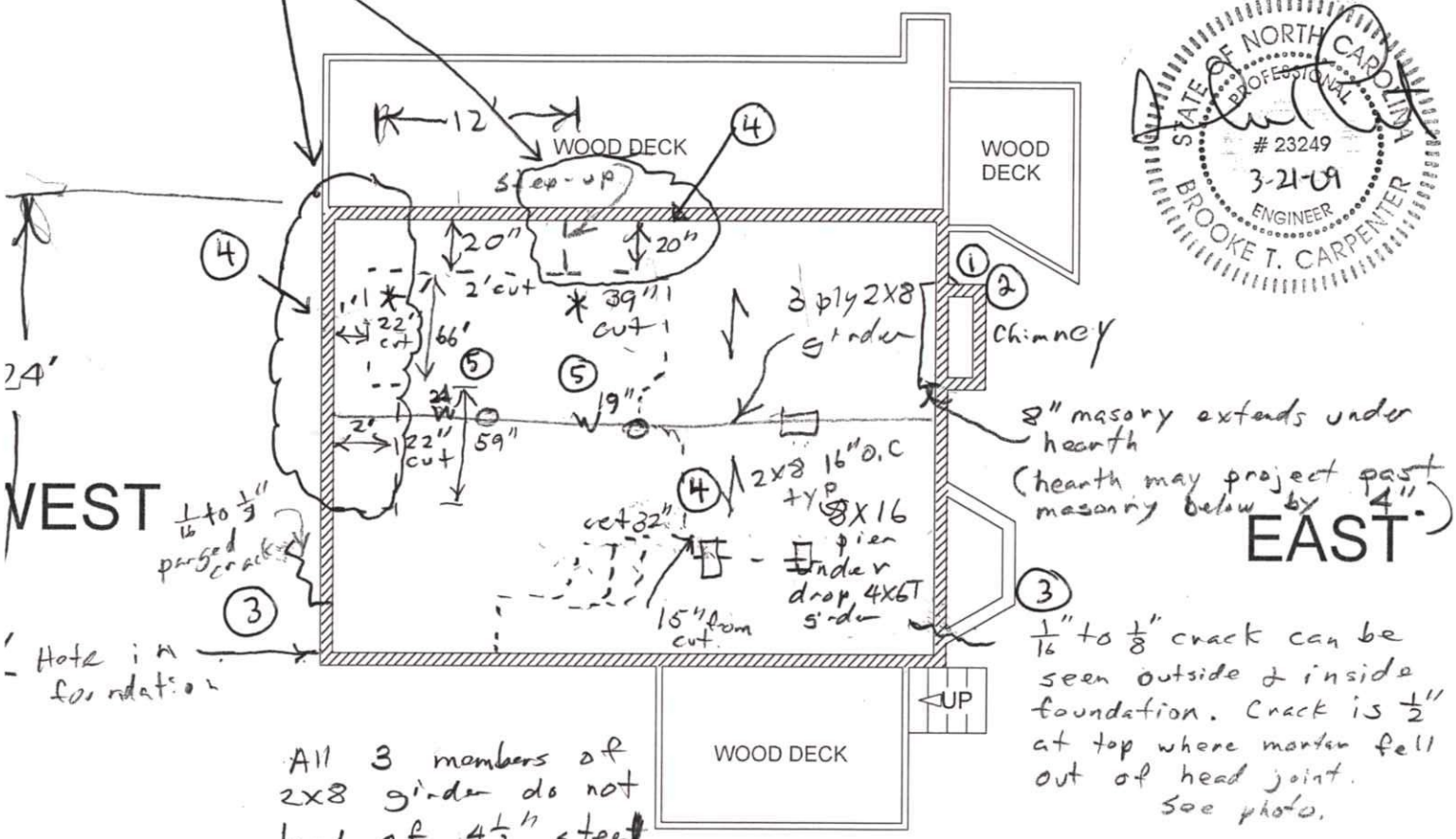
circled areas require repair at soil cuts by foundation

NORTH

Front

STATE OF NORTH CAROLINA PROFESSIONAL # 23249 3-21-09 ENGINEER BROOKE T. CARPENTER



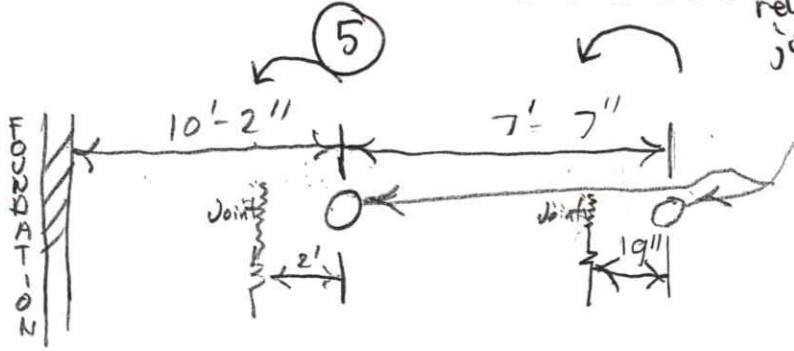
All 3 members of 2x8 girder do not load of 4½" steel columns. 2 piers were removed from these joints due to over dig. (joints 19" & 24" from center of steel column)

