

**STRUCTURAL GENERAL NOTES**

**DESIGN LOADS:** International Building Code, IBC 2009 Edition, except as noted  
Occupancy Category, Table 1604.5

Roofs:	II	Standard
Ground Snow, Pg	60 psf	(used for drifting calculations)
Snow Exposure Factor, Ce	Table 1608.3.1	1.0
Snow importance Factor, Is	Table 1604.5	1.0
Snow Thermal Factor, Ct	Table 1608.3.2	1.0

Floors:	40 psf
Residential	40 psf
Residential balconies	60 psf
Corridors/Stairs	Occupancy Served

Laterals	Analytic Method
Wind IBC 1603.1.4, ASCE 7-05	Analytic Method
3 Second Gust Velocity	100 mph
Importance Factor	1.0
Building Category and Internal Pressure Coefficient	Enclosed
IBC 1609.2, ASCE Figure 6-5	Enclosed
Exposure	C
Components and Cladding Pressures	DP 35 uno. Also see arch.

**FOUNDATION:**

- Foundations are designed without an engineer's soil investigation. Foundation design criteria was assumed for purposes of foundation design and shall be confirmed by a soils engineer, at owner's expense, prior to construction. (This procedure may require revisions to foundation design, at additional expense to the owner, if soils engineer determines that such design criteria are inappropriate for this building site.)
- Footings shall be placed on undisturbed natural soil or compacted fill tested and approved by soils engineer.
- Maximum design soil pressure: 1,500 psf

**FOUNDATION WALLS:**

- Design lateral soil pressure (equivalent fluid pressure): Walls: 45 pcf.
- Backfill all retaining walls with free draining granular material except the top two feet.
- Provide perimeter drain system with invert minimum of 6" below bottom of basement slab. Extend perimeter drain to daylight or to sump.
- Slope perimeter grade away from building.
- Place concrete continuously without horizontal cold joints.

**REINFORCED CONCRETE:**

We encourage the use of bladed furnace slag. Design is based on "Building Code Requirements for Reinforced Concrete"(ACI 318). Concrete work shall conform to "Standard Specifications for Structural Concrete" (ACI 3019).

Intended Use	F <sub>c</sub> , psi 28day	Max W/C Ratio	Maximum Aggregate	Slump inches	Entrained Air Percent ±1.5%	Cement Type	Admixtures, Comments
footings	3,000	.6	3/4" Stone	4	---	I/II	
walls	4,000	.45	3/4" Stone	4	6%	I/II	
exterior slab on grade	4,500	.45	3/4" Stone	4	6%	I/II	
interior slabs on grade	3,500	.5	3/4" Stone	4	---	I/II	Fibermesh

Detailing, fabrication, and placement of reinforcing steel shall be in accordance with the Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315).

Welded wire fabric shall conform to ASTM A185.

Reinforcing bars shall conform to ASTM A615, Grade 60,

except ties or bars shown to be field-bent, which shall be Grade 40.

Epoxy coated reinforcing bars shall conform to ASTM 775.

Zinc coated (galvanized) reinforcing bars shall conform to ASTM 767.

Bars to be welded shall conform to ASTM 706.

At splices, lap bars 50 diameters unless noted otherwise.

At corners and intersections, make horizontal bars continuous or provide matching corner bars.

Around openings in walls and slabs, provide 2-#5, extending 2'-0" beyond edge of opening.

In continuous members, splice top bars at mid-span and splice bottom bars over supports.

Provide intermittent shear keys at all construction joints and elsewhere as shown on the drawings.

