

# HARRIS REMODEL

1640 72nd Ave SE  
Mercer Island, WA 98040

Permit Set  
10/01/2021



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Engineer's Stamp



Project Title

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Project Information

Project No. 21-127-01  
Checked By KA

Issue

Permit Set 10/01/2021

Department Approval

Sheet Title

STRUCTURAL  
TITLE SHEET

Sheet Number

S1.1

## ABBREVIATIONS

@	AT	JST	JOIST
∅	DIAMETER	JT	JOINT
#	POUND OR NUMBER	K	KIPS = 1000 LBS
<b>AAC</b>	AUTOCLAVED AERATED CONCRETE	<b>KSI</b>	KILOPOUNDS PER SQUARE INCH
<b>AB</b>	ANCHOR BOLT	<b>L</b>	ANGLE
<b>ADJ</b>	ADJACENT	<b>LBS</b>	POUNDS
<b>AFF</b>	ABOVE FINISH FLOOR	<b>LVL</b>	LEVEL
<b>AISC</b>	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	<b>LVL</b>	LAMINATED VENEER LUMBER
<b>AITC</b>	AMERICAN INSTITUTE OF TIMBER CONSTRUCTION	<b>L&amp;I</b>	LABOR & INDUSTRIES DEPARTMENT
<b>ANSI</b>	AMERICAN NATIONAL STANDARDS INSTITUTE	<b>LLH</b>	LONG LEG HORIZONTAL
<b>ASD</b>	ALLOWABLE STRESS DESIGN	<b>LLV</b>	LONG LEG VERTICAL
<b>ASCE</b>	AMERICAN SOCIETY OF CIVIL ENGINEERS	<b>LOC</b>	LOCATE, LOCATION
<b>ASTM</b>	AMERICAN SOCIETY FOR TESTING AND MATERIALS	<b>LONGIT</b>	LONGITUDINAL
<b>AWS</b>	AMERICAN WELDING SOCIETY	<b>LSL</b>	LAMINATED STRAND LUMBER
<b>AWC</b>	AMERICAN WOOD COUNCIL	<b>MB</b>	MACHINE BOLT
<b>BLKG</b>	BLOCKING	<b>MECH</b>	MECHANICAL
<b>BM</b>	BEAM	<b>MTL</b>	METAL
<b>BNDY</b>	BOUNDARY	<b>MFR</b>	MANUFACTURER
<b>BN</b>	BOUNDARY NAILING	<b>MIN</b>	MINIMUM
<b>BOT</b>	BOTTOM	<b>MC</b>	MOISTURE CONTROL
<b>BRG</b>	BEARING	<b>MPH</b>	MILES PER HOUR
<b>BS</b>	BOTH SIDES	<b>NS</b>	NEAR SIDE
<b>BTWN</b>	BETWEEN	<b>NDS</b>	NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION
<b>CIP</b>	CAST-IN-PLACE	<b>NTS</b>	NOT TO SCALE
<b>CJ</b>	CONSTRUCTION/CONTROL JOINT	<b>NWT</b>	NORMAL WEIGHT
<b>CL</b>	CENTERLINE	<b>OC</b>	ON CENTER
<b>CLG</b>	CEILING	<b>OPP</b>	OPPOSITE HAND
<b>CLR</b>	CLEAR	<b>PAF</b>	POWDER ACTUATED FASTENER
<b>CLT</b>	CROSS-LAMINATED TIMBER	<b>PC</b>	PRE-CAST
<b>CMU</b>	CONCRETE MASONRY UNIT	<b>PCF</b>	POUNDS PER CUBIC FOOT
<b>COL</b>	COLUMN	<b>PERP</b>	PERPENDICULAR
<b>CONC</b>	CONCRETE	<b>PL</b>	PLATE
<b>CONT</b>	CONTINUOUS	<b>PLF</b>	POUNDS PER LINEAR FOOT
<b>CONTR</b>	CONTRACTOR	<b>PNL</b>	PANEL
<b>CSK</b>	COUNTERSINK	<b>PRE-ENG</b>	PRE-ENGINEERED
<b>CTR</b>	CENTER	<b>PSF</b>	POUNDS PER SQUARE FOOT
<b>CVR</b>	COVER	<b>PSI</b>	POUNDS PER SQUARE INCH
<b>DBA</b>	DEFORMED BAR ANCHOR	<b>PSL</b>	PARALLEL STRAND LUMBER
<b>DBL</b>	DOUBLE	<b>PW</b>	PLYWOOD
<b>DIAPH</b>	DIAPHRAGM	<b>REF</b>	REFERENCE
<b>DIM</b>	DIMENSION	<b>REINF</b>	REINFORCEMENT
<b>D</b>	DEEP	<b>REQ'D</b>	REQUIRED
<b>DF</b>	DOUGLAS-FIR	<b>RT</b>	PRE-ENGINEERED ROOF TRUSS
<b>DLT</b>	DOWEL LAMINATED TIMBER	<b>SBC</b>	SEATTLE BUILDING CODE
<b>DT</b>	PRE-ENGINEERED DRAG TRUSS	<b>SCHED</b>	SCHEDULE
<b>EA</b>	EACH	<b>SDI</b>	STEEL DECK INSTITUTE
<b>EL</b>	ELEVATION	<b>SDCI</b>	SEATTLE DEPARTMENT OF CONSTRUCTION & INSPECTIONS
<b>ELEV</b>	ELEVATOR	<b>SER</b>	STRUCTURAL ENGINEER OF RECORD
<b>EMBED</b>	EMBEDMENT	<b>SF</b>	SQUARE FEET
<b>EN</b>	END NAILING	<b>SHG</b>	SHEATHING
<b>ENGR</b>	ENGINEER	<b>SIM</b>	SIMILAR
<b>EOR</b>	ENGINEER OF RECORD	<b>SIMP</b>	SIMPSON STRONG-TIE
<b>EQ</b>	EQUAL	<b>SOG</b>	SLAB ON GRADE
<b>EQUIV</b>	EQUIVALENT	<b>SPCG</b>	SPACING
<b>EA FACE</b>	EACH FACE	<b>SRC</b>	SEATTLE RESIDENTIAL CODE
<b>EA SIDE</b>	EACH SIDE	<b>SS</b>	STAINLESS STEEL
<b>EA WAY</b>	EACH WAY	<b>STD</b>	STANDARD
<b>(E)</b>	EXIST, EXISTING	<b>STIFF</b>	STIFFENER
<b>ESR</b>	ICC EVALUATION SERVICE REPORT	<b>STRUC</b>	STRUCTURAL
<b>EXP</b>	EXPANSION	<b>SW</b>	SHEAR WALL
<b>EXT</b>	EXTERIOR	<b>SQ</b>	SQUARE
<b>FDN</b>	FOUNDATION	<b>T&amp;G</b>	TONGUE AND GROOVE
<b>FF</b>	FINISH FLOOR	<b>THK</b>	THICK
<b>FFE</b>	FINISH FLOOR ELEVATION	<b>THRD</b>	THREADED
<b>FOC</b>	FACE OF CONCRETE	<b>TMS</b>	THE MASONRY SOCIETY
<b>FOM</b>	FACE OF MASONRY	<b>T&amp;B</b>	TOP & BOTTOM
<b>FOS</b>	FACE OF STUD	<b>TO</b>	TOP OF
<b>FS</b>	FAR SIDE	<b>TOC</b>	TOP OF CONCRETE
<b>FT</b>	FEET	<b>TOS</b>	TOP OF STEEL
<b>FTG</b>	FOOTING	<b>TRANSV</b>	TRANSVERSE
<b>FT-LB</b>	FOOT POUNDS	<b>TRTD</b>	TREATED
<b>GA</b>	GAGE	<b>TS</b>	TUBE STEEL
<b>GALV</b>	GALVANIZED	<b>TYP</b>	TYPICAL
<b>GC</b>	GENERAL CONTRACTOR	<b>UNO</b>	UNLESS NOTED OTHERWISE
<b>GL</b>	GLUE LAMINATED	<b>VERT</b>	VERTICAL
<b>GLB</b>	GLUE LAMINATED BEAM	<b>VIF</b>	VERIFY IN FIELD
<b>GR</b>	GRADE	<b>WABO</b>	WASHINGTON ASSOCIATION OF BUILDING OFFICIALS
<b>GR</b>	GRADE	<b>W</b>	WIDE
<b>GT</b>	PRE-ENGINEERED GIRDER TRUSS	<b>w/</b>	WITH
<b>GWB</b>	GYPSON WALL BOARD	<b>w/o</b>	WITHOUT
<b>HGR</b>	HANGER	<b>WF</b>	WIDE FLANGE
<b>HDR</b>	HEADER	<b>WHS</b>	WELDED HEADED STUD
<b>HF</b>	HEM-FIR	<b>WTS</b>	WELDED THREADED STUD
<b>HSS</b>	HOLLOW STRUCTURAL STEEL	<b>WWF</b>	WELDED WIRE FABRIC
<b>HT</b>	HEIGHT		
<b>HORIZ</b>	HORIZONTAL		
<b>IBC</b>	INTERNATIONAL BUILDING CODE		
<b>ICF</b>	INSULATED CONCRETE FORM		
<b>IN</b>	INCHES		
<b>INT</b>	INTERIOR		

## GRAPHIC SYMBOL LEGEND

	CONCRETE WALL (ABOVE)
	CONCRETE WALL (BELOW)
	CMU WALL (ABOVE)
	CMU WALL (BELOW)
	WOOD/CFB SHEAR WALL (ABOVE)
	WOOD/CFB STUD WALL (ABOVE)
	WOOD/CFB STUD WALL (BELOW)
	CONCRETE COLUMN (ABOVE)
	CONCRETE COLUMN (BELOW)
	WOOD POST (ABOVE)
	WOOD POST (BELOW)
	STEEL HSS COLUMN (ABOVE)
	STEEL HSS COLUMN (BELOW)
	STEEL WIDE FLANGE COLUMN (ABOVE)
	STEEL WIDE FLANGE COLUMN (BELOW)
	BEAM/JOIST
	BRACED FRAME BEAM
	GRID LINE
	CENTERLINE
	CONCRETE BY OTHERS (CUT)
	GRAVEL (CUT)
	EARTH (CUT)
	SIMPSON TENSION TIE HOLDOWN
	NUMBER OF KINGS PLUS TRIMMERS
	JOIST SPAN w/ HANGER
	JOIST SPAN
	DECK SPAN
	EXTENT
	OVERFRAMING
	BLOCKED DIAPHRAGM
	CONCRETE COLUMN TYPE
	SURFACE SLOPE PER ARCHITECT
	DETAIL REFERENCE NO.
	SECTION CALLOUT
	SHEET REFERENCE NO.
	DETAIL REFERENCE NO.
	ELEVATION CALLOUT
	SHEET REFERENCE NO.
	DETAIL REFERENCE NO.
	DETAIL CALLOUT
	SHEET REFERENCE NO.
	DETAIL REFERENCE NO.
	DETAIL CALLOUT
	SHEET REFERENCE NO.
	HIGH SIDE
	FOOTING STEP

SHEET INDEX	
SHEET NUMBER	SHEET NAME
S1.1	STRUCTURAL TITLE SHEET
S1.2	STRUCTURAL GENERAL NOTES
S1.3	STRUCTURAL GENERAL NOTES
S1.4	STRUCTURAL GENERAL NOTES
S2.1	FOUNDATION PLAN
S2.2	MAIN LEVEL FRAMING PLAN
S2.3	UPPER LEVEL FRAMING PLAN
S2.4	ROOF FRAMING PLAN
S3.1	STRUCTURAL CONCRETE DETAILS
S5.1	STRUCTURAL STEEL DETAILS
S6.1	STRUCTURAL WOOD DETAILS
S6.2	STRUCTURAL WOOD DETAILS
S6.3	STRUCTURAL WOOD DETAILS

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STRUCTURAL  
GENERAL NOTES

Sheet Number

S1.2

**GENERAL REQUIREMENTS**

**SUMMARY OF WORK**

Project is a remodel including a newly converted master bedroom, new exterior deck addition, and new exterior trellises as shown on these Contract Documents used in coordination with the Architectural and other discipline's documents.

**GOVERNING CODE**

All design and construction shall conform to the 2018 International Building Code and local jurisdiction amendments.

Reference to ASTM and other standards shall refer to the latest edition designated by IBC Chapter 35. Refer to the specifications for information in addition to that covered by these structural notes and drawings.

**DOCUMENTS**

Structural Documents shall be used in conjunction with Architectural Documents for all bidding and construction.

Drawings indicate general and typical details of construction. Typical details and general notes shall apply even if not specifically denoted on plans, UNO. Where conditions are not specifically indicated similar details of construction shall be used, subject to review and approval by the Architect and the SER.

Existing structural information, designated as (E) on the Structural drawings, has been compiled from information furnished by various sources and is not necessarily field-verified by the Engineer. Dimensions relating to existing structures are intended for use as guidelines only; all dimensions shall be field-verified by the contractor prior to start of construction. Notify the Architect of any discrepancies.

These Contract Documents and any materials used in preparation of them, including calculations, are the exclusive property of the SER and can be reproduced only with the permission of the SER.

**WARRANTY**

The SER has used that degree of care and skill ordinarily exercised under similar circumstances by members of the profession in this locale and no other warranty, either expressed or implied, is made in connection with rendering professional services.

**OWNER RESPONSIBILITY**

The Owner shall retain a Special Inspector to perform the special inspection requirements required by the building official and as outlined in the Special Inspection section below.

**DESIGN CRITERIA**

**BUILDING CATEGORY**

Structural Risk Category II  
Importance factors for snow and seismic are listed with the loading criteria.

**LIVE LOADS - FLOOR AND ROOF**

Live loads indicated with \* are reducible per IBC  
Partition loading has been added per IBC

Residential:  
Residential floor 40 psf  
Residential decks 60 psf

Miscellaneous:  
Guardrails/balcony rails 50 plf

**LIVE LOADS - SNOW**

Numbering below is per IBC Section 1603.1.3:

- Flat-Roof Snow Load:  $P_f = 25$  psf
- Snow Exposure Factor:  $C_e = 1.0$
- Snow Importance Factor:  $I_s = 1.0$
- Thermal Factor:  $C_t = 1.0$

**Additional Items:**

- Ground Snow Load:  $P_g = 25$  psf
- Minimum uniform roof snow load = 25 psf
- Rain on snow surcharge of 5 psf for roof slopes less than 5 degrees

**LATERAL LOADS - WIND**

Numbering below is per IBC Section 1603.1.4:

- Ultimate Design Wind Speed (3-second gust):  $V_{ult} = 98$  mph  
Nominal Design Wind Speed:  $V_{nom} = 76$  mph
- Risk Category: II
- Wind Exposure: C
- Internal Pressure Coefficient = +/- 0.18
- Components and Cladding:  
The following working loads may be used in lieu of calculations (zones per ASCE 7-16 Table 30.6.2-2):

TABLE 30.6.2-2

Location	Zone	Pressure (PSF) (100 Sq Ft)	
		Service	Ultimate
Roof	1	-14.4 / +9.6	-24.0 / +16.0
	2e	-21.2 / +9.6	-35.3 / +16.0
	2r	-21.2 / +9.6	-35.2 / +16.0
Walls	3	-21.2 / +9.6	-35.3 / +16.0
	4	-13.4 / +12.2	-22.4 / +20.4
	5	-14.9 / +12.2	-24.9 / +20.4

**Additional Info:**

- Topographic Factor:  $K_{zt} = 1.0$
- Directionality Factor:  $K_d = 0.85$
- Ground Elevation Factor:  $K_e = 1.0$
- Enclosure classification: Enclosed
- Gust Effect Factor:  $G = 0.85$
- Analysis Procedure: Directional

**LATERAL LOADS - EARTHQUAKE**

Numbering below is per IBC Section 1603.1.5:

- Risk Category: II
- Seismic Importance Factor:  $I_p = 1.0$
- Mapped Spectral Response Acceleration Parameters:  $S_{s1} = 1.38$  g;  $S_{s2} = 0.48$  g
- Site Class: D;  $F_A = 1.2$ ;  $F_V = 1.82$
- Design Spectral Response Acceleration Parameters:  $S_{D1} = 1.10$  g;  $S_{D2} = 0.58$  g
- Seismic Design Category: D
- Basic Seismic Force-Resisting Systems:  
Vertical Elements: Plywood Sheathed Wood Shear Walls  
Diaphragms: Plywood Sheathed Diaphragms
- Seismic Response Coefficient:  $C_s = 0.17$
- Response Modification Coefficient:  $R = 6.5$
- Analysis Procedure: Equivalent Lateral Force Procedure

**Additional Items:**

Building Location: 47.5951° N, 122.2419° W

**CONTRACTOR PERFORMANCE REQUIREMENTS**

**DESIGN DOCUMENTS**

Contractor shall verify all dimensions and all conditions at the job site, including building and site conditions before commencing work, and be responsible for same. All discrepancies shall be reported to the Architect before proceeding with work. Any errors, ambiguities and/or omissions in the contract documents shall be reported to the Architect immediately, in writing. No work is to be started before correction is made.