NOT TO SCALE
DIRECTIONAL REFERENCE ONLY

293 PINEWOOD CIRCLE
FLEETWOOD, NC

SOUTH

relocate columns under girder joints w/new 24"x24"x8" concrete footings



BC/BCS *Post Caps*

SIMPSON Strong-Tie®

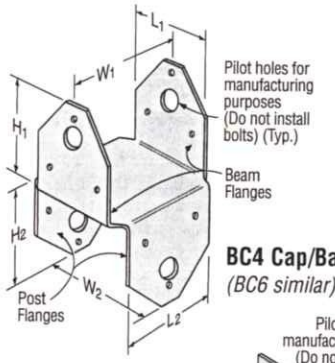
The BCS allows for the connection of 2-2x's to a 4x post or 3-2x's to a 6x post. Double shear nailing between beam and post gives added strength! The BC series offers dual purpose post cap/base for light cap or base connections.

MATERIAL: 18 gauge

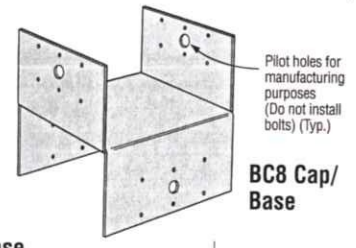
FINISH: Galvanized. Some products available in ZMAX® coating; see Corrosion Information, page 10-11.

INSTALLATION:
- Use all specified fasteners. See General Notes.
- Do not install bolts into pilot holes.
- BCS: install dome nails on beam; drive nails at an angle through the beam into the post below to achieve the table loads
- BC: install with 16d commons or 16dx2½" joist hanger nails.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non top-supported installations *(such as fences or unbraced carports).*
- To tie multiple 2x members together, the Designer must determine the fasteners required to join members to act as one unit without splitting the wood.

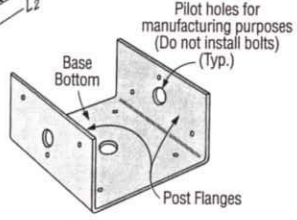
CODES: See page 12 for Code Reference Key Chart.



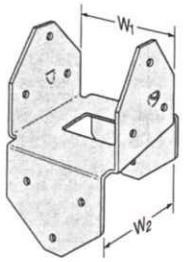
BC4 Cap/Base
(BC6 similar)



BC8 Cap/ Base



BC60 Half Base
(other similar)

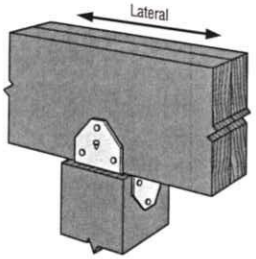


BCS2-2/4
U.S. Patent 5,603,580

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson Strong-Tie for details.

Model No.	Dimensions						Fasteners			Allowable Loads (160)[1]		Code Ref.
	W_1	W_2	L_1	L_2	H_1	H_2	Beam Flange	Post Flange	Base Bottom	Uplift	Lateral	
CAPS												
BC4	3 9/16	3 9/16	2 7/8	2 7/8	3	3	6-16d	6-16d	—	980	1000	I12, L20, F11
BC46	3 9/16	5½	4 7/8	2 7/8	3½	2½	12-16d	6-16d	—	980	1000	
BC4R	4	4	4	4	3	3	12-16d	12-16d	—	980	1000	
BC6	5½	5½	4 3/8	4 3/8	3 3/8	3 3/8	12-16d	12-16d	—	1050	2000	
BC6R	6	6	6	6	3	3	12-16d	12-16d	—	1050	2000	
BC8	7½	7½	7½	7½	4	4	12-16d	12-16d	—	1800	2000	
BCS2-2/4	3⅛	3 9/16	2 7/8	2 7/8	2 15/16	2 15/16	8-10d	6-10d	—	780	1025	
BCS2-3/6	4⅝	5 9/16	4 3/8	2 7/8	3 5/16	2 15/16	12-16d	6-16d	—	800	1495	
BASES												
BC40	3 9/16	—	3¼	—	2¼	—	—	6-16d	4-16d	510	735	170
BC40R	4	—	4	—	3	—	—	6-16d	4-16d	510	735	
BC460	5½	—	3⅜	—	3	—	—	6-16d	4-16d	450	735	
BC60	5½	—	5½	—	3	—	—	6-16d	4-16d	450	735	
BC60R	6	—	6	—	3	—	—	6-16d	4-16d	450	735	
BC80	7½	—	7½	—	4	—	—	6-16d	4-16d	450	735	
BC80R	8	—	8	—	4	—	—	6-16d	4-16d	450	735	

1. Allowable loads have been increased 60% for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
2. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face. See technical bulletin T-SCLCOLUMN for values on the narrow face (edge) *(see page 191 for details).*
3. Base allowable loads assumes nails have full penetration into supporting member. Loads do not apply to end grain post installations.
4. **NAILS:** 16d = 0.162" dia. x 3½" long, 10d = 0.148" dia. x 3" long. See page 16-17 for other nail sizes and information.