Except as noted on the drawings, concrete protection for reinforcing in cast-in-place concrete shall be as follows:

- Cast against and permanently exposed to earth 3"
- Exposed to earth or weather:
  - #6 through #18 bars 2"
  - #5 bar, W31 or D31 wire, and smaller 1-1/2"
- Not exposed to weather or in contact with ground:
  - Slabs, walls, joists: #11 bar and smaller 3/4"
  - Beams, columns:
    - Primary reinforcement 1-1/2"
    - Stirrups, ties, spirals 1-1/2"

Fibermesh admixture shall be 100% virgin polypropylene, fibrillated fibers as manufactured by Fibermesh Co. per ASTM C-1116 type 111 4.1.3 and ASTM C-1116 performance level one, 1.5 lbs per cubic yard of concrete.

Anchor bolts and rods for beam and column-bearing plates shall be placed with setting templates.

Permanent corrugated steel forms for concrete floor slabs shall be manufactured and erected according to the "Specifications and Code of Standard Practice" of the Steel Deck Institute.

All concrete work is subject to inspection by a qualified special inspector employed by the owner in accordance with IBC Section 1704.4.

**STRUCTURAL STEEL:**

Structural steel shall be detailed, fabricated, and erected in accordance with latest AISC Specifications, and Code of Standard Practice.

Structural steel wide flange beams shall conform to ASTM A992.

Except as noted, framed beam connections shall be bearing-type with 3/4" diameter, snug tight, A490-N bolts, detailed in conformance with Part 4, Tables II and III, for 0.6 times the allowable uniform loads tabulated in Part 2 of the AISC Manual, 9th Edition. Install bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

All beams shall have full depth web stiffeners each side of webs above and below columns.

Anchor rods shall conform to ASTM F1554, Grade 55, with weldability supplement S1.

Attached anchor studs (HAS) shall be attached to structural steel with equipment approved by the stud manufacturer according to the stud manufacturer's recommendations.

Welding shall be done by a certified welder in accordance with AISC and AWS specifications and recommendations using E70-electrodes. Where not specifically noted, minimum weld shall be 3/16" fillet by length of contact edge.

All post-installed anchors shall have current National Evaluation Report, and shall be installed in accordance with the manufacturer's requirements.

Expansion anchors shall be approved "wedge" type unless specifically noted to be "sleeve" type.

Chemical anchors shall be approved epoxy or similar adhesive type and shall have current National Evaluation Report. Where base material is not solid, approved screen tubes shall be used.

GROUT beneath column base and beam-bearing plates shall be minimum 28-day compressive strength of 7,500 psi.

approved pre-bagged, non-metallic, non-gaseous, bleed free, non-shrink, when tested in accordance with ASTM C1107

Grade B or C at a flow cone fluid consistency of 20 to 30 seconds

**STRUCTURAL WOOD FRAMING:**

In-Grade Base Values have been used for design.

2x framing shall be Spruce-Pine-Fir S4S No. 2 and better unless noted.

All lumber shall be 19% maximum moisture content, unless noted.

Solid timber beams and posts shall be Douglas Fir-Larch No. 1.

Studs shall be Spruce-Pine-Fir S4S No. 2 and better.

Top and bottom plates shall be Spruce-Pine-Fir S4S No. 2 and better.

Wood in contact with concrete shall be pressure-treated Spruce-Pine-Fir S4S No. 2 or Southern Yellow Pine.

Conventional light framing shall comply with IBC Section 2308.

Except as noted otherwise, minimum nailing shall be provided as specified in IBC Table 2304.9.1 "Fastening Schedule."

All plywood and oriented strand board (OSB) sheathing shall be engineered grades with APA grade stamp indicating appropriate maximum spacing of supports.

Floor sheathing: nominal 3/4", APA Sturd-i-floor @ 24 inch o.c. tongue & groove glued and nailed.

Roof sheathing: minimum 1/2" CDX plywood, or 15/32" OSB, APA 3216, nailed.

Wall sheathing: 1/2" CDX plywood or 7/16" OSB, APA 2416, blocked and nailed.

Nail wall sheathing with 8d commons at 4" o.c. at panel edges, and 12" o.c. at intermediate framing except as noted.

Sheath all exterior walls. Sheath interior walls as shown on the drawings. Block and nail all edges between studs.