Contractor shall verify and/or coordinate all dimensioned openings and slab edges shown on the contract documents. Some dimensions, openings and embedded items are shown on the Structural drawings. Others may be required. Refer to Architectural drawings for size and location of curbs, equipment pads, wall and floor openings, Architectural treatment, embeds required for architectural items and dimensions. Refer to mechanical, plumbing, electrical and fire protection drawings for size and location of all openings for ducts, piping, conduits, etc. Submit openings to Architect for review.

Do not scale drawings. Use only field verified dimensions. When electronic plan files are provided for the Contractor to complete the work described in these contract documents. The Contractor shall be responsible for all required safety standards, safety precautions and the methods, techniques, sequences or procedures required in performing their work. For concrete construction refer to ACI 318 - Section 26.11.2 "Removal of Formwork".

**CONTRACTOR-INITIATED CHANGES**

Contractor-initiated changes shall be submitted in writing to the Architect for review and acceptance prior to fabrication or construction. Changes shown on shop drawings only will not satisfy this requirement.

**INSPECTIONS**

The Contractor shall coordinate with the building department for all building department required inspections.

**TEMPORARY SHORING AND BRACING**

The Contractor shall provide temporary bracing as required until all permanent connections and stiffening have been installed. The Contractor is responsible for the strength and stability of all partially completed structures including but not limited to concrete or masonry walls, steel framing and erection aids. The Contractor shall, at their discretion, employ the aid of a licensed Structural Engineer to design all temporary bracing and shoring necessary to complete the work described in these contract documents. The Contractor shall be responsible for all required safety standards, safety precautions and the methods, techniques, sequences or procedures required in performing their work. For concrete construction refer to ACI 318 - Section 26.11.2 "Removal of Formwork".

**SAFETY PROCEDURES**

Contractor shall be responsible for all safety precautions and the methods, techniques, sequences or procedures required to perform the contractor's work. The Structural Engineer has no overall supervisory authority or actual and/or direct responsibility for the specific working conditions at the site and/or for any hazards resulting from the actions of any trade contractor. The Structural Engineer has no duty to inspect, supervise, note, correct, or report any health or safety deficiencies to the Owner, Contractors, or other entities or persons at the project site.

**RENOVATIONS**

**DEMOLITION**

Contractor shall verify all existing conditions before commencing any demolition. Shoring shall be installed to support existing construction as required and in a manner suitable to the work sequences. Demolition debris shall not be allowed to damage or overload the existing structure. Limit construction loading (including demolition debris) on existing floor systems to 40 psf.

**EXISTING CONCRETE**

Existing reinforcing shall be saved where and as noted on the plans. Saw cutting, if and where used, shall not cut existing reinforcing that is to be saved.

- All new openings through existing walls, slabs and beams shall be accomplished by saw cutting wherever possible.
- Contractor shall verify all existing conditions and location of members prior to cutting any openings.
- Small round openings shall be accomplished by core drilling, if possible.
- Where new reinforcing terminates at existing concrete, dowels epoxy grouted into existing concrete shall be provided to match horizontal reinforcing, unless noted otherwise on plans.

**EXISTING WOOD**

Contractor shall check for dryrot at all areas of new work. All rot shall be removed and damaged members shall be replaced or repaired as directed by the Structural Engineer or Architect.

**EXTERIOR MASONRY INSPECTION & REPAIR**

All exterior masonry walls shall be inspected and repaired as follows:

Scrape all loose and weakened mortar out to full depth of the deterioration; remove and replace any loose masonry units; check for loose facing brick veneers; tuck point all joints solid. All masonry restoration and repair shall be performed in such a manner that the existing structure is not weakened or left unsupported during the process of the work. All exterior appendages such as fire escapes, cornices and eyebrows shall be inspected for structural integrity and the condition of the connections to the structure. The Contractor shall notify the Structural Engineer as to their findings.

**BUILDING MOVEMENT**

All non-structural wall connections shall account for construction tolerances, column shortening and beam deflections. In addition, all design components shall accommodate a typical vertical movement at each floor of 3/4" due to variable live loading. This displacement will occur at the free end of cantilever beams and at midspan of simple span beams. Non-structural walls shall accommodate typical lateral movements of 1/2" between adjacent floors perpendicular and/or parallel to the wall.

Wall attachments shall not apply any lateral loads to the bottom flange of beams. If attachment is made to the bottom of beams, additional inclined struts bracing the bottom flange or other equivalent means to counteract this force shall be provided by the Contractor.

**SHOP DRAWINGS AND SUBMITTALS**

**SHOP DRAWING & SUBMITTAL REVIEW (including Deferred Structural Components)**

The contractor must review and stamp the shop drawings & submittals for review. SER will only review submittals for items shown on SER documents. Submittals for Deferred Structural Components will receive cursory review by SER for loads imposed on primary structure. SER will review shop drawings for general conformance with design concept of the project and general compliance with the information given in the Structural Contract Documents. Review of submittals does not constitute approval or acceptance of unauthorized deviation from Contract Documents.

Corrections or comments made on shop drawings during this review do not relieve Contractor from compliance with the requirements of the plans and specifications.

**Contractor responsible for:**

- Reviewing, approving, stamping and signing submittals prior to submittal to Architect and SER
- Timing submittals to allow two weeks of review time for the SER and time for corrections and/or resubmittal
- Conformance to requirements of the Contract Documents
- Dimensions and quantities
- Verifying information to be confirmed or coordinated
- Information solely for fabrication, safety, means, methods, techniques and sequences of construction
- Coordination of all trades

Resubmittals shall be clouded and dated for all changes to the submittal. Only clouded portions of resubmittal will be reviewed and SER's review stamp applies to only these areas.

**SUBSTITUTIONS**

Substitutions shall be submitted in writing prior to submittal of shop drawings. Shop drawings bearing substitutions will be rejected. Submit engineering data to substantiate the equivalence of the proposed items. The SER's basic services contract does not include review of substitutions that require re-engineering of the item or adjacent structure. Nor does the SER's contract cover excessive review of proposed substitutions. The fees for making these reviews and/or redesign shall be paid by the Contractor. Reviews and approvals shall not be made until authorization is received.

**SHOP DRAWINGS AND SUBMITTALS**

**SUBMITTALS**

Shop drawings and material submittals shall be submitted to the Architect and SER prior to any fabrication or construction for the following structural items. Submittals shall include one reproducible and one copy; reproducible will be marked and returned. If deviations, discrepancies, or conflicts between shop drawings submittals and the contract documents are discovered either prior to or after shop drawing submittals are processed by the SER, the Contract Documents control and shall be followed.

- Construction sequence description
- Contractor quality control testing procedures when required in specifications
- Concrete mix designs
- Concrete construction joint plans
- Concrete accessories material specification, size and location
- Reinforcing bar shop drawings and placing plans
- Reinforcing bar mill certificates shall be available upon request
- Non-shrink grout material specifications and manufacturer's installation recommendations
- Fabrication shop AISC Certification
- Structural steel registration/certification or quality control inspection records
- Structural steel shop and erection drawings
- Welding Procedure Specifications
- Glued laminated members (certificates shall be on site and be available upon request)
- Engineered wood beams (certificates shall be on site and be available upon request)
- Deferred Structural Components listed below
- Certificate of conformance for welding material, including supplemental notch toughness requirements

**DEFERRED STRUCTURAL COMPONENTS**

Components referred to as Deferred Structural Components shall comply with these notes. These elements have not been permitted under the base building application. The Contractor will be required to submit the component system documents to the building official for approval. The documents shall be stamped and signed by an Engineer licensed by the state where the project is located. The deferred structural components shall not be installed until the design and submittal documents have been approved by the building official.

Prior to building department submittal, the deferred structural components submittals shall receive cursory review by SER for loads imposed on primary structure and general conformance with design concept of the project and general compliance with the information given in the Structural Contract Documents. Review of submittals does not constitute approval or acceptance of unauthorized deviation from Contract Documents. Submittals of contractor-designed components shall include the designing professional engineer's stamp and signature, as noted above. The submittal shall be approved by the component vendor prior to review by the SER. The designing professional is responsible for code conformance and all necessary connections not specifically called out on Architectural or structural contract documents.

Submittals shall include details of connections to primary structure that indicate magnitude and direction of all loads imposed at point of connection. Design criteria shall be provided with submittal and calculations shall be made available upon request.

The following list includes the items that are defined as Deferred Structural Components. Refer to other discipline's contract documents for additional deferred components that may require structural design and details. Connections of these elements shall not induce torsion on structural members. Deferred Structural Components shall be manufactured, delivered, handled, stored, and field erected in conformance with instructions prepared by the component vendor.

**Deferred structural components:**

- Plywood web joists
- Pre-manufactured wood trusses
- Handrails, guards, grab bars, and wall mounted shower seats
- Marquees and canopies, unless detailed on Contract Documents

**INSPECTIONS**

**INSPECTIONS BY BUILDING OFFICIAL**

The building official, upon notification, shall make structural inspections as required by local ordinance. The inspection by the building official per IBC Section 110 will be separate from and in addition to the special inspection and structural observation mentioned subsequently.

**SPECIAL INSPECTIONS**

A Special Inspector shall be hired by the Owner to perform the following special inspections per IBC Section 1704. See the specifications for additional requirements for special inspection and testing. The architect, Structural Engineer, and building department shall be furnished with copies of all inspection reports and test results.

Each contractor responsible for the construction of a seismic force resisting system, designated seismic system, or component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the Owner prior to the commencement of work on the system or component. The written statement shall be in accordance with IBC Section 1704.4.

See IBC Chapter 17: "Special Inspections and Tests" for more detailed requirements.

**SPECIAL INSPECTIONS AND TESTS OF SOILS (PER IBC 1705.6)**

Verification and Inspection	Frequency		Reference
	Cont.	Periodic	
Verify materials below shallow foundations are adequate to achieve the design bearing capacity		X	
Verify that excavations are extended to proper depth and have reached proper material		X	
Perform classification and testing of compacted fill materials		X	
Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	X		
Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly		X	

**SPECIAL INSPECTIONS OF WOOD CONSTRUCTION (PER IBC 1705.5 & 1705.12.2)**

Verification and Inspection	Frequency		Reference
	Cont.	Periodic	
Moisture content of wood-framed construction at time of cover		X	Refer to general notes
Nailing, bolting, anchoring and other fastening of components (spaced 4" or closer) within the seismic force resisting system, including drag struts, braces, holdowns, shear walls, and diaphragms		X	1705.12.2.2 1705.5.1
Field gluing operations of elements within the seismic, force resisting system	X		1705.12.2.1
Inspection of metal plate connected wood truss fabricator's quality control procedures		X	1704.2.5 TPI 1 Section 2.3.6.11

**INSPECTIONS (cont'd)**

**SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION (PER IBC 1705.3)**

Verification and Inspection	Frequency		Reference
	Cont.	Periodic	
Inspect reinforcement and verify placement		X	IBC 1908.4 ACI 318: 20, 25.2-3, 26.6.1-3
Inspection of anchors cast in concrete		X	ACI 318: 17.8.2
Inspection of anchors and reinforcing bar post-installed in hardened concrete members: • Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads • Mechanical anchors, adhesive anchors and reinforcing bar not defined above	X		ACI 318: 17.8.2.4 ACI 318: 17.8.2
Verifying use of required design mix		X	IBC 1904.1, 1904.2, 1908.2-3, ACI 318: 19, 26.4.3, 26.4.4
Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete	X		IBC 1908.10 ACI 318: 26.4, 26.12 ASTM C172, C31
Inspection of concrete for proper application techniques	X		IBC 1908.6-8 ACI 318: 26.5
Verify maintenance of specified curing temperature and techniques		X	IBC 1908.9 ACI 318: 26.5.3-5
Inspect formwork for shape, location and dimensions of the concrete being formed		X	ACI 318: 26.11.1.2(b)

**SPECIAL INSPECTIONS OF STRUCTURAL STEEL CONSTRUCTION OTHER THAN SEISMIC LATERAL FORCE RESISTING SYSTEMS (PER IBC 1705.2.1)**

Verification and Inspection	Frequency		Reference
	Cont.	Periodic	
Inspection of fabricator's quality control procedures		X	IBC 1704.2.5 AISC 360-N.2
Review of material test reports and certifications listed in AISC Section N3.2	X		AISC 360-N.5.2 AWS D1.1
Inspection of welding structural steel:	Per AISC 360 tables N5.4-1-3		AISC 360-N.5.4-5 AWS D1.1
Nondestructive testing of welded joints	Per AISC 360 N5.5		AISC 360-N5.5 AWS D1.1
Inspect the fabricated steel or erected steel frame to verify compliance with the details shown on the construction documents		X	AISC 360-N.5.8
Inspection during the placement of anchor rods and other embedments supporting structural steel	X		AISC 360-N.5.8

**GEOTECHNICAL**

**GENERAL CRITERIA**

Allowable soil pressure and lateral earth pressure are assumed and therefore must be verified by a Geotechnical Inspector or the building official. If soils are found to be other than assumed, notify the Structural Engineer for possible foundation redesign.

Unless noted otherwise, footings shall be centered below columns or walls.

**INSPECTIONS**

All prepared soil-bearing surfaces shall be inspected by the Owners Geotechnical Inspector (or building official) prior to placement of reinforcing steel and concrete. Inspections shall be made per IBC Table 1705.6.

**BEARING VALUES**

All footings shall bear on undisturbed soil and shall be lowered to firm bearing if suitable soil is not found at elevations shown. Exterior footings shall bear a minimum of 18" below the finished ground surface. Footing elevations shown on plans (or in details) are minimum depths and for guidance only; the actual elevations of footings must be established by the Contractor in the field working with the Geotechnical Inspector.

Allowable vertical bearing soil pressure = 2,500 psf per existing drawings

**SUBGRADE PREPARATION**

Prepare subgrade per the Geotechnical Report, summarized as follows: All footings shall be cast on undisturbed firm natural soils that are free of organic materials. Footing excavation shall be free of loose soils, sloughs, debris and free of water at all times. If organic silt and/or fill material is encountered at subgrade elevations, overexcavate a minimum of 2'-0" below the design foundation subgrade elevation prior to placing footings. The overexcavated areas shall be backfilled with structural fill compacted to 95% proctor per ASTM D-1557 or a lean concrete mix.