Typical BCS Installation

LCC *Lally Column Caps* / CCOS *Steel Column Caps*

Lally column caps and steel column caps provide adequate bearing length for larger girder reactions.

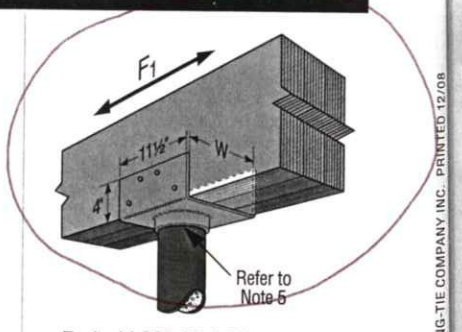
MATERIAL: LCC—12 gauge; CCOS—7 gauge **FINISH:** LCC—Simpson Strong-Tie® gray paint; CCOS—G90 Galvanized

INSTALLATION:
- Use all specified fasteners. See General Notes.
- LCC—Fit the lally column cap over the lally column and attach to the girder.
- **CCOS—Attach steel column cap to column end plate with (4) Simpson Strong-Tie Quik Drive® self-tapping screws *(provided)* and attach to girder.**

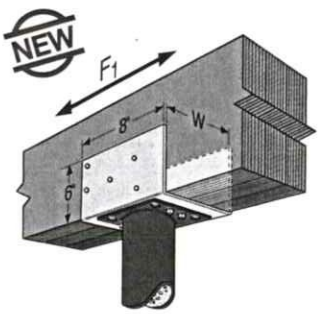
CODES: See page 12 for Code Reference Key Chart.

Model No.	W	Girder	Nails[7]	Lally Column Outside Diameter	Allowable Loads				Code Ref.
					Download[1,2,3,4]		Uplift	F_1[5]	
					DF/SP/SPF	LVL/PSL/LSL	(160)	(160)	
LCC4.5-3.5	4⅝	Triple 2x10/12	8-16d	3½	15820	—	—	1615	170
NEW CCOS3.12	3⅛	Double 2x10/12	10-10d	—	10200	—	1020	2200	
LCC3.5-3.5	3⅝	3.5 LVL/PSL/LSL	8-16d	3½	—	15820	—	1615	
LCC3.5-4	3⅝	3.5 LVL/PSL/LSL	8-16d	4	—	20670	—	1615	
NEW CCOS3.62	3⅝	3.5 LVL/PSL/LSL	10-10d	—	—	16665	1020	2200	
LCC4.5-4	4⅝	Triple 2x10/12	8-16d	4	20670	—	—	1615	
NEW CCOS4.62	4⅝	Triple 2x10/12	10-10d	—	15300	—	1020	2200	
LCC5.25-3.5	5⅜	5.25 LVL/PSL/LSL	8-16d	3½	—	15820	—	1615	
LCC5.25-4	5⅜	5.25 LVL/PSL/LSL	8-16d	4	—	20670	—	1615	
NEW CCOS5.50	5½	5.25 LVL/PSL/LSL	10-10d	—	—	22100	1020	2200	
LCC6-3.5	6⅛	Quad 2x10/12	8-16d	3½	15820	—	—	1615	
LCC6-4	6⅛	Quad 2x10/12	8-16d	4	20670	—	—	1615	
LCC7-3.5	7⅛	7 LVL/PSL/LSL	8-16d	3½	—	15820	—	1615	
LCC7-4	7⅛	7 LVL/PSL/LSL	8-16d	4	—	20670	—	1615	
NEW CCOS7.25	7¼	7 LVL/PSL/LSL	10-10d	—	—	27525	1020	2200	

1. Loads may not be increased for short-term loading.
2. Allowable loads are determined using the lowest of the bearing loads using F_{C}-perp equal to 425 psi for SPF, 625 psi for DF and 700 psi for LVL/PSL/LSL.
3. Loads are for a continuous beam.
4. Spliced conditions for the LCC must be detailed by the Designer to transfer tension loads between spliced members by means other than the lally column. The splice condition load is 6750 lbs per beam side for LCC must be evenly loaded.
5. To achieve lateral loads, the LCC pipe must be welded to the column with an ⅛" fillet weld around the entire pipe.
6. The CCOS must be attached to end plate of the column with (4) Quik Drive XQ112S1224 self-tapping screws through the end plate and into the bottom of the CCOS.
7. All pipe columns need to be designed by a qualified Designer. CCOS minimum column diameter is 3".
8. CCOS caps can resist out-of-plane (F_2) forces up to 2200 lbs. provided the beam is braced to resist torsional rotation.
9. **NAILS:** 16d = 0.162" dia. x 3½" long, 10d = 0.148" dia. x 3" long. See page 16-17 for other nail sizes and information.



Typical LCC5.25-3.5 Installation connecting a 3-ply LVL and a 3½" diameter (O.D.) steel column



Typical CCOS5.50 Installation connecting a 3-ply LVL and a steel column