Sheathing shall be continuous from bottom plate to top plate. Cut in "L" and "T" shapes around openings. Lap sheathing over rim joists min. 4" at all floors to tie upper and lower stud walls together.

Minimum height of sheathing panels shall be 16" to assure that plates are tied to studs.

Minimum 3-8d per stud and nail plates with "edge nail" spacing.

Sole plate at all perimeter walls and at designated shear walls shall be nailed as for braced panels with 3-16d x 3 1/2" long box nails (coated or deformed shank) per 16". 12d nails are not acceptable.

Provide solid blocking between joists under jamb studs of openings.

Pre-engineered, prefabricated trusses shall be designed for the fabricator by a Professional Engineer Registered in the State of construction, and shall comply with Code Requirements.

Truss to truss connections specified shall be by truss supplier, unless specifically noted on the drawings.

Lower chord of gable end trusses shall be anchored to wall plate with framing anchors at 4'-0" spacing and laterally braced to roof framing at 8'-0" spacing.

Truss supplier shall specify all floor and roof truss bracing and bridging.

All roof rafters, joists, trusses, and beams shall be anchored to supports with metal framing anchors.

Light gage framing anchors shown or required, shall be Simpson "Strong Tie" or equal Code approved connectors and installed with the number and type of nails recommended by the manufacturer to develop the rated capacity.

Note that heavy-duty hangers and skewed hangers may not be stocked locally and require special order from the factory.

All beams and trusses shall be braced against rotation at points of bearing.

Unless otherwise indicated, install two lengths of solid blocking x joist depth x 12 inches long in floor framing under column loads. Columns must have a continuous load path to foundation.

Lead holes for lag screws shall be drilled in accordance with Table 6.23 of the AITC Timber Construction Manual, 3rd edition.

**SHOP DRAWINGS:**

Construction Documents are copyrighted and shall not be copied for use as erection plans or shop details.

Use of SI Inc.'s electronic files as base for shop drawings requires prior approval by SI Inc, signed release of liability by subcontractor,

payment of an administration fee of \$100 per drawing sheet to SI Inc, and

deletion of SI Inc.'s name and Logo from all sheets so used.

The General Contractor and his subcontractors shall submit in writing any requests to modify the plans or specifications.

All shop and erection drawings shall be checked and stamped by the General Contractor prior to submission for Engineer's review.

Unchecked submittals will be returned without review.

Furnish one (1) reproducible and two (2) prints of shop and erection drawings to the Structural Engineer for review prior to fabrication for reinforcing steel, structural steel and wood trusses.

Submit in a timely manner to permit ten (10) working days for review.

In shop drawings submitted for review do not constitute "in writing" unless specific suggested changes are clearly marked.

Any events, such changes by means of the shop drawing submittal process become the responsibility of the one initiating such change.

**FIELD VERIFICATION OF EXISTING CONDITIONS:**

Contractor shall thoroughly inspect and survey existing structure to verify conditions that affect the work shown on the drawings.

Contractor shall report any variations or discrepancies to the Architect before proceeding.

**STRUCTURAL ERECTION AND BRACING REQUIREMENTS:**

The structural drawings illustrate the completed structure with elements in their final positions, properly supported and braced.

These construction documents contain typical and representative details to assist the contractor.

Details shown apply at all similar conditions unless otherwise indicated.

Although due diligence has been applied to make the drawings as complete as possible, not every detail is illustrated, nor is every exceptional condition addressed.

Proprietary connections shall be installed in accordance with the manufacturers' recommendations.

All work shall be accomplished in a workmanlike manner and in accordance with the applicable code and local ordinances.

The general contractor is responsible for coordination of all work, including layout and dimension verification, materials coordination, shop drawing review, and the work of subcontractors.

Any discrepancies or omissions discovered in the course of the work shall be immediately reported to the architect for resolution.