**EXISTING UTILITIES**

The Contractor shall determine the location of all adjacent underground utilities prior to any excavation, shoring, pile driving, or pier drilling. Any utility information shown on the plans and details are approximate and not verified by the SER. Contractor is to provide protection of any utilities or underground structures during construction.

**DRAINAGE**

Drainage systems, including foundation, roof and surface drains, shall be installed as directed by the Geotechnical Report. Vapor retarder placed below slab-on-grade shall conform to ASTM E 1643 and ASTM E 745.

**RETAINING WALLS**

Grade on either side of concrete walls shall not vary by more than 12", UNO. Slope of backfill shall not exceed 2H to 1V, UNO. Backfill behind all retaining walls with free draining, granular fill installed per the Geotechnical Report. Provide for subsurface drainage. Design pressures used for the design of retaining walls are based on drained conditions.

- Active earth pressure (restrained/unrestrained) = 35/55 PCF (assumed)
- Passive earth pressure = 250 PCF (assumed)
- Coefficient of friction (factor of safety of 1.5 included) = 0.3 (assumed)

Provide temporary shoring for tops of walls if backfill is placed prior to the supporting structure being constructed. Supporting structure is the floor framing and sheathing completely installed and attached to perpendicular walls.

## CONCRETE

### CAST-IN-PLACE CONCRETE

Concrete materials shall conform to the following:

Portland cement:	Type 1, ASTM C150
Fly ash (if used):	ASTM C618 class F or C
Slag cement (if used):	ASTM C989
Lightweight aggregates:	lightweight aggregates shall not be used without prior approval of SER and building department
Normal weight aggregates:	ASTM C33
Sand equivalent:	ASTM C33
Water:	Potable per ASTM C94
Air entraining admixtures:	ASTM C260
Chemical admixtures:	ASTM C494
Flowable concrete admixtures:	ASTM C1017

Durability requirements of concrete mixes shall conform to building code. These requirements include water-cementitious material ratios, minimum compressive strengths, air entrainment, type of cement, and maximum chloride ion content.

### CONCRETE STRENGTH REQUIREMENTS

Concrete shall be mixed, proportioned, conveyed and placed in accordance with IBC Section 1904, 1905, 1906 and ACI 301, including testing procedures. Concrete shall attain a 28-day strength of  $F_c = 3,000$  psi for purposes of weathering, and accommodate placement, while  $F_c = 2,500$  psi is required for strength. Special inspection is not required for concrete with a 28-day strength greater than  $F_c = 2,500$  psi for purposes of weathering per IBC 1704.6.

### CONCRETE MIXTURES

Mixes shall be proportioned to meet compliance requirements of ACI 318 Section 26.4.3. Slump, W/C ratio, admixtures and aggregate size will be determined by the contractor. Submit documentation of concrete mixture characteristics for review by the SER before the mixture is used and before making changes to mixtures already in use. Documentation shall comply with ACI 318 Section 26.4.4.

All concrete, including slab on grade, shall contain an acceptable water-reducing admixture conforming to ASTM C494 and be used in strict accordance with the manufacturer's recommendations.

All concrete which is exposed to freezing and thawing in a moist condition or exposed to deicing chemicals shall contain an air entraining agent, conforming to ASTM C260. Total air content shall be adjusted per ACI 318 for mix designs with smaller nominal aggregate size. The amount of entrained air shall be measured at the discharge end of the placing nozzle. Entrained air shall be as noted  $\pm 1.0\%$  by volume. Air-entrainment shall not be used at slabs that will receive a smooth, dense, hard-troweled finish.

Trucks hauling plant-mixed concrete shall arrive on-site with a field ticket indicating the maximum gallons of water that can be added at the site not to exceed the total water content in the approved mix design.

Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement, embedded items, and into corners of forms.

### FORMWORK AND ACCESSORIES

Concrete construction shall conform to ACI 301 "Specifications for Structural Concrete" and the Building Code, including testing procedures. See specifications and/or Architectural documents for formwork requirements. Installation shall adhere to ACI 301. Conduits and pipes of aluminum shall not be embedded in concrete construction.

See Architectural drawings for exact locations and dimensions of door and window openings in all concrete walls. See Mechanical drawings for size and location of mechanical openings through concrete walls. See Architectural drawings for all grooves, notches, chamfers, feature strips, color, texture, and other finish details at all exposed concrete surfaces, both cast-in-place and precast. See structural details for reinforcing around openings.

Contractor shall submit the proposed locations of construction joints to the Architect for acceptance before starting construction. Erico Lenton Formasaver (IAPMO-UES-ER-0129) may be used as an alternate to the roughened joint. All construction, control, and isolation joints for slabs on ground shall be in accordance with the typical details.

Concrete accessories and embedded items shall be coordinated with Architectural and all other Contract Documents and suppliers' drawings before placing concrete. Wet-setting of anchor rods, reinforcing, hardware, etc. is not allowed in concrete. Anchor rods, reinforcing, hardware, etc. shall be firmly tied in place prior to concrete placement.

Refer to Architectural documents for waterstops, damp proofing, and soil retaining wall drainage requirements at concrete and at concrete joints (construction joints, slab to wall joints, curb to slab joints, etc).

### CURING AND FINISHES

Protect and cure freshly placed concrete per ACI 305.1 in hot conditions, ACI 306.1 in cold conditions, and ACI 308.1 "Specification for Curing Concrete". All exposed edges and corners shall have 3/4" chamfer, UNO. Concrete flatwork shall be sloped to provide positive drainage. Coordinate finish with Architectural contract documents.

At the time of application of finish materials or special treatment to concrete, moisture content of concrete shall conform to requirements in finish material specifications. Where vapor sensitive coverings are to be placed on slabs on grade, conform strictly to slab covering manufacturer's recommendations regarding vapor retarder and granular fill requirements below the slab.

### CONCRETE CRACK MAINTENANCE

Cracking occurs in concrete structures due to inherent shrinkage, creep, and the restraining effects of walls and other structural elements. Most cracking due to shrinkage and creep will likely occur over the first two years of the life of the structure; further concrete movement due to variations in temperature may persist. Cracks that result in water penetration will need to be repaired to protect reinforcing. Other cracking may be repaired at the Owner's discretion for aesthetic reasons or performance of applied finishes. Prior to repairing cracks, a Structural Engineer should be consulted to provide direction on which cracks to repair and on whether observed cracks may affect the strength of the structure.

### GROUTING STEEL BASE PLATES

Nonshrink grout for base plates shall be an approved nonshrink cementitious grout containing natural aggregates delivered to the job site in factory prepackaged containers requiring only the addition of water. The minimum 28-day compressive strength shall be at least 6000 psi, UNO. Grouts shall meet ASTM C1107. Approved grouts include: Master Builders "Master Flow 713", Sika Corporation's "SikagROUT 212", Burke Company's "Nonferrous Nonshrink Grout", W.R. Meadows CG-86 Construction Grout Grout, or approved equal. Grout shall be mixed, applied, and cured strictly in accordance with the manufacturer's published recommendations.

## REINFORCEMENT IN CONCRETE AND MASONRY

### REINFORCING STEEL

Reinforcing steel shall conform to ASTM A615 (including supplement S1), Grade 60,  $F_y = 60,000$  psi, except any bars specifically so noted on the drawings shall be Grade 40,  $F_y = 40,000$  psi.

### WELDED WIRE REINFORCING

Welded Wire Reinforcing (WWR) shall conform to ASTM A1064. Lap splice adjacent mats of welded wire fabric a minimum of 8" at sides and ends. In equipment pads, use minimum WWR 6x6-W2.1xW2.1, UNO.

### PROCEDURES

Reinforcing steel shall be detailed (including hooks and bends) in accordance with ACI 315 "Details and Detailing of Concrete Reinforcement". Lap all reinforcement in accordance with "The Reinforcing Splice and Development Length Schedule" on these documents. If table is not provided, lap all reinforcing by 40 bar diameters. Provide corner bars at all wall and footing intersections.

Reinforcing steel shall be adequately supported to prevent displacement during concrete and grout placement. Bars shall be bent cold.

Bars partially embedded in concrete shall not be field bent, unless specifically so detailed or approved by the SER.

## ANCHORAGE

Post-installed anchors or reinforcing bar shall not be installed without prior approval of Engineer of Record unless noted otherwise on the plans.

### ADHESIVE ANCHORS

Adhesive anchors (threaded rods or reinforcing bar) specified on the drawings shall be installed using "HIT-HY 200" as manufactured by the Hilti Corporation. Install in strict accordance with ICC Report No. ESR-3187. Rods shall be ASTM F1554 Gr.55, unless noted otherwise. Special inspection of installation is required.

### EXPANSION ANCHORS

Expansion anchors into concrete and concrete masonry units shall be "Kwik Bolt TZ" as manufactured by the Hilti Corporation. Install in strict accordance with ICC Report Number ESR-1917, including minimum embedment requirements. At concrete masonry or brick masonry applications, bolts shall be installed into fully-grouted cells. Substitutes proposed by contractor shall be submitted for review with ICC Reports indicating equivalent or greater load capacities. Special inspection of installation is required.

### SCREW ANCHORS

Post-installed mechanical anchors into concrete and concrete masonry units shall be "Titen HD" screw anchors as manufactured by the Simpson Strong-Tie Company. Install in strict accordance with ICC Report Number ESR-2713 (into concrete) or ESR-1056 (into masonry), including minimum embedment requirements. At concrete masonry or brick masonry applications, bolts shall be installed into fully-grouted cells. Titen HD screw anchors are approved for dry interior applications only. Special inspection is required for the installation of all screw anchors resisting tension.

## MASONRY

### CONCRETE MASONRY UNIT WALLS

Concrete masonry unit walls shall be constructed of normal weight units, conforming to ASTM C90, laid in a running bond.

Mortar shall be Type S per IBC 2103.2. Grout shall conform to IBC 2103.3 and ASTM C476 requirements and attain a minimum compressive strength of 2,000 psi at 28 days, design  $F'_m = 2,000$  psi. Full stresses are required.

Strength shall be verified by prism testing in accordance with IBC Section 2108. Masonry units shall be chosen in accordance with TMS 602 Table 2.

All preparation and placing of masonry shall conform to Section 2104 of the IBC.

### MASONRY CHIMNEYS

Masonry chimneys shall be constructed of grade M units, conforming to ASTM C90, laid in a running bond.

Mortar shall be Type "S" per IBC 2103.2. Grout shall conform to IBC 2103.3 and ASTM C476 requirements and attain a minimum compressive strength of 2,000 psi at 28 days, design  $F'_m = 1,500$  psi. Full stresses are required.

### GLASS BLOCKS

Glass blocks shall be PPG (or approved) and shall conform to IBC 2110.

Mortar shall be Type "M". Mortar joint shall have a maximum thickness of 3/8" and a minimum width of 3".

## STRUCTURAL STEEL

### REFERENCE STANDARDS

Steel construction shall conform to the latest editions of the AISC Specifications and Codes. "Specification for Structural Steel Buildings" ANSI/AISC 360, "Specification for Structural Joints Using High-Strength Bolts" AISC 348 and "Code of Standard Practice for Steel Buildings and Bridges" AISC 303 amended by the deletion of paragraph 4.4.1.

### FABRICATORS

Fabricators for structural steel must have a quality assurance program in place. The quality assurance program must meet the requirements of one of the following methods:

- Registration in the Washington Association of Building Officials (WABO) Steel Fabricator Registration Program
- Participation in the AISC quality certification program, designated as an AISC Certified Plant, Category BU.
- Meeting the requirements of AISC 360 for structural steel buildings, appendix N and submitting plant documentation to the authority having jurisdiction, the Engineer of Record, and the Owner or Owner's designee. Quality assurance requirements of steel construction for wind and seismic (AISC 341, Chapter J) shall be included as required in Special Inspection section of the general notes, where applicable.

Fabricator for structural steel must be registered and approved to perform work without special inspection. At completion of fabrication, the fabricator shall submit a certificate of compliance to the building official stating that the work was performed in accordance with the approved construction documents.

### FINISHING

The terms finish, finish column, finishing, milled, milled surface or milling are intended to include surfaces which have been accurately sawed or finished to a true plane as defined by AISC.

Grind surface value equal to or less than 1,000 as defined by ANSI B46.2 (4-inch and thinner).

### STEEL COATINGS AND PROTECTION

Coatings and protection (weather, fire, corrosion, etc.) shall be as specified by the architect. Galvanized steel members shall conform to ASTM A-123 and galvanized steel hardware shall conform to ASTM A-153. Guidelines outlined in ASTM A-384 shall be followed in order to safeguard against warping and distortion during hot-dip galvanizing of steel assemblies. Steel anchors and ties embedded in concrete and masonry shall be left unpainted.

### CORROSION CONTROL

All steel noted as galvanized and any steel in ground contact or within 6-inches of grade shall be zinc-plated (galvanized) by the hot-dipped galvanic method (or pre-approved equivalent), except where such steel is to be fully encased in concrete. Furthermore, any surface where the coating has been removed or damaged must be brushed and re-coated in clean, dry field conditions with an approved zinc-based anti-corrosion coating except where such area is to be encased in concrete.

### SHOP PAINTING

All steel to be shop primed. Steel fire proofed or encased with concrete need not be painted. All other steel shall be given one coat of shop paint, in accordance with Section M3 of the AISC "Specification" and Section 6.5 of the AISC "Code", unless noted otherwise. The surface preparation of the structural steel prior to painting shall be in accordance with the specific paint manufacturer's published recommendations. Structural joints and faying surfaces which are to be connected by means of welds or bolts shall not be painted until all welds and bolts are installed, inspected and approved. Paint shall be held back 3" from the faying surface or the joint to be welded.

### STRUCTURAL STEEL MEMBERS

Structural Steel shall conform to the following requirements (unless otherwise shown on plans):

### STRUCTURAL STEEL MEMBER SPECIFICATIONS TABLE

Type of Member	ASTM Specification	Fy
Rolled wide-flange shapes	A992	50 ksi
Plates, channels, angles	A36, Grade 36	36 ksi
Threaded rods	A36	36 ksi
Anchor rods (hooked, headed, threaded & nutted)	F1554, Grade 36 (UNO)	36 ksi
Common bolts	A307, Grade A	-

## STRUCTURAL STEEL (cont'd)

### STEEL FRAMING

The contractor shall be responsible for all erection aids and joint preparations that include, but are not limited to: erection angles, lift holes, and other aids; welding procedures; required root openings; root face dimensions; groove angles; backing bars; copes; surface roughness values; and tapers of unequal parts.

### WELDING

All welding shall be in conformance with AISC and AWS standard and shall be performed by AWS certified welders using E70XX Electrodes in accordance with AWS D1.1. Only Prequalified welders, as defined by AWS, shall be used.

Shop drawings shall show all welding with AWS D1.4 symbols. Welds shown on the drawings are the minimum sizes. Increase weld size to AWS minimum sizes, based on plate thickness. Minimum welding shall be 3/16" UNO. Filler metal with a specified minimum Charpy V-notch toughness of 20 ft-lb at 40°F or lower shall be used at complete-joint-penetration groove welds. Welds designated as demand critical shall be made with filler metals meeting the requirements specified in AWS D1.8 clause 6.3.

Welding procedures shall be submitted to the Owner's testing agency for review prior to commencement of fabrication or erection. All complete-penetration welds shall be ultrasonically tested upon completion of the connection except plate less than or equal to 1/4" thick shall be magnetic particle tested. Complete penetration welds on plates less than or equal to 1/4" shall be magnetic particle tested.

Field welds shown are Engineer's recommendation. Contractor is responsible for actual welds used to support specific means and methods.

### WELDING GALVANIZED STEEL

Welding of galvanized steel shall conform to AWS specification D-19.0. Welded areas of galvanized steel shall be touched up in conformance with ASTM A-780.

### BOLTS

All high-strength bolts, not part of the Seismic Load Resisting System (SLRS), need only be tightened to snug-tight (ST) conditions, defined as the tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. All bolt holes shall be standard size, unless noted otherwise. All ASTM A-307 bolts shall be provided with lock washers under nuts or self-locking nuts.

Connections, joints and fasteners that are part of the Seismic Load Resisting System (SLRS) shall be pretensioned (PT) high-strength bolts and shall meet the requirements for slip-critical (SC) joints. UNO All faying surfaces shall be prepared as required for class A or better slip-critical joints. All high-strength bolts shall be installed, tightened and inspected in accordance with AISC 348. Slip-critical (SC) connections shall use compressible-washer-type direct tension indicators or twist-off-type tension-control bolts.

## WOOD

### MATERIAL CRITERIA

Framing lumber shall be kiln dried or MC-19 (unless more stringent criteria are required in these notes or on the drawings) and graded and marked in conformance with the latest WCLUB "Standard Grading Rules No. 17 for West Coast Lumber". Finish to the following minimum standards:

### WOOD STANDARDS

Member	Grade	Moisture Content
4x Beams & posts, 6x Posts	DF #2	MC19
4x Treated beams & posts, and 6x treated posts	DF #2	MC19
2x Joists, rafters, built-up beams, and headers	DF #2	MC19
2x, 3x Flatwise & edgewise blocking	DF Standard	MC19
3x Nailers on steel beams	DF #2	MC19
2x4 and 2x6 Studs	DF #2	MC19
3x Studs	DF #2	MC19
2x4 Plates	DF Standard	KD15
2x6 Plates	DF #2	KD15
2x, 3x, and 4x Treated plates, ledgers	DF #2	KD15
Tongue and groove decking (non-visual)	DF Utility/ #3 Commercial DED	MC19
Tongue and groove decking (exposed)	DF #2	MC19
Tongue and groove decking (upper end exposed)	DF Select DEX	MC19

### MOISTURE CONTENT AND CARE OF MATERIAL DURING CONSTRUCTION

All 2x studs and plates shall be kiln dried. The Contractor shall take measures to minimize exposure of sawn lumber and engineered wood products to moisture during construction. Excessive changes in moisture content during construction may result in swelling and shrinkage of a single story level in the magnitude of 1/2". This may create problems where multi-story wood construction joins multi-story concrete wall construction. All wood framed construction shall have maximum moisture content not to exceed 10% at time of fur-out, which shall be verified by a testing agency hired by the Owner. These test results shall be submitted to the Architect and Structural Engineer of Record for review prior to installation and interior drywall installation is performed. In addition, pre-loading the entire wood building with the interior drywall while the building is being dried out is recommended before wood ledgers are attached to concrete shear walls.

Wood joists and beams supporting topping slabs or subjected to construction loading shall have a maximum live load deflection of  $l/600$ . The contractor shall be responsible for ensuring that the moisture content of wood members supporting concrete or construction loads is, and remains, at 10% or less. Wood framing with higher moisture contents before, or during, the placement of topping slabs or subjected to construction loading are subject to excessive creep. Contractor to provide means to maintain the moisture content as required to prevent creep.

### VERTICAL SHRINKAGE

Allow for 1/2" of wood shrinkage/compression at each level (including foundation). Values are cumulative for the height of the building. Building systems such as mechanical, electrical, plumbing, fire sprinklers, etc. shall have flexible components that account for the potential wood shrinkage/compression. Structural finishes shall also account for the potential wood shrinkage/compression.

### TREATED WOOD

All wood framing in direct contact with concrete or masonry, exposed to weather, or that rest on exterior foundation walls and are located within 8" of earth, shall be pressure-treated with an approved preservative per IBC section 2303.1.9. Cut or drilled sections of treated material shall be treated with an approved preservative per IBC section 2303.1.9. See IBC section 2304.12 for additional requirements.

### GLUE LAMINATED TIMBER MATERIAL

Glue laminated timber, or glulam, members shall be fabricated in conformance with ANSI/AITC A190.1 and ASTM D3737, Stress Class 24F-1.8E. Each member shall bear an AITC identification mark and shall be accompanied by an AITC certificate of conformance. All simple span beams shall be douglas fir combination 24F-V4,  $f_b = 2,400$  psi,  $f_v = 265$  psi and all cantilevered beams and columns shall be douglas fir combination 24F-V8,  $f_b = 2,400$  psi,  $f_v = 265$  psi unless noted otherwise. Camber all simple span glulam beams to 3,500' radius or zero camber, unless shown otherwise on the plans.

## WOOD (cont'd)

### (Trus-Joist)

### STRUCTURAL COMPOSITE LUMBER

Manufactured lumber, PSL, LVL, and LSL, shall be manufactured under a process approved by the national research board. Each piece shall bear a stamp or stamps noting the name and plant number of the manufacturer, the grade, the national research board number, and the quality control agency. All PSL, LVL and LSL lumber shall be manufactured in accordance with ICC Report ESR-1387. LVL lumber shall be manufactured using veneer glued with a water-proof adhesive complying with the requirements of ASTM D2559 with all grain parallel with the length of the member. The members shall have the following minimum properties:

### MINIMUM DESIGN PROPERTIES FOR COMPOSITE LUMBER (Trus-Joist)

Grade	Orientation	E (ksi)	Fb (psi)	Fcl (psi)	Fv (psi)
1.55E LSL	Beam	1,550	2,325	2,170	310
2.0E LVL	Beam	2,000	2,600	2,510	285
1.8E PSL	Column	1,800	2,400	2,500	190
2.0E PSL	Beam	2,000	2,900	2,900	290

Design shown on plans is based on Trus-Joist products manufactured by the Weyerhaeuser Corporation. Alternate manufacturers may be used subject to review and approval by the Architect and Structural Engineer of Record. Alternate joist hangers and other hardware may be substituted for items shown provided they have ICC approval for equal or greater load capacities. All joist hangers and other hardware shall be compatible in size with members provided.

### PLYWOOD WEB JOISTS

Prefabricated plywood web joist design shown on plans is based on Trus-Joist products manufactured by the Weyerhaeuser Corporation. Alternate plywood web joist manufacturers may be used provided they conform with the ICC evaluation service reports ESR-1387 and ESR-1153 and are subject to review and approval by the Architect and Structural Engineer of Record. Alternate plywood web joists must have equivalent section properties and allowable stresses to those previously specified to be considered. Alternate joist hangers and other hardware may be substituted for items shown provided they have ICC approval for equal or greater load capacities. All joist hangers and other hardware shall be compatible in size with plywood web joist provided. All necessary bridging, blocking, blocking panels, stiffeners, etc., shall be detailed and furnished by the manufacturer. All permanent and temporary bridging shall be installed in conformance with manufacturer's specifications. The following deflection criteria shall be maintained with all alternates.

- Floor live load deflections shall be limited to span/480 (span/360 at 100 psf live load).
- Roof total load deflections shall be limited to span/240.
- Specified plywood web joists at floors have been designed for a minimum TJ-Pro rating of 40 in addition to the maximum allowable deflections noted above.

Alternative framing members at shear wall rim / blocking locations may be used, provided ICC reports or manufacturer's test data are submitted. The submitted data shall verify the ability of the alternative members to provide equivalent or greater shear capacities using the specified nail and anchor sizes and spacing.

### WOOD STRUCTURAL PANELS

Wood structural panels shall be APA rated sheathing, exposure 1 durability classification, in conformance with USDOC PS 1, ASTM D 5457 and IBC 2303.1.5 and Table 2304.8(2).

Oriented strand board (OSB), shall be in accordance with USDOC PS 2, and of equivalent thickness, exposure rating and span rating and may be used in lieu of plywood pending OSB substitution approval by Architect. Contractor to ensure OSB is protected to prevent warping during installation.

### FASTENERS

Fasteners shall conform to the following requirements, unless noted otherwise. Splitting shall be avoided at all wood fasteners:

Bolts	NDS section 12.1.3
Lag screws	NDS section 12.1.4
Wood screws	NDS section 12.1.5
Nails	NDS section 12.1.6
Wood-to-wood connection bolts	ASTM A307
Steel-to-wood connection bolts	ASTM A307
Anchor rods (7" embed min)	ASTM F1554 grade 36 with threaded ends and welded nut at end (provide higher grade at holdown rods where indicated)

Thru-bolt and anchor rod holes shall be at least 1/32" but no more than 1/16" larger than bolt/rod diameter. Clearance holes for lag screw shanks shall have the same diameter as the lag shank and the same penetration depth as the length of the unthreaded shank. Lead holes for threaded portion of lag screws shall have a diameter of 55 to 60% of lag screw shank diameter and shall extend the length of the threaded portion of the lag screw. Fasteners exposed to earth, weather or located in pressure preservative or fire retardant treated wood shall comply with the criteria listed in the "Metal Products in Contact with Treated Lumber" section.

### FRAMING CONNECTORS

Timber connectors called out by letters and numbers shall be "Strong-Tie" by the Simpson Strong-Tie Company. Equivalent devices by other manufacturers may be substituted, provided they have ICC approval for equal or greater load capacities.

All connectors shall be installed in accordance with the manufacturer's recommendations. Provide number and size of fasteners as specified by manufacturer. All shims shall be seasoned and dried and the same grade (minimum) as members connected. All nails shall be as called out in the "Fasteners" section of this sheet, unless noted otherwise. All bolts in wood members shall conform to ASTM A307. Provide washers under the heads and nuts of all bolts and lag screws bearing on wood. Where connector straps connect two members, place one-half of the nails or bolts in each member.

### METAL PRODUCTS IN CONTACT WITH TREATED LUMBER

Simpson hardware in contact with ACQ, CA, or CBA pressure-preservative treated wood shall have a Zmax finish (G185 HDG per ASTM A653) or shall be post-hot-dip galvanized (per ASTM A123 for connectors and ASTM A153 for fasteners) unless noted otherwise. Exception: type 304 or 316 stainless steel connectors and fasteners are required for the following applications:

- ACQ, CA, or CBA treatments with ammonia where members are used in exterior applications.
- All ACZA treatments
- Retention levels greater than 0.40 pcf for ACQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B treatments.

Stainless steel connectors require matching stainless steel fasteners. Zmax and post-hot-dip galvanized connectors require fasteners galvanized per ASTM A153. Thru-bolts and anchor rods used in dry conditions shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, class 55 minimum. See IBC section 2304.10.5.1 and "Framing Connectors" section on this sheet for additional requirements.



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Project Information

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Sheet Title

STRUCTURAL  
GENERAL NOTES

Sheet Number

S1.3



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**STRUCTURAL  
GENERAL NOTES**

Sheet Number

**S1.4**

**PREFABRICATED WOOD ROOF TRUSSES**

**PREFABRICATED CONNECTOR-PLATE WOOD ROOF TRUSSES**

Prefabricated connector plate wood roof truss loading shall be as follows:

top chord snow load	25 psf unless noted otherwise in the load criteria
top chord dead load	10 psf
bottom chord dead load	10 psf
bottom chord live load	10 psf (uninhabitable attics w/o storage)
bottom chord live load*	20 psf (uninhabitable attics w/ light storage or uninhabitable attics w/o storage, but containing areas where the clear distance between the top and bottom chords is greater than or equal to 42" for a horizontal distance of 24" involving (2) or more trusses)

\* the bottom chord live load does not act concurrently with the roof live or snow load

See Architectural and Mechanical drawings for sprinkler and mechanical equipment loading. Wind uplift (top chord) per ASCE 7, use components and cladding loads, see loading criteria.

The truss manufacturer shall be responsible for the complete design, fabrication for all trusses, blocking, incidental framing, framing for openings, permanent member lateral restraint and bracing, bridging, connections, holdown anchors, and all other items required for a complete truss system. Truss configurations are shown on the Architectural or Structural drawings. The truss manufacturer shall have at least 3 years experience in the fabrication of prefabricated wood trusses. Truss installer shall be responsible for erection procedures and temporary lateral restraint for a safe installation of the trusses.

Prefabricated wood trusses shall be metal plate connected wood trusses designed and fabricated in accordance with the current ANSI/TPI.1 requirements to support their own weight plus superimposed dead, live, uplift and lateral loads shown on the drawings. Contractor shall submit design calculations and truss design drawings in accordance with the Deferred Submittal Section to the Architect and Structural Engineer of Record. Design calculations and truss design drawings shall be approved by the Architect and the building official prior to manufacturing the trusses.

Truss design drawings are the written, graphic and pictorial depiction of each individual truss. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, all items covered in ANSI/TPI.1 2.3.5.5.

Design of trusses shall consider deflection of trusses relative to adjacent parallel supports and include design of bridging, bracing, additional trusses or other means necessary to alleviate problems resulting from differential deflections.

Load criteria for wind and seismic loading are indicated on the general notes, vertical loads are indicated above and in the load maps. Trusses shall be designed to limit total deflections to a maximum of span/600 or 1/4", whichever is smaller. Provided a more stringent deflection requirement is not needed to accommodate brittle finishes.

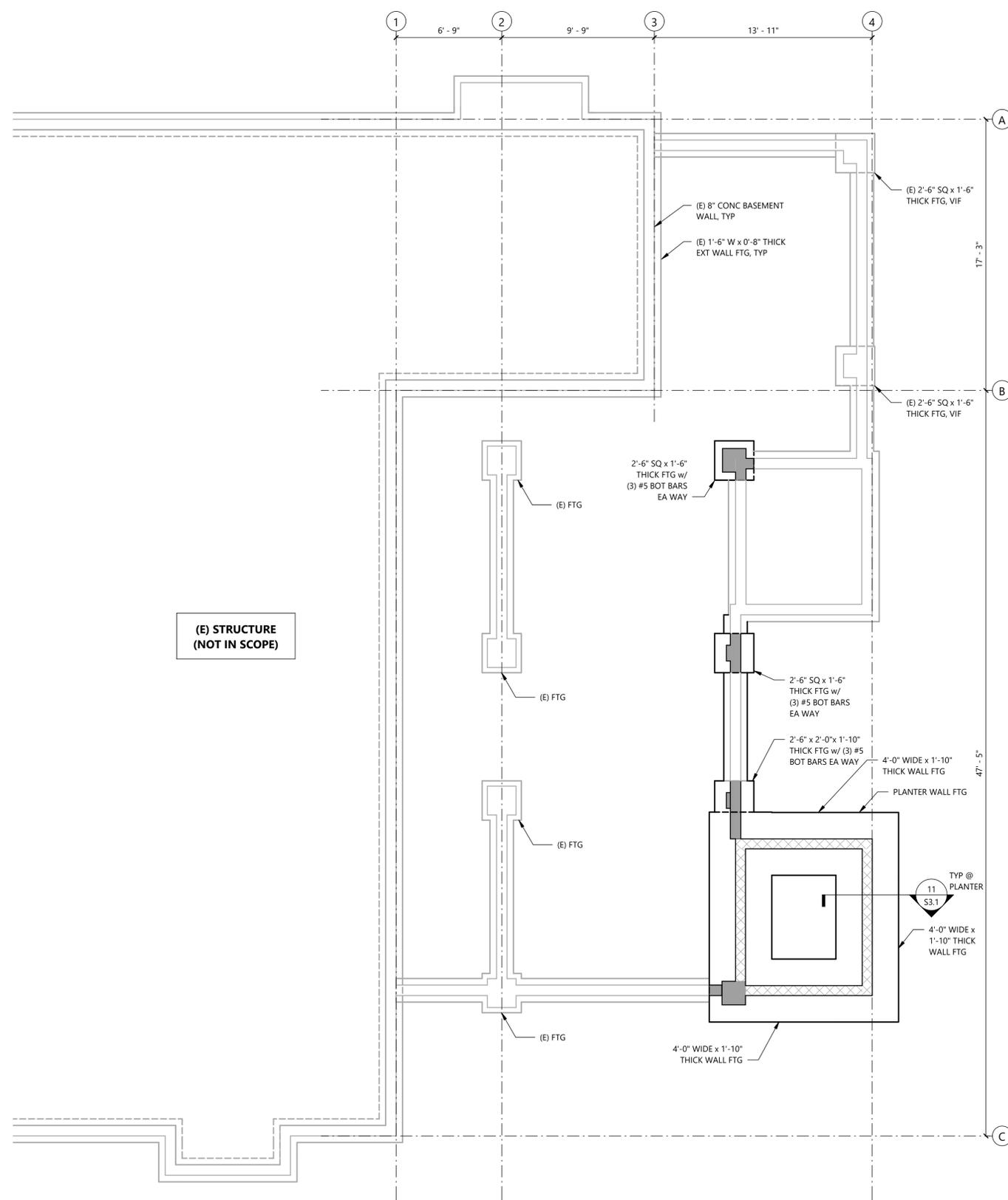
The truss manufacturer shall provide a Truss Placement Diagram (TPD) that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The TPD shall be provided as part of the truss submittal package, and with the shipment of trusses delivered to the job site. The TPD is not required to bear the seal or signature of the truss designer unless the TPD is prepared under the direct supervision of a registered design professional, in which case the TPD is required by Washington state law to be signed and sealed a civil or Structural Engineer licensed in the governing jurisdiction. The Truss Submittal Package (TSP) shall consist of each individual truss design drawing, the TPD, the permanent individual member lateral restraint and bracing details or specifications or drawings and the cover sheet/truss index sheet.