Continuation of work without notification of discrepancies relieves the architect and engineer from all consequences.

Unless otherwise specifically indicated, the drawings do not describe methods of construction.

The contractor, in the proper sequence, shall perform or supervise all work necessary to achieve the final completed structure, and to protect the structure, workmen, and others during construction.

Such work shall include, but not be limited to, bracing, shoring for construction equipment, shoring for excavation, formwork, scaffolding, safety devices and programs of all kinds, support and bracing for cranes and other erection equipment.

Do not backfill against basement or retaining walls until supporting slabs and floor framing are in place and securely anchored, unless adequate bracing is provided.

Temporary bracing shall remain in place until all floors, walls, roofs and any other supporting elements are in place.

The architect and engineer bear no responsibility for the above items, and observation visits to the site do not in any way include inspection of them.

**ABBREVIATIONS KEY**

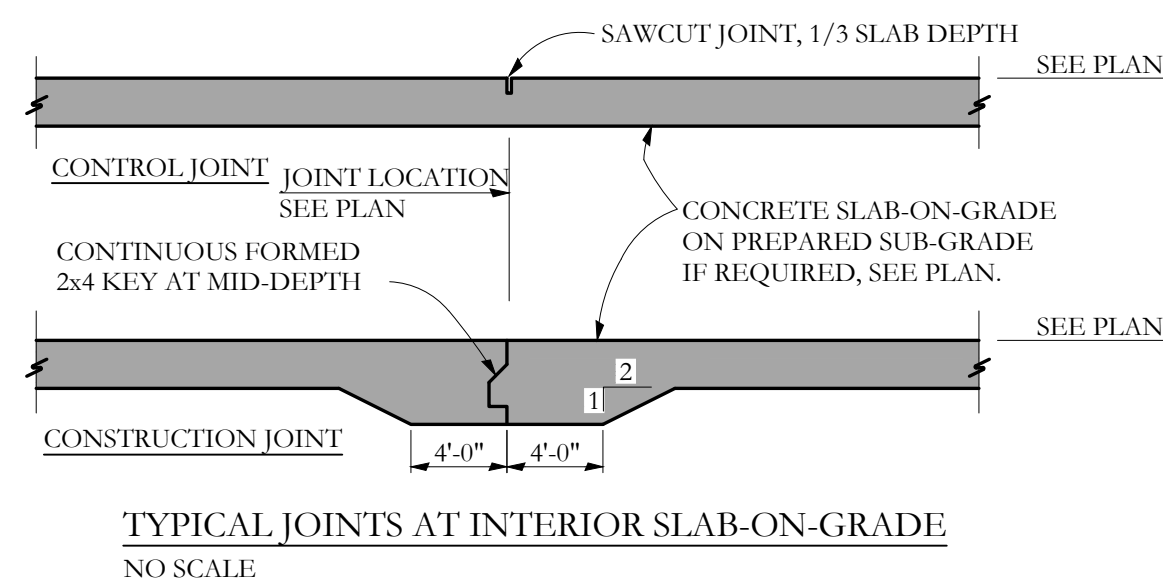
AB	Anchor Rod (Bolt)	EF	Each Face	MACH	Machine	SC	Slip Critical
ADDL	Additional	EJ	Expansion Joint	MASY	Masonry	SCH	Schedule
ADI	Adjustable	ELEV	Elevation	MATL	Material	SDST	Self Drilling Self Tapping
AFF	Above Finished Floor	ELEC	Electric (Electrical)	MAX	Maximum	SECT	Section
ALT	Alternate	ENGR	Engineer	MB	Machine bolt	SF	Square Feet
AMT	Amount	EQ	Equal	MECH	Mechanical	SHT	Sheet
ANCH	Anchor, Anchorage	EQUIP	Equipment	MEZZ	Mezzanine	SHTG	Sheathing
APPROX	Approximate	EQUIV	Equivalent	MFR	Manufacture, -er, -ed	SIM	Similar
ARCH	Architect, -ural	ES	Each Side	MIN	Minimum	SLH	Short Leg Horizontal
ATR	All Thread Rod	EST	Estimate	ML	Microslam	SLV	Short Leg Vertical
AVG	Average	E-W	East to West	MO	Masonry Opening	SOG	Slab on Grade
BC	Bottom of Concrete	EXC	Excavate	MTL	Metal	SP	Spaces
BL	Brick Ledger	EXP	Expansion	NF	Near Face	SPEC	Specifications
BLK	Block	EXT	Exterior	NI	Not In Contract	SQ	Square
BLKG	Blocking	FND	Foundation	NS	Near Side	ST	Smag Tight
BM	Beam	FF	Far Face, Finished Floor	N-S	North to South	STD	Standard
BOT	Bottom	F-F	Face to Face	NTS	Not to Scale	STIFF	Stiffener
BRG	Bearing	FIG	Figure	OCJ	OSHA Column Joist	STL	Steel