Where permanent individual member lateral restraint and bracing of truss members is required on the truss design drawings, it shall be accomplished by ANSI/TPI.1 2.3.3.1.1 or 2.3.3.1.2.

Erection bracing and bridging sizes and spacing shall be as required by the truss manufacturer in accordance with the latest recommendations of the Truss Plate Institute (TPI). Install and lap bracing and bridging per latest TPI recommendations.

Additional trusses shall be designed and supplied as required to support mechanical equipment, piping, ducts, etc. All connectors specified by the truss manufacturer shall have current ICC approval and shall be designed and sized for twice the calculated load. No offsets for connections will be permitted. Truss manufacturer is responsible for truss to truss connections. General Contractor is responsible for equipment connections to trusses.

Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written consent and approval of a registered design professional. New load or changes in loads resulting in the addition of loads to any truss (e.g., HVAC equipment, water heater, piping, ducts, etc.) shall not be permitted without verification that the truss is capable of supporting such additional loading.



**FOUNDATION PLAN NOTES**

**1. GENERAL**

- 1.1 ELEVATION AT TOP OF SLAB SHALL BE PER ARCH. UNO.  
[-'X'-X"] INDICATES ELEVATION AT TOP OF FOOTING, MEASURED IN FEET.  
FOOTING ELEVATIONS SHOWN ARE FOR CONTRACTOR CONVENIENCE AND BIDDING ONLY. FINAL ELEVATIONS SHALL BE DETERMINED BY ON-SITE VERIFICATION BY SOILS ENGINEER, BUT SHALL NOT BE SHALLower THAN THOSE SHOWN ON THIS PLAN. REFER TO STRUCTURAL GENERAL NOTES FOR ADDITIONAL INFORMATION.
- 1.2 GRID LINES ARE TO FACE STUD AND CENTERLINE OF COLUMN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
- 1.3 EXISTING CONDITIONS ARE ASSUMED AND MUST BE VERIFIED BY THE CONTRACTOR. WHERE DISCOVERED CONDITIONS VARY FROM THOSE SHOWN ON PLANS, CONTRACTOR SHALL CONTACT THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.
- 1.4 WHEREVER NEW CONCRETE ABUTS EXISTING CONCRETE, ADD DOWELS TO MATCH REINFORCEMENT IN NEW CONSTRUCTION. LAP DOWELS WITH NEW REINFORCEMENT PER TYPICAL LAP SPICE TABLE AND EMBED INTO EXISTING CONCRETE WITH EPOXY GROUT PER STRUCTURAL GENERAL NOTES.  
FOR BARS #5 AND SMALLER: EMBED 6" MIN;  
FOR BARS #6 AND LARGER: EMBED 9" MIN.

**2. FOUNDATIONS**

- 2.1 EXCAVATE, BACKFILL, AND PREPARED SOILS AS REQUIRED PER STRUCTURAL GENERAL NOTES AND GEOTECHNICAL REPORT.



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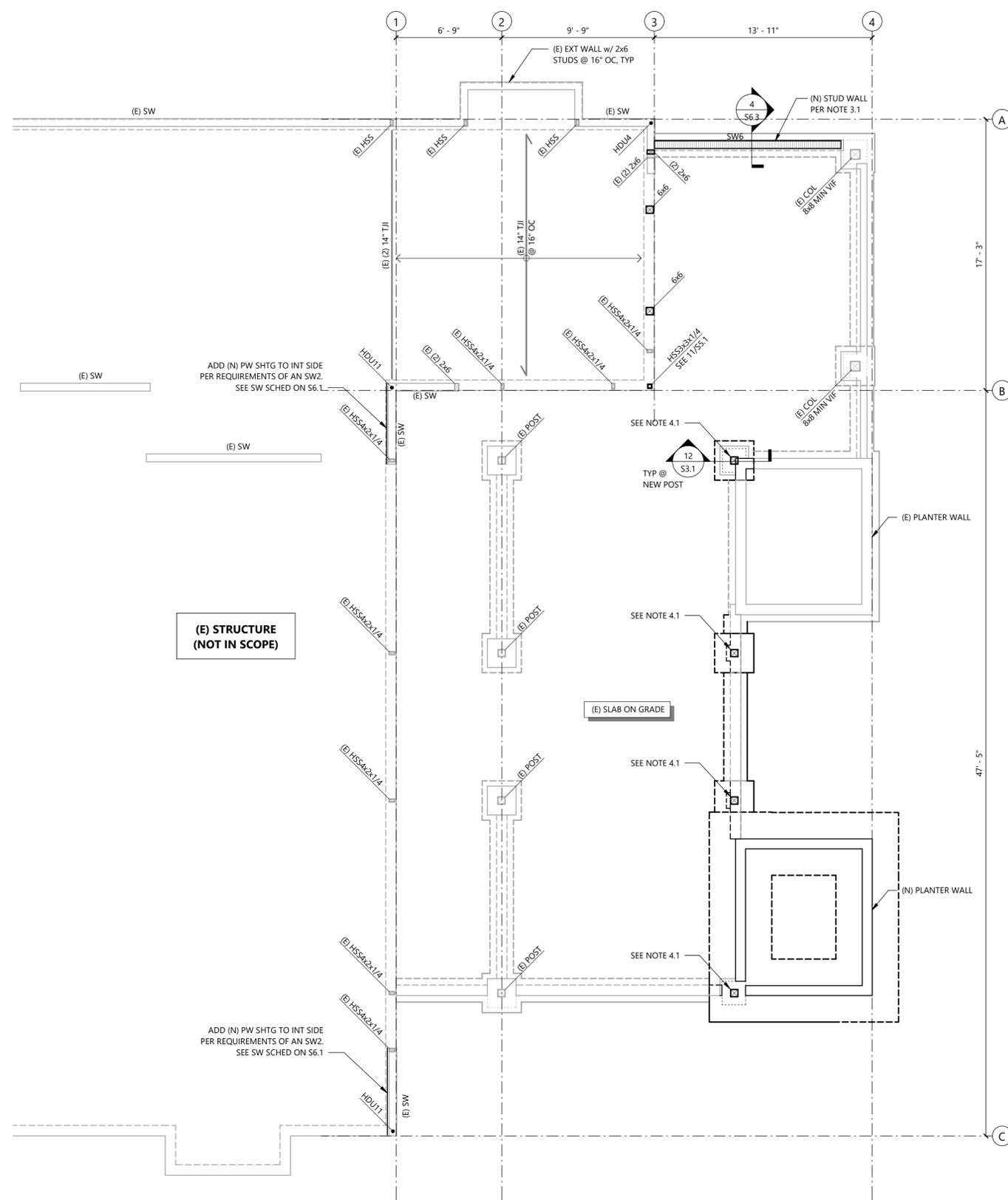
Sheet Title

**FOUNDATION PLAN**

Sheet Number

**S2.1**





**FLOOR FRAMING PLAN NOTES**

**1. GENERAL**

- 1.1. ELEVATION AT TOP OF SHEATHING SHALL BE PER ARCH, UNLESS NOTED OTHERWISE.
- 1.2. GRID LINES ARE TO FACE OF STUD AND CENTERLINE OF COLUMN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
- 1.3. EXISTING CONDITIONS ARE ASSUMED AND MUST BE VERIFIED BY THE CONTRACTOR, WHERE DISCOVERED CONDITIONS VARY FROM THOSE SHOWN ON PLANS, CONTRACTOR SHALL CONTACT THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.

**2. FLOORS**

- 2.1. FLOOR SHALL BE 23/32" APA-RATED SHEATHING, (48/24) EXPOSURE 1, TONGUE & GROOVE, GLUED AND NAILED. WHERE BLOCKED DIAPHRAGM IS NOTED ON PLAN, USE 2x FLAT BLOCKING AND 'Z' CLIPS AT UNSUPPORTED PANEL EDGES.

NAIL SHEATHING AS FOLLOWS:

FLOOR BOUNDARY (BN).....	10d @ 6"
PANEL EDGES (EN).....	10d @ 6"
OTHER SUPPORTS, FIELD NAILING.....	10d @ 10"
BLOCKING, INTERIOR RIM JOISTS & STRUTS.....	10d @ 4"

NAILS SHALL BE DRIVEN FLUSH WITH THE FACE OF SHEATHING. GLUE SHALL CONFORM TO APA AFG-01.

- 2.2. TYPICAL RIM JOISTS SHALL BE MINIMUM 1 1/2" LSL, UNO. REFER TO SHEAR WALL SCHEDULE FOR ADDITIONAL REQUIREMENTS AT RIMS.
- 2.3. TYPICAL HEADER SHALL BE 4x10 DF NO. 2, UNLESS NOTED OTHERWISE.
- 2.4. TYPICAL HANGERS SHALL BE SIMPSON JB OR LU, UNLESS NOTED OTHERWISE.

**3. WALLS**

- 3.1. STRUCTURAL WALL STUDS AT THIS LEVEL SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:  
 EXTERIOR WALLS.....2x6 @ 16" OC  
 INTERIOR WALLS.....2x6 @ 16" OC

SEE DETAIL SHEET S6.1 FOR TYPICAL WALL FRAMING REQUIREMENTS AND FOR TYPICAL SHEAR WALL ALL REQUIREMENTS. FRAME ALL SHEAR WALL INTERSECTIONS PER TYPICAL DETAILS.

- 3.2. USE (1) KING STUD AND (1) TRIMMER STUD AT EXTERIOR HEADERS AT THIS LEVEL, UNLESS NOTED OTHERWISE.
- 3.3. ALL EXTERIOR WALLS SHALL BE CONSTRUCTED AS SW6 PER TYPICAL SHEAR WALL SCHEDULE, UNLESS NOTED OTHERWISE.

**4. TRELLIS**

- 4.1. TRELLIS COLUMNS TO MATCH EXISTING TRELLIS COLUMN SIZE. VERIFY IN FIELD. COLUMNS SHALL BE 8x8 DF NO 1 MIN.

**LEGEND**

	STRUCTURAL WALL BELOW WITH HEADER (CONT WALL PLATES)
	STRUCTURAL WALL BELOW WITH FLUSH BEAM (BREAK WALL PLATES)
	STRUCTURAL WALL THIS LEVEL WITH CONT SILL PLATE AT OPENING
	STRUCTURAL WALL THIS LEVEL WITH BREAK IN SILL PLATE AT OPENING
	FLOOR JOIST & EXTENT
	BEAM PER PLAN OR HEADER PER NOTE 2.3
	JOIST HANGER PER NOTE 2.4
	SHEAR WALL PER S6.##
	SIMPSON STRAP TIE HOLDOWN USE (2) 2x MIN AT STRAPS; SEE S6.##
	NUMBER OF KINGS PLUS TRIMMERS, UP FROM THIS LEVEL
	INDICATES OVERFRAMING
	INDICATES BLOCKED DIAPHRAGM PER NOTE 2.1
	STRAP & BLOCKING PER PLAN
	STRAP PER PLAN



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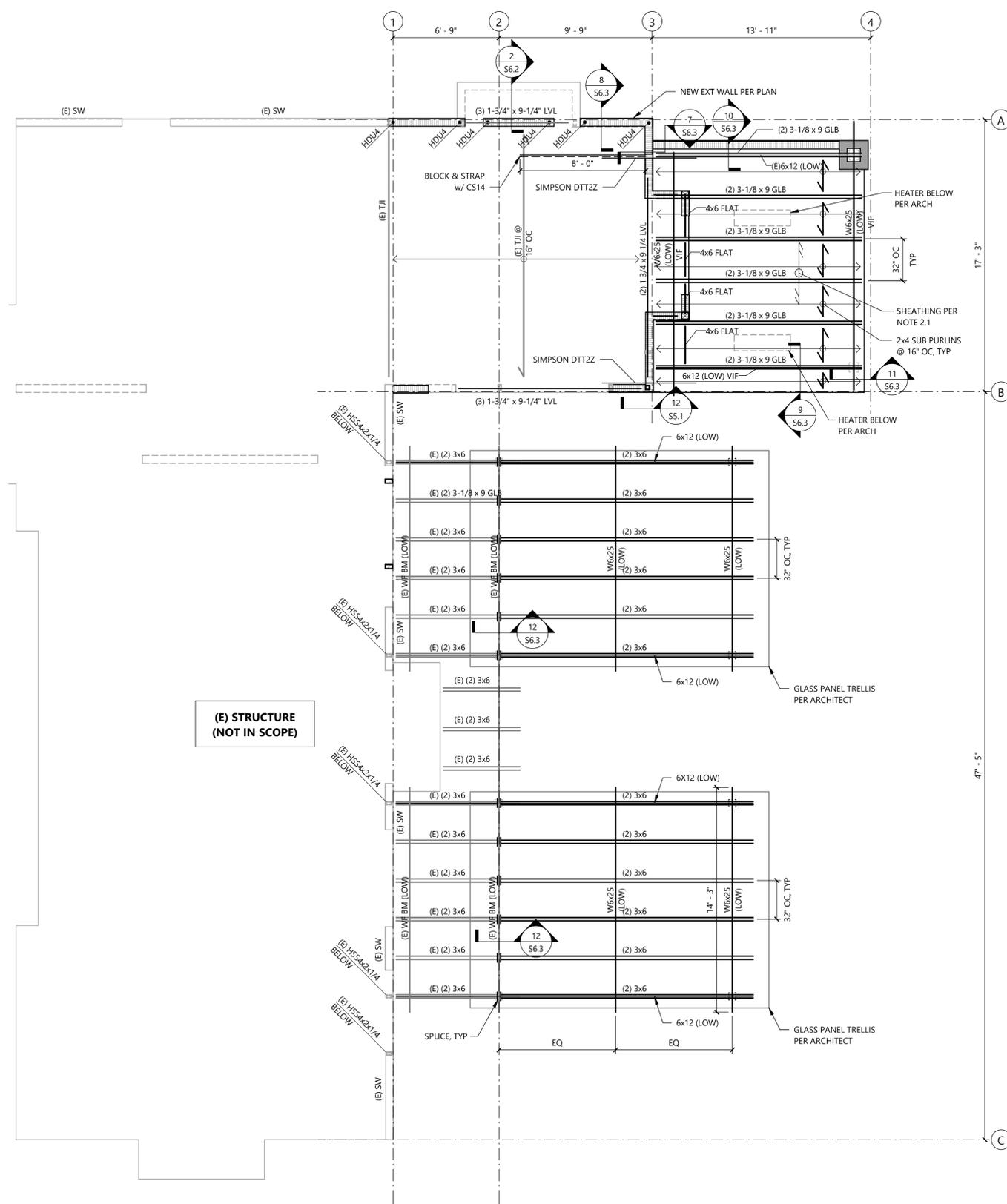
Sheet Title