BW	Bottom of Wall	FL	Flush	OD	Outside Diameter	STRUCT	Structure, -al
CB	Counterbore	FLG	Flange	OF	Outside Face	SUPT	Support
CF	Cubic Foot	FLR	Floor	OH	Opposite Hand	SY	Square Yard
CG	Center of Gravity	FO	Face of	OPNG	Opening	SYM	Symmetrical
CIP	Cast in Place	FP	Full Penetration	OPP	Opposite	T&B	Top and Bottom
CJ	Construction Joint (Control Joint)	FS	Far Side	OSB	Oriented Strand Board	T&G	Tongue and Groove
CLG	Ceiling	FTG	Footing	PAF	Powder Actuated Fast'n	TB	Top of Beam
CLR	Clear	GALV	Galvanized	PC	Precast	TC	Top of Concrete
CM	Construction Manager (Management)	GC	General Contractor	PCF	Pounds Per Cubic Foot	TD	Top of Deck
CMU	Concrete Masonry Unit	GEN	General	PEN	Penetration	THD	Thread
COL	Column	GL	Glue laminated (Glulam)	PERP	Perpendicular	THK	Thick, -ness
COM	Common	GND	Ground	PL	Property Line	TJ	Top of Joist
COMB	Combine	GR	Grade	PLF	Pounds per Linear Foot	TL	Total Load
CONC	Concrete	GT	Girder Truss	PNL	Panel	TPG	Topping
CONN	Connection	GYP BD	Gypsum Board	PP	Panel Point	TRANS	Transverse
CONT	Continue (Continuous)	HAS	Headed Anchor Stud	PS	Prestressed	TW	Top of Wall
COORD	Coordinate, -tion	HORIZ	Horizontal	PSF	Pounds per Square Foot	TYP	Typical
CS	Countersink	HT	Height	PSI	Pounds per Square Inch	ULT	Ultimate
CTR	Center	ID	Inside Diameter	PSL	Pounds per Square Inch (generic term)	UNO	Unless Noted Otherwise
CY	Cubic Yard	IF	Inside Face	PRT	Parallel Strand Lumber (generic term)	VERT	Vertical
DAB	Deformed Anchor Bar	INT	Interior (Intermediate)	PT (1)	Post Tensioned	VIF	Verify in Field
DET	Detail	JB	Joist Bearing	PT (2)	Pressure Treated	WA	Wedge Anchor
DEV	Develop	JST	Joist	PWD	Plywood	WP	Work Point
DIAG	Diagonal	JT	Joint	QTY	Quantity	WT	Weight
DIM	Dimension	K	Kip (1,000 lbs.)	R	Radius	WWF	Welded Wire Fabric
DL	Dead Load	LD	Load	RE	Reference (refer to)	XS	Extra Strong
DN	Down	LL	Live Load	RECT	Rectangle	XSECT	Cross-section
DP	Drip	LLH	Long Leg Horizontal	REIN	Reinforce, -ed, -ing	XXS	Double Extra Strong
DPI	Driped Pier	LLV	Long Leg Vertical	REQ	Required	(E)	Existing
DT	Double Tee	LOC	Location	REQM	Requirement	(N)	New
DWG	Drawing	LSL	Laminated Strand Lumber (generic term)	REFQMT	Requirement	(R)	Remove
DWL	Dowel	LT	Light	RET	Retaining		
EA	Each	LVL	Laminated Veneer Lumber (generic term)	RM	Room		
ECC	Eccentric			RMO	Rough Masonry Opening		
E-E	End to End			RO	Rough Opening		