MAIN LEVEL  
FRAMING PLAN

Sheet Number

S2.2

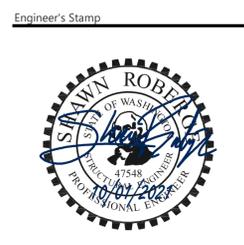
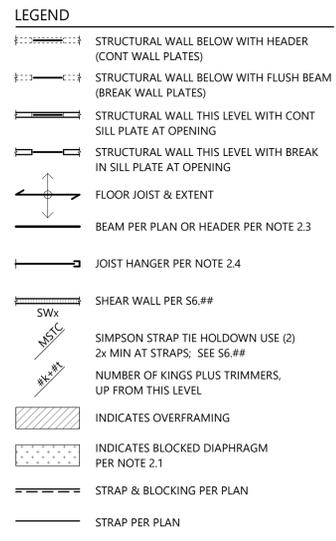




(E) STRUCTURE  
(NOT IN SCOPE)

**FLOOR FRAMING PLAN NOTES**

- GENERAL**
  - ELEVATION AT TOP OF SHEATHING SHALL BE PER ARCH, UNLESS NOTED OTHERWISE.
  - GRID LINES ARE TO FACE OF STUD AND CENTERLINE OF COLUMN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
  - EXISTING CONDITIONS ARE ASSUMED AND MUST BE VERIFIED BY THE CONTRACTOR. WHERE DISCOVERED CONDITIONS VARY FROM THOSE SHOWN ON PLANS, CONTRACTOR SHALL CONTACT THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.
- FLOORS**
  - FLOOR SHALL BE 23/32" APA-RATED SHEATHING, (48/24) EXPOSURE 1, TONGUE & GROOVE, GLUED AND NAILED. WHERE BLOCKED DIAPHRAGM IS NOTED ON PLAN, USE 2x FLAT BLOCKING AND 'Z' CLIPS AT UNSUPPORTED PANEL EDGES.  
 NAIL SHEATHING AS FOLLOWS:  
 FLOOR BOUNDARY (BN) ..... 10d @ 6"  
 PANEL EDGES (EN) ..... 10d @ 6"  
 OTHER SUPPORTS, FIELD NAILING ..... 10d @ 10"  
 BLOCKING, INTERIOR RIM JOISTS & STRUTS ..... 10d @ 4"  
 NAILS SHALL BE DRIVEN FLUSH WITH THE FACE OF SHEATHING. GLUE SHALL CONFORM TO APA AFG-01.
- WALLS**
  - STRUCTURAL WALL STUDS AT THIS LEVEL SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:  
 EXTERIOR WALLS ..... 2x6 @ 16" OC  
 INTERIOR WALLS ..... 2x6 @ 16" OC  
 SEE DETAIL SHEET S6.1 FOR TYPICAL WALL FRAMING REQUIREMENTS AND FOR TYPICAL SHEAR WALL REQUIREMENTS. FRAME ALL SHEAR WALL INTERSECTIONS PER TYPICAL DETAILS.
  - USE (1) KING STUD AND (1) TRIMMER STUD AT EXTERIOR HEADERS AT THIS LEVEL, UNLESS NOTED OTHERWISE.
  - ALL EXTERIOR WALLS SHALL BE CONSTRUCTED AS SW6 PER TYPICAL SHEAR WALL SCHEDULE, UNLESS NOTED OTHERWISE.



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Project No.	21-127-01
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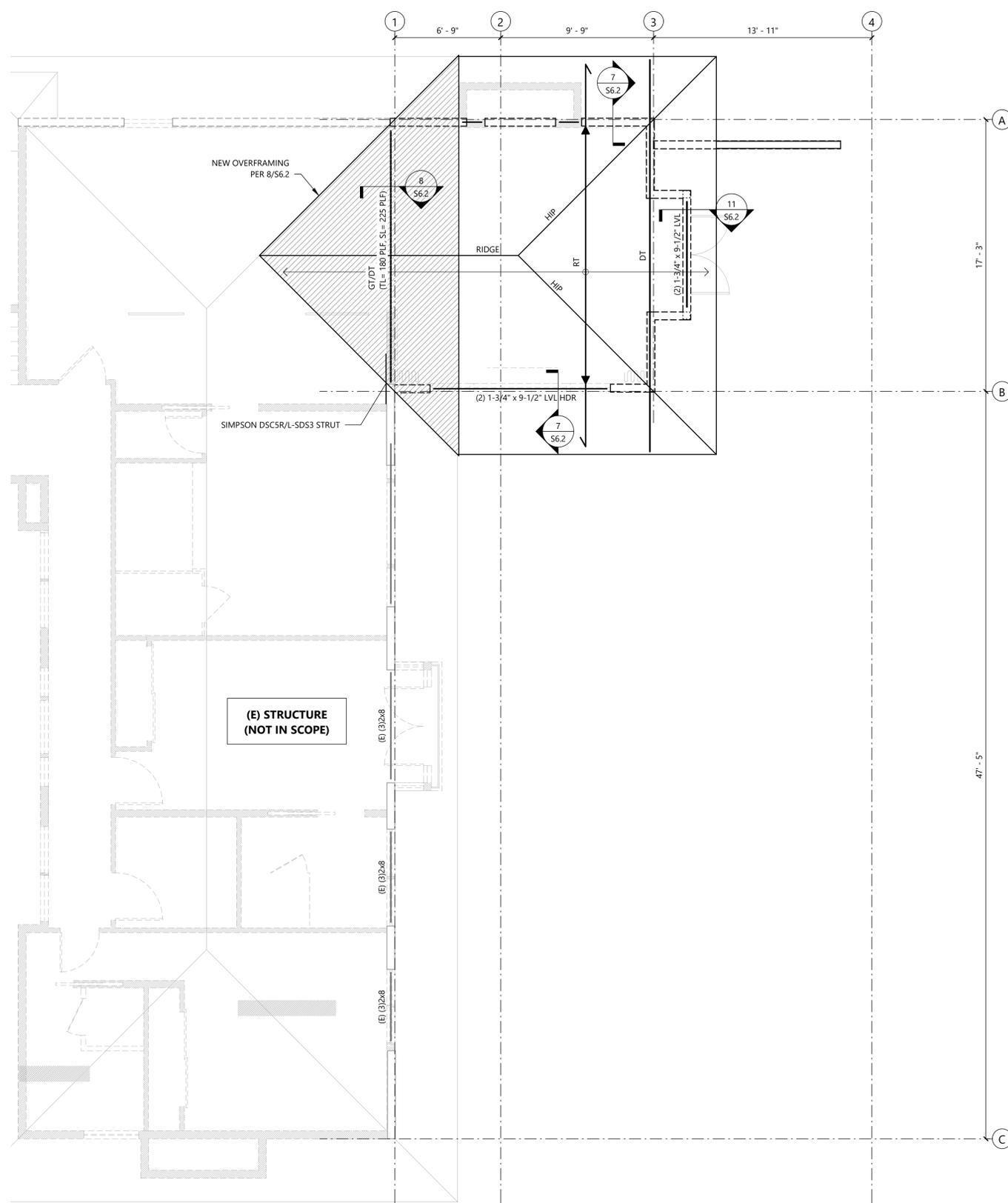
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Sheet Title  
**UPPER LEVEL FRAMING PLAN**

Sheet Number

**S2.3**





**ROOF FRAMING PLAN NOTES**

**1. GENERAL**

- 1.1. ELEVATION AT TOP OF SHEATHING SHALL BE XX'-X", UNLESS NOTED OTHERWISE.
- 1.2. GRID LINES ARE TO FACE OF STUD AND CENTERLINE OF COLUMN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
- 1.3. EXISTING CONDITIONS ARE ASSUMED AND MUST BE VERIFIED BY THE CONTRACTOR. WHERE DISCOVERED CONDITIONS VARY FROM THOSE SHOWN ON PLANS, CONTRACTOR SHALL CONTACT THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.

**2. ROOF**

- 2.1. ROOF SHEATHING SHALL BE 15/32" APA RATED SHEATHING (32/16), EXPOSURE 1. SHEATHING IS SUPPORTED BY 4x T&G TIMBER DECKING. NAIL SHEATHING PANELS AS FOLLOWS:
 

ROOF BOUNDARY (BN)	.....	10d @ 6"
PANEL EDGES (EN)	.....	10d @ 6"
OTHER SUPPORTS, FIELD NAILING (FN)	.....	10d @ 12"
BLOCKING, INTERIOR RIM JOISTS AND STRUTS	.....	10d @ 6"

NAILS SHALL BE FLUSH WITH THE FACE OF SHEATHING.
- 2.2. TYPICAL RIM JOISTS SHALL BE MINIMUM 1 1/2" LSL, UNO. REFER TO SHEAR WALL SCHEDULE FOR ADDITIONAL REQUIREMENTS AT RIMS.
- 2.3. TYPICAL HEADER SHALL BE 4x10 DF NO. 2, UNLESS NOTED OTHERWISE.
- 2.4. TYPICAL HANGERS SHALL BE SIMPSON IUS OR ITS, UNLESS NOTED OTHERWISE.

**LEGEND**

- STRUCTURAL WALL BELOW WITH HEADER (CONT WALL PLATES)
- STRUCTURAL WALL BELOW WITH FLUSH BEAM (BREAK WALL PLATES)
- INDICATES PRE-ENGINEERED ROOF TRUSSES AT 24" OC; SEE GENERAL STRUCTURAL NOTES FOR CRITERIA.
- (▲) DENOTES BEARING POINT BELOW.
- RT** INDICATES PRE-ENGINEERED ROOF TRUSSES AT 24" OC
- GT** INDICATES PRE-ENGINEERED GIRDER TRUSS
- DT** INDICATES PRE-ENGINEERED DRAG TRUSS. SEE DETAIL 4/S6.2
- INDICATES OVERFRAMING
- INDICATES BLOCKED DIAPHRAGM PER NOTE 2.1



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ROOF FRAMING  
PLAN

Sheet Number

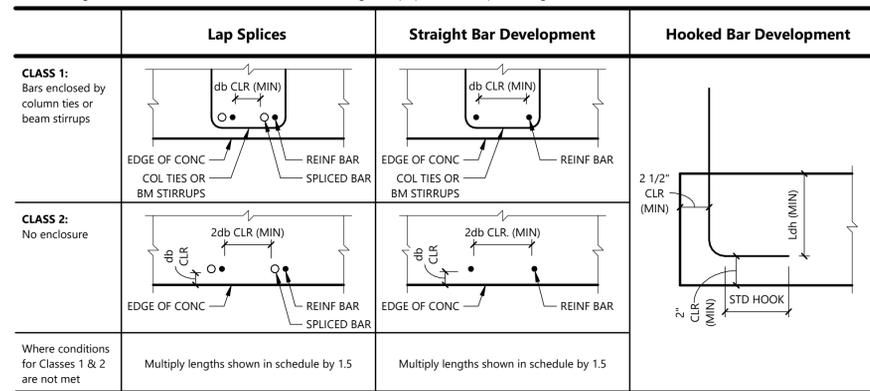
**S2.4**





### REINFORCING BAR LAP SPLICE & DEVELOPMENT LENGTH DIAGRAMS

The following conditions must be met in order to use the Reinforcing Bar Lap Splice & Development Length Tables



**Notes:**

- All bars shall be developed & all splices lapped per ACE 318 for tension, uno. Table may be used where conditions meet criteria noted in diagrams.
- Tables are applicable for normal weight concrete, only.
- Top bars are horizontal bars with more than 12" depth of concrete cast below them. (wall horizontal reinforcement is exempt).
- Where bars of different size are lap spliced, splice length shall be the larger of:
  - Developed length of larger bar
  - Splice length of smaller bar
- Where minimum straight bar development length cannot be achieved, use with standard hook.
- Refer to concrete cover table for minimum concrete cover requirements.

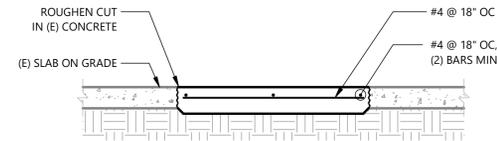
## 2 Reinforcing Bar Lap Splice & Development Length Tables

Scale: 1 1/2" = 1'-0"

### REINFORCING BAR LAP SPLICE & DEVELOPMENT LENGTH TABLE

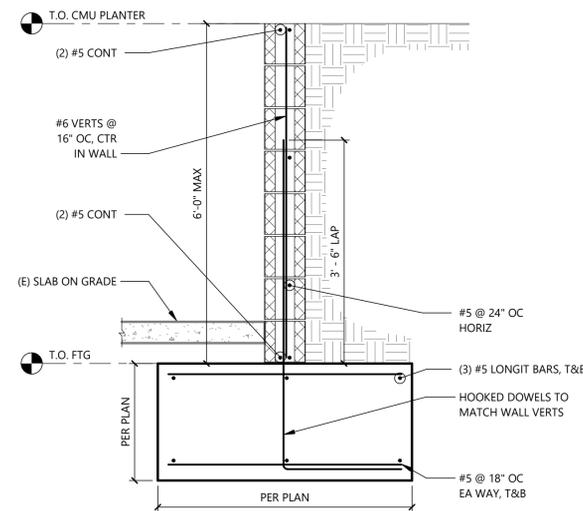
f'c = 3,000 psi Grade 60 Reinforcing

Bar Size	Min Lap Splice Lengths (Ls)		Min Straight Bar Development Lengths (Ld)		Min Hooked Bar Embedment Lengths (Ldh)
	Top Bars	Other Bars	Top Bars	Other Bars	
#3	28"	22"	22"	17"	9"
#4	38"	29"	29"	22"	11"
#5	47"	36"	36"	28"	14"
#6	56"	43"	43"	33"	17"
#7	81"	63"	63"	48"	20"
#8	93"	72"	72"	55"	22"
#9	105"	81"	81"	62"	25"
#10	118"	91"	91"	70"	28"
#11	131"	101"	101"	78"	31"



## 7 Typical Patching at Slab on Grade

Scale: 3/4" = 1'-0"



## 11 Typical CMU Planter Wall

Scale: 3/4" = 1'-0"

### CONCRETE COVER FOR REINFORCING STEEL

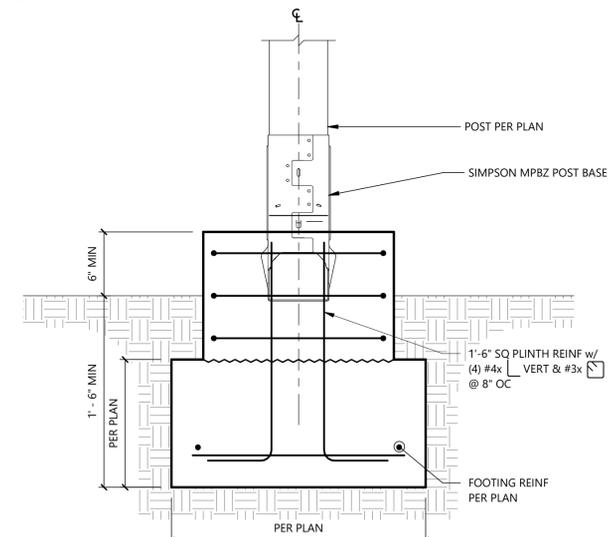
Reinforcing Bar Location	Minimum Concrete Cover
Unformed surfaces cast against and permanently exposed to earth	3"
Formed surfaces exposed to earth or weather (#6 bars and larger)	2"
Formed surfaces exposed to earth or weather (#5 bars and smaller)	1 1/2"
Columns and beams w/ bars enclosed in stirrups, ties or spiral reinforcement	1 1/2"
Slabs, joists and interior faces of walls (#11 bars and smaller)	3/4"
2-hour and 3-hour slabs	(Refer to plan notes)
Clear spacing between longitudinal bars in columns and boundary elements	1 1/2" or 1.5db
Clear spacing between parallel bars in a layer	1" or db
Clear spacing between (2) or more parallel layers	1"

**Notes:**

- Where a thickness of cover required for fire protection is greater than that specified in this table, the greater thickness shall be used.
- Where two values are shown, the greater shall be used.

## 8 Concrete Cover for Reinforcing Steel

Scale: 3/4" = 1'-0"



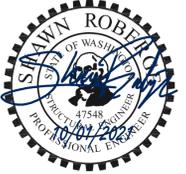
## 12 Typical Post Footing with Square Plinth

Scale: 1 1/2" = 1'-0"

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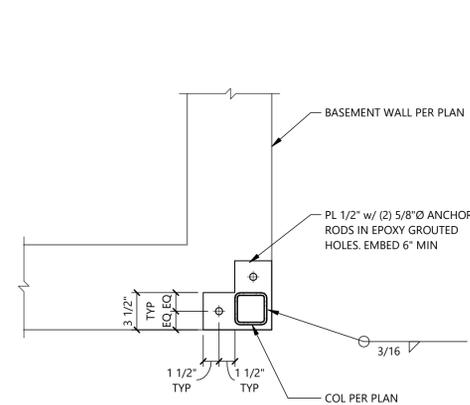
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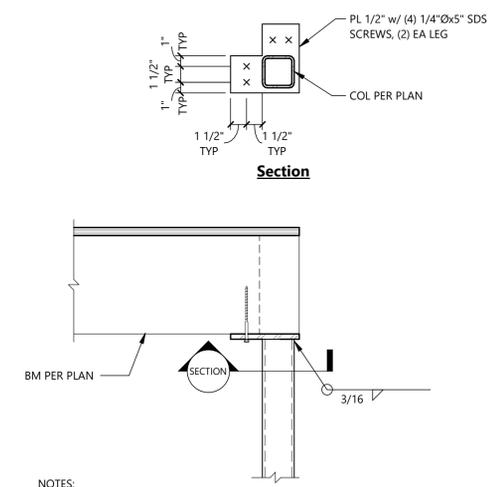
**STRUCTURAL  
STEEL DETAILS**

Sheet Number

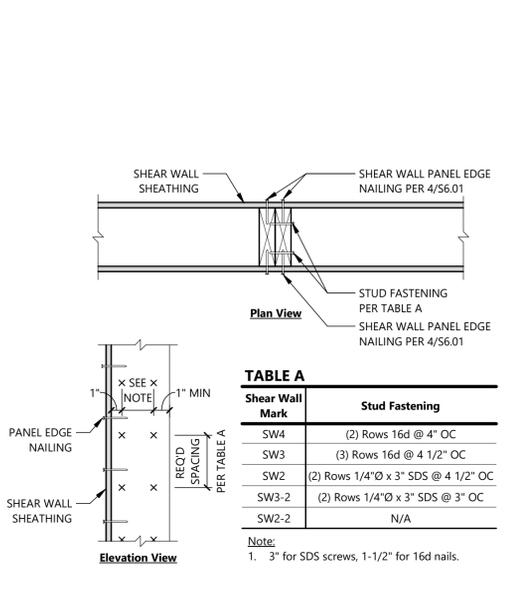
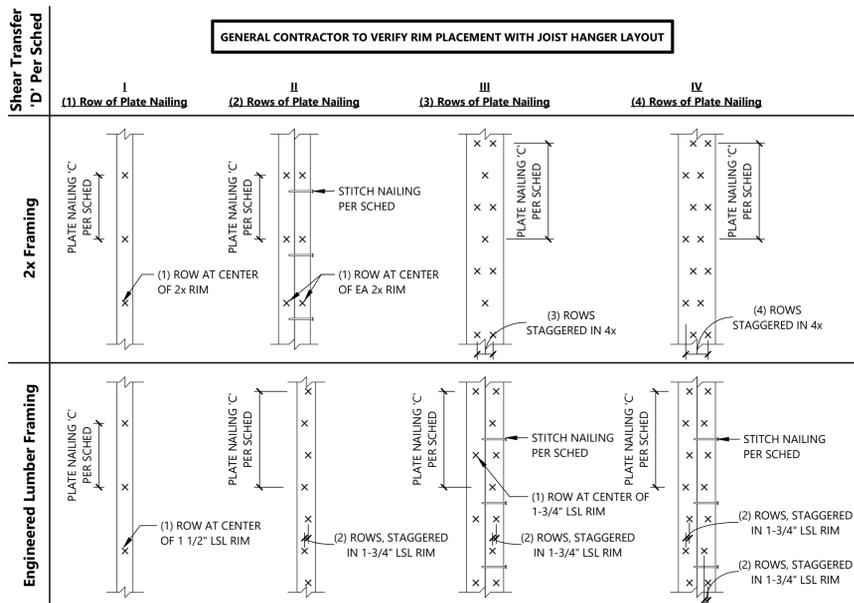
**S5.1**



**11** Column Base Detail  
Scale: 1 1/2" = 1'-0"



**12** HSS Connection at Top of Col  
Scale: 1 1/2" = 1'-0"



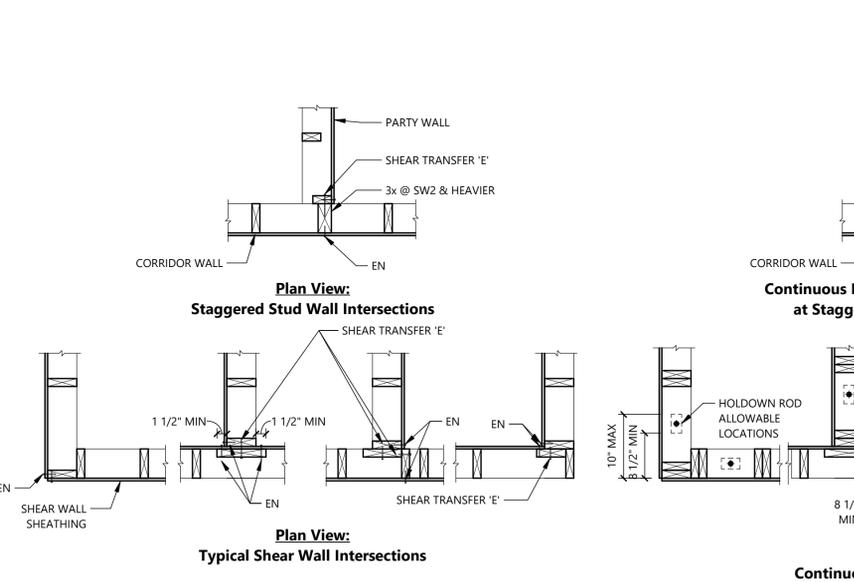
**TABLE A**

Shear Wall Mark	Stud Fastening
SW4	(2) Rows 16d @ 4" OC
SW3	(3) Rows 16d @ 4 1/2" OC
SW2	(2) Rows 1/4"Ø x 3" SDS @ 4 1/2" OC
SW3-2	(2) Rows 1/4"Ø x 3" SDS @ 3" OC
SW2-2	N/A

Note:  
1. 3" for SDS screws, 1-1/2" for 16d nails.

1 Typical Shear Wall Schedule - Plate Nailing Details  
Scale: 1 1/2" = 1'-0"

2 Alternative Built-up 2X Option at Abutting Panel Edge  
Scale: 1 1/2" = 1'-0"



5 Holddown Anchor Placement at Shear Wall Intersections  
Scale: 3/4" = 1'-0"

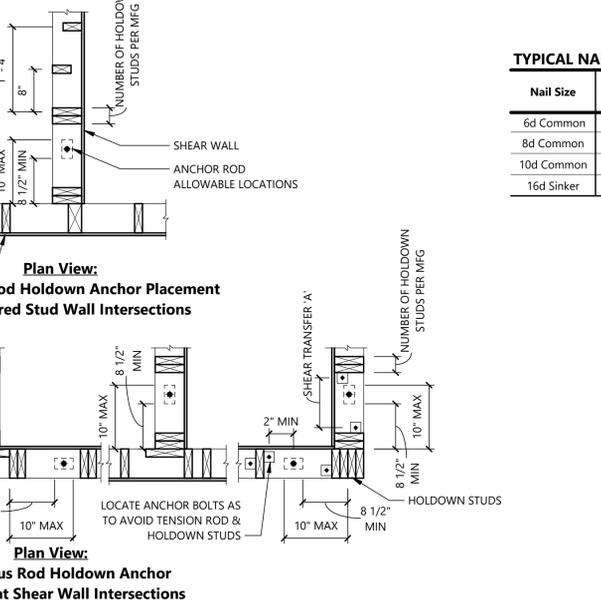
**ROUGH WINDOW SILL**

Horiz Rough Opening	Number of Sills Req'd	End Attachment	Reference
0'-0" to 6'-0"	1	(2) 16d end nails	11/S6.1
> 6'-0"	2	(2) 16d end nails + A35 each end @ each sill	11/S6.1

**HEADER END NAILING**

Nominal Depth	End Attachment
4	(4) 16d
6	(6) 16d
8	(8) 16d
10	(10) 16d
12	(12) 16d
14	(14) 16d
16	(16) 16d
18	(18) 16d

9 Header End Nailing  
Scale: NTS



**TYPICAL NAIL LENGTH TABLE**

Nail Size	Nail Diameter	Typical Nail Length (UNO)
6d Common	0.113"Ø	2"
8d Common	0.131"Ø	2 1/2"
10d Common	0.148"Ø	2 1/4"
16d Sinker	0.148"Ø	3 1/4"

**(MINIMUM FASTENING SCHEDULE (UNO) PER IBC 2015, TABLE 2304.10.01)**

No.	Connection	Nailing, Location UNO
1	Blocking between joist/rafter or trusses to top plate or other framing above	(3) 8d, toenail each end
2	Blocking between joist/rafter or trusses not at the wall top plate, to rafter or truss	(2) 8d, toenail each end
3	Flat blocking to truss and web filler	16d face nail
4	Joists to top plate or girder	(3) 8d, toenail
5	Ceiling joist not attached to parallel rafter, laps over partitions (no thrust)	(3) 16d
6	Collar tie to joist/rafter	(3) 10d
7	Roof truss to top plate	(3) 10d, toenail
8	Roof joist/rafter to ridge valley or hip rafters; or roof rafter to 2" ridge beam	(2) 16d, end nail
9	Stud to stud (not at shear walls)	16d @ 24" O.C., face nail
10	Continuous header to stud	(4) 8d, toenail
11	Top plate to top plate, at end joints	(8) 16d, Each side of end joint, face nail (minimum 24" lap splice length each side of end joint)
12	Sill plate to joist, rim joist or blocking (not at braced wall panels)	16d @ 16" OC, face nail
13	Sill plate to joist, rim joist or blocking at braced wall panels	(3) 16d @ 16" OC, face nail
14	Stud to sill plate	(4) 8d, toenail OR (2) 16d, end nail*
15	Top plate to stud	(2) 16d, end nail
16	Top plates, laps at corners and intersections	(2) 16d, face nail
17	1" brace to each stud and plate	(2) 8d, face nail
18	1" x 6" sheathing or less to each bearing	(2) 8d, face nail
19	1" x 8" and wider sheathing to each bearing	(3) 8d, face nail
20	Joist to sill, top plate or girder	(3) 8d, toenail
21	Rim joist, or blocking to top plate, sill or other framing below	8d @ 6" OC, toenail
22	1" x 6" subfloor or less to each joist	(2) 8d, face nail
23	2" subfloor to joist or girder	(2) 16d, blind and face nail
24	2" planks (plank & beam - floor & roof)	(2) 16d, each bearing, face nail
25	Built-up girders and beams, 2" lumber layers	20d @ 32" OC, face nail at top and bottom staggered on opposite sides and (2) 20d at ends of each splice
26	Ledger strip supporting joists or rafters	(3) 16d, each joist or rafter, face nail
27	Joist to rim joist	(3) 16d, end nail
28	Bridging or blocking to joist	(2) 8d, each end, toenail

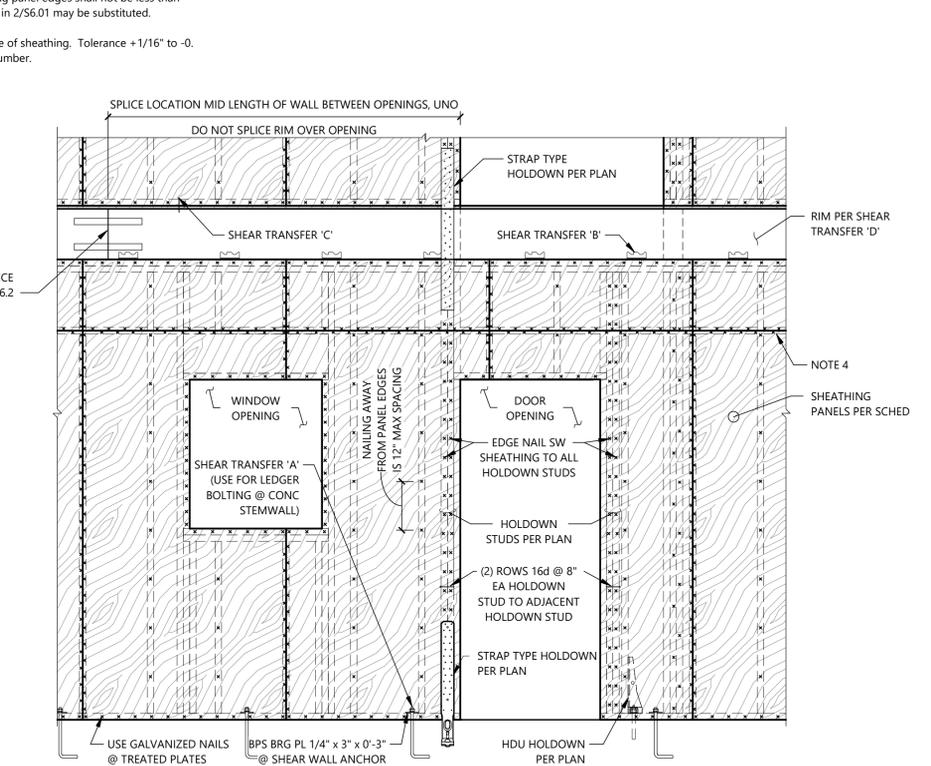
\*Use (4) 16d end nail studs to top and sill plates at 2x10 studs