**FRAMING PLAN SYMBOLS KEY**

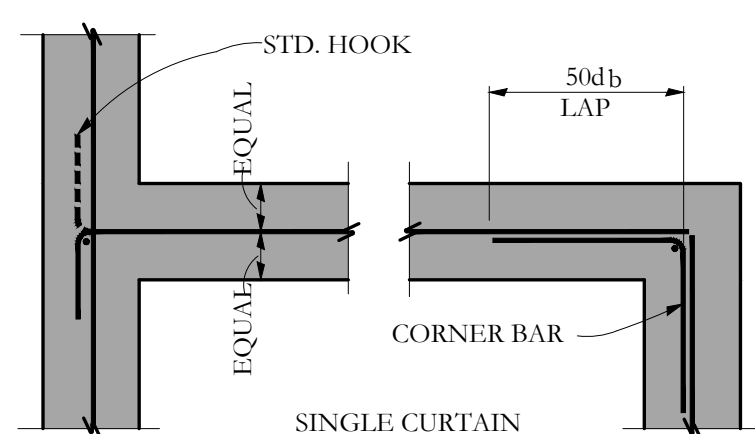
□	WOOD POST
○	STEEL COLUMN
(X)	NUMBER OF WOOD STUDS IN POST BELOW
A	COLUMN ABOVE THIS LEVEL
C	COLUMN CONTINUOUS THROUGH THIS LEVEL
←	JOIST BEARING
→	CONTINUOUS JOIST WITH INTERMEDIATE BEARING
↔	FLASH FRAMED JOIST BEARING WITH HANGER
▬	WOOD STUD BEARING WALL BELOW
▬	OVER FRAMING BY OTHERS - TYP
▲	NUMBER OF TRIM STUDS UNDER HEADER
▲	NUMBER OF KING STUDS ADJACENT TO HEADER

**Structural Drawing Index**

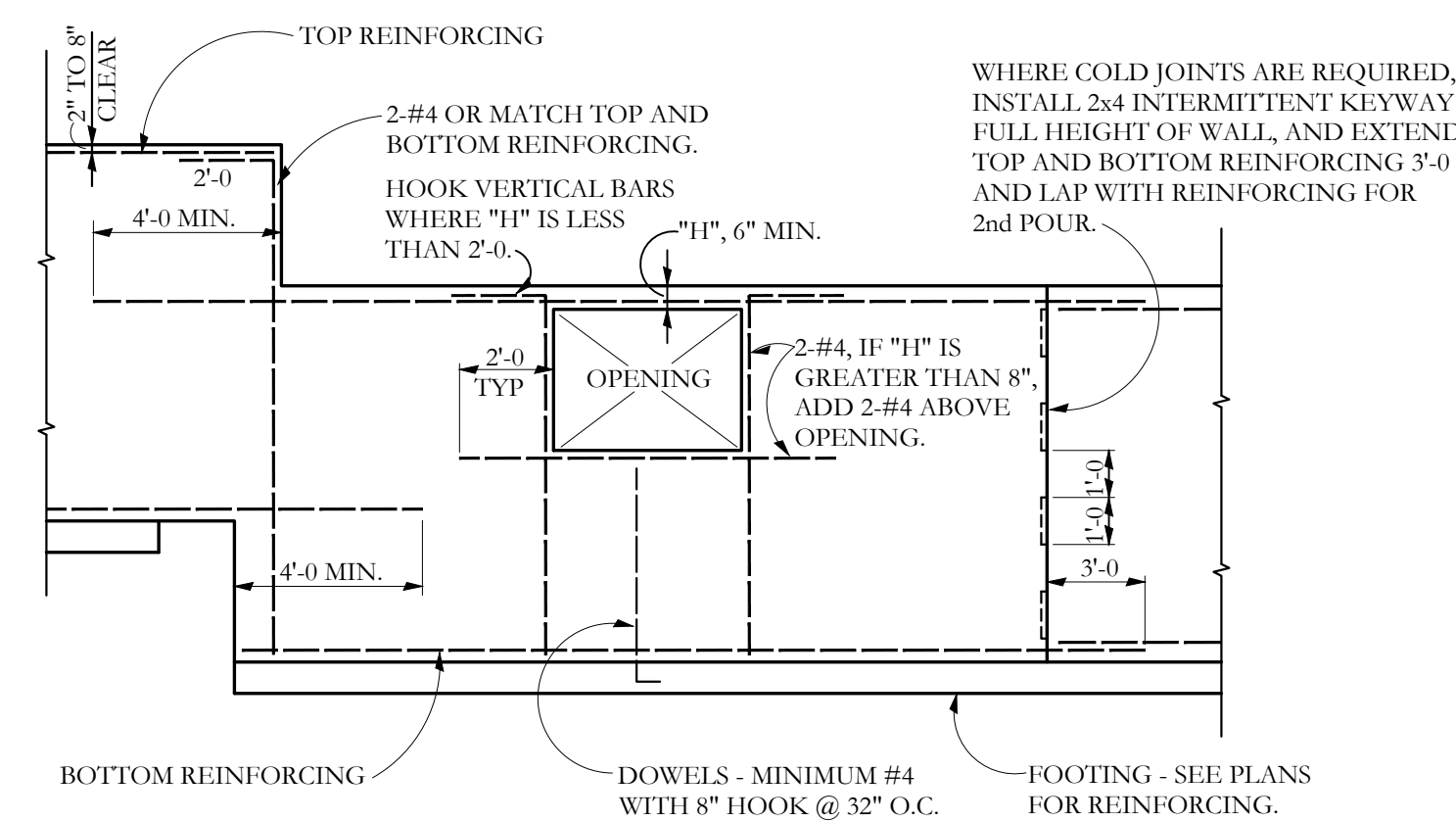
S1.0	General Notes, Etc.
S1.1	Foundation / Ground Floor Plan
S1.2	First Floor Framing Plan
S1.3	Second Floor Framing Plan
S1.4	Third Floor Framing Plan
S1.5	Fourth Floor Framing Plan
S1.6	Roof Framing Plan
S2.1	Sections
S2.2	Sections



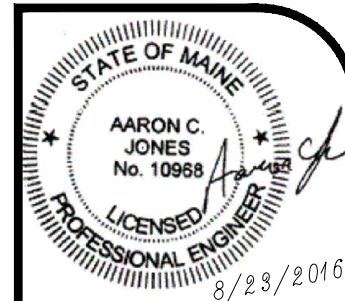
TYPICAL JOINTS AT INTERIOR SLAB-ON-GRADE  
NO SCALE



TYPICAL CONCRETE WALL INTERSECTIONS  
NO SCALE



TYPICAL REINFORCING AT STEPS AND OPENINGS  
NO SCALE



PROJECT NO. 16-0080  
PROJECT NAME Merrill Street - 7 unit  
Portland, ME

REVISIONS  
1 - 11/11/16  
2 - 12/15/16  
3 - 12/20/16  
4 - 03/09/17

PERMIT SET  
DRAWN BY MKL  
SHEET TITLE  
GENERAL NOTES