**SHEAR WALL SCHEDULE (DOUG FIR FRAMING)**

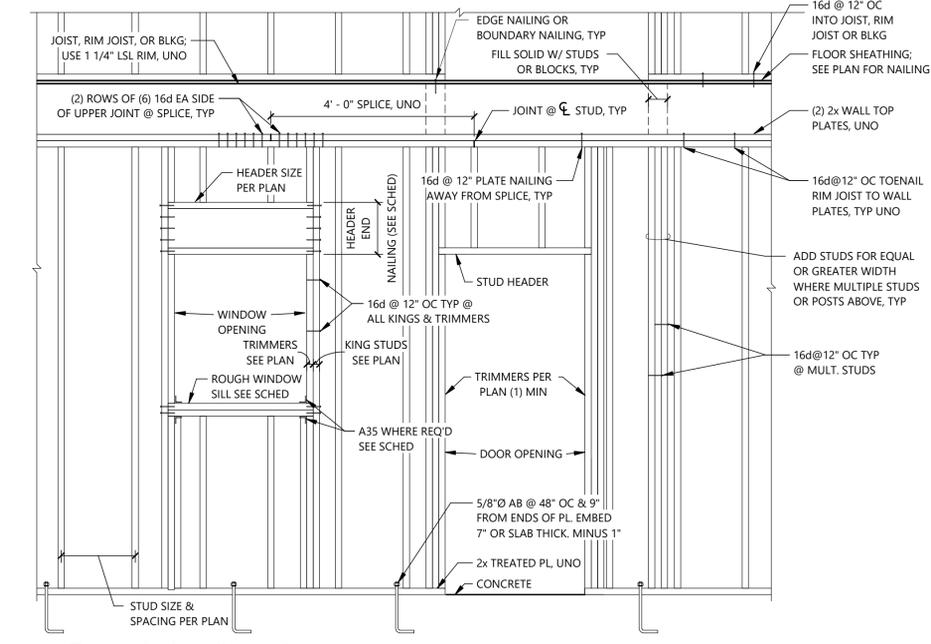
Mark	Sheathing (15/32" Plywood)	Nailing		Framing			Shear Transfer			Capacity (ASD)			
		(EN) Edge	Field	Min Stud & Blkg at Panel Edges	Sill Plate	Top Plates	(A) Sill Pl to Concrete	(B) Rim/Joist/Blkg to Top Pl	(C) Sill Pl to Rim/Joist/Blkg (See 1/S6.1)	(D) Rim Below Sill Pl (See 1/S6.1)	(E) Shearwall Intersections	Seismic	Wind
SW6	(1) Side	10d @ 6"	10d @ 12"	2x	2x	(2)2x	5/8"Ø Anchor Bolt @ 41"	A35 @ 26" or LTP4 @ 20"	16d @ 4" or 1/4"Ø x 6" SDS screw @ 14"	I	16d @ 4" or 1/4"Ø x 6" SDS screw @ 13"	310 plf	435 plf
SW4	(1) Side	10d @ 4"	10d @ 12"	3x	2x	(2)2x	5/8"Ø Anchor Bolt @ 27"	A35 @ 18" or LTP4 @ 13"	(2) Rows 16d @ 6" or 1/4"Ø x 6" SDS screw @ 9"	II or I	(2) ROWS 16d @ 6" or 1/4"Ø x 6" SDS screw @ 8"	460 plf	645 plf
SW3	(1) Side	10d @ 3"	10d @ 12"	3x	2x	(2)2x	5/8"Ø Anchor Bolt @ 21"	A35 @ 13" or LTP4 @ 10"	(2) Rows 16d @ 5" or 1/4"Ø x 6" SDS screw @ 7"	II or I	(2) ROWS 16d @ 5" or 1/4"Ø x 6" SDS screw @ 6"	600 plf	840 plf
SW2	(1) Side	10d @ 2"	10d @ 12"	3x	2x	(2)2x	5/8"Ø Anchor Bolt @ 16"	A35 @ 10" or LTP4 @ 7"	(3) Rows 16d @ 6" or (2) Rows 1/4"Ø x 6" SDS screws @ 10"	III or II	1/4"Ø x 6" SDS screw @ 5"	770 plf	1078 plf
SW4-2	(2) Sides	10d @ 4"	10d @ 12"	3x	3x	(2)2x	5/8"Ø Anchor Bolt @ 15"	A35 + LTP4 @ 13"	(3) Rows 16d @ 5" or (2) Rows 1/4"Ø x 6" SDS screws @ 9"	III or II	1/4"Ø x 6" SDS screw @ 4"	920 plf	1288 plf
SW3-2	(2) Sides	10d @ 3"	10d @ 12"	3x	3x	(2)2x	5/8"Ø Anchor Bolt @ 15"	A35 + LTP4 @ 10"	(4) Rows 16d @ 5" or (2) Rows 1/4"Ø x 6" SDS screws @ 7"	IV or II	1/4"Ø x 6" SDS screw @ 3"	1200 plf	1680 plf
SW2-2	(2) Sides	10d @ 2"	10d @ 12"	3x	3x	(2)2x	5/8"Ø Anchor Bolt @ 12"	A35 + LTP4 @ 8"	(4) Rows 16d @ 4" or (3) Rows 1/4"Ø x 6" SDS screws @ 8"	IV or III	1/4"Ø x 6" SDS screw @ 2"	1540 plf	2155 plf

**SHEAR WALL SCHEDULE NOTES:**

- In addition to framing requirements of 11/S6.11, provide framing at shear walls as indicated.
- See schedule for sheathing and nailing requirements. Lumber grade as indicated or better. Stagger panel joint each side of wall where sheathing is required both sides of wall.
- All framing members receiving edge nailing from abutting panel edges shall not be less than sizes indicated. In lieu of 3x studs, 2/5/6.1 studs shown in 2/S6.01 may be substituted.
- Block all panel edges.
- Nail sizes per nail size table. Drive all nails flush with face of sheathing. Tolerance +1/16" to -0. Stagger nailing where necessary to prevent splitting of lumber.
- Plates on concrete shall be treated. See general notes.
- Connect sheathing & studs at shear wall intersections as indicated.
- Where only one holdown is specified, locate on open-side of holdown studs. See wall elevation.
- The plans and sections shown here schematically demonstrate the typical connection designed by the Engineer of Record. Alternate connections must be approved in writing by the Engineer prior to construction.



7 Shear Wall Framing w/ Holddowns  
Scale: NTS



11 Typical Wall Framing  
Scale: NTS

Engineer's Stamp



Project Title

**HARRIS REMODEL**

1640 72nd Ave SE  
Mercer Island, WA 98040

Project Information

Project No. 21-127-01  
Checked By KA  
Issue  
Permit Set 10/01/2021

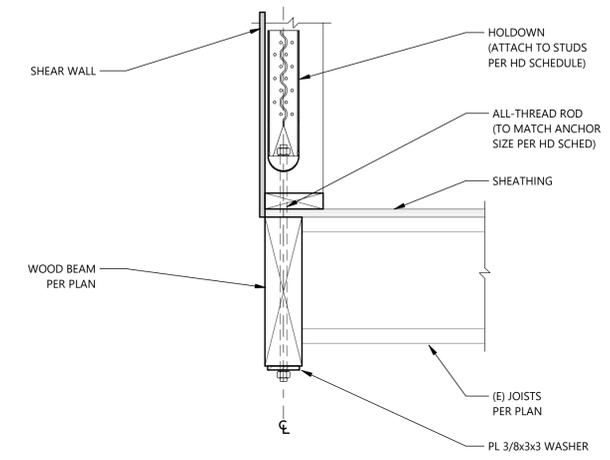
Department Approval

Sheet Title

**STRUCTURAL WOOD DETAILS**

Sheet Number

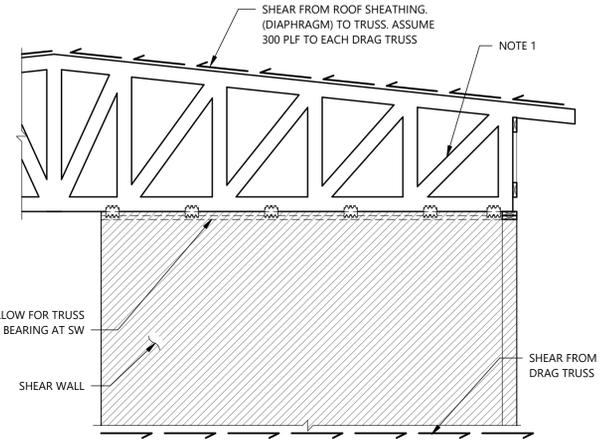
**S6.2**



**HOLDOWN SCHEDULE**

Mark	Framing Attachment		Anchorage		
	M	Fasteners (SDS 1/4 x 2 1/2)	D	Anchor Type	Embed
HDU2	1 3/4"	6	4 1/4"	5/8"Ø	1'-6"
HDU4	1 3/4"	10	4 1/4"	5/8"Ø	1'-6"
HDU5	1 3/4"	14	4 1/4"	5/8"Ø	1'-6"
HDU8	1 3/4"	20	4 1/4"	7/8"Ø	1'-6"
HDU11	1 3/4"	30	4 1/4"	1"Ø	1'-6"

- NOTES:**
- INSTALL ALL HOLDOWNS PER MANUFACTURER'S INSTRUCTIONS.
  - PLACEMENT OF ALL ANCHORS IS BASED ON CAST-IN-PLACE INSTALLATION, UNO, POST-INSTALLED ANCHORS SHALL NOT BE INSTALLED WITHOUT PRIOR APPROVAL OF ENGINEER OF RECORD.
  - "M" INDICATES MINIMUM DEPTH OF WOOD FRAMING MEMBER ATTACHED TO HOLDOWN. ALL FRAMING MEMBERS SHALL BE DOUG-FIR, UNO.
  - "D" INDICATES MINIMUM DISTANCE FROM END OF CONCRETE WALL/FOOTING AT CORNER AND WALL END CONDITIONS. REFER TO ELEVATION AND SECTION FOR PLACEMENT DETAILS. UNLESS NOTED OTHERWISE, THE DISTANCE FROM ANY ANCHOR TO THE END OF CONCRETE WALL/FOOTING SHALL BE NO LESS THAN TWICE THE EMBEDMENT DEPTH NOTED IN THE SCHEDULE.

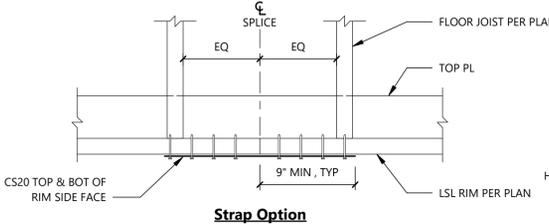


- NOTES:**
- DESIGN EACH SHEAR TRUSS TO TRANSFER 300 PLF HORIZONTAL FORCE BETWEEN TOP & BOTTOM CHORDS.

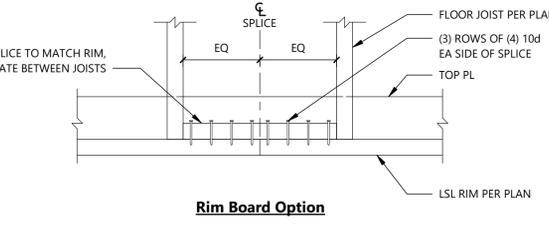
**2 Typical Holdown to Wood Beam**  
Scale: 1 1/2" = 1'-0"

**3 Typical Holdown Schedule**  
Scale: 3/4" = 1'-0"

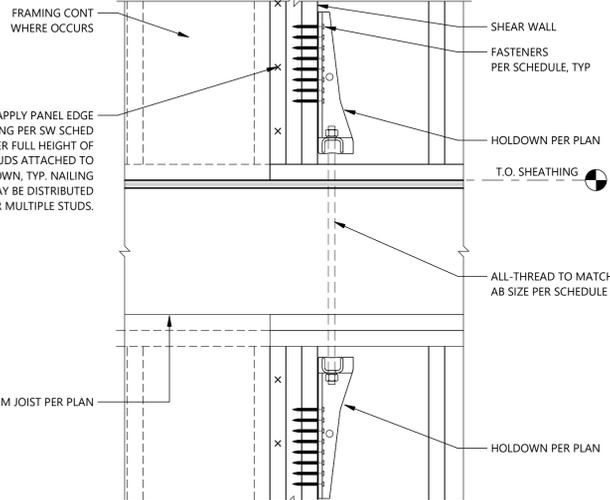
**4 Drag Truss**  
Scale: 3/8" = 1'-0"



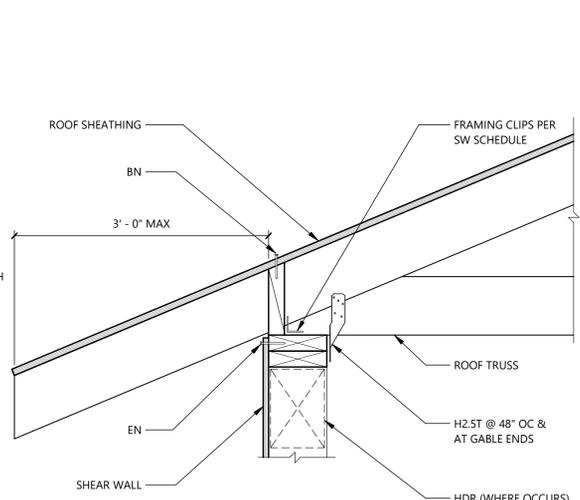
**Strap Option**



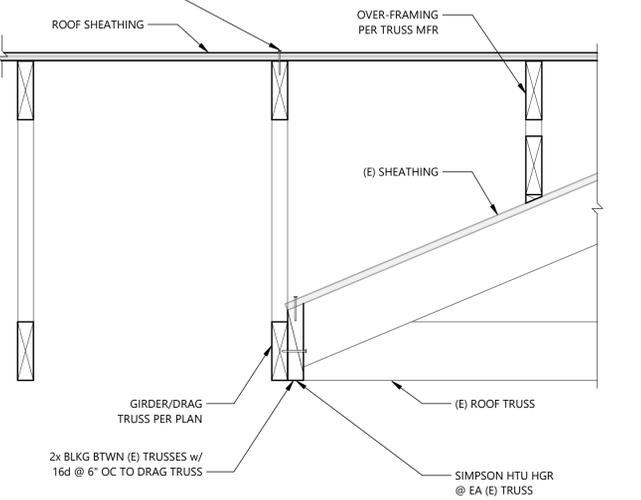
**Rim Board Option**



**6 Typical Holdown at Wood Wall**  
Scale: 1 1/2" = 1'-0"

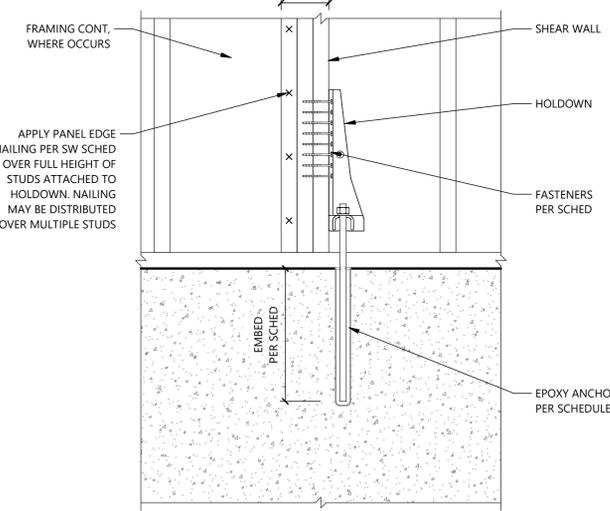


**7 Typical Roof Truss Perp**  
Scale: 1 1/2" = 1'-0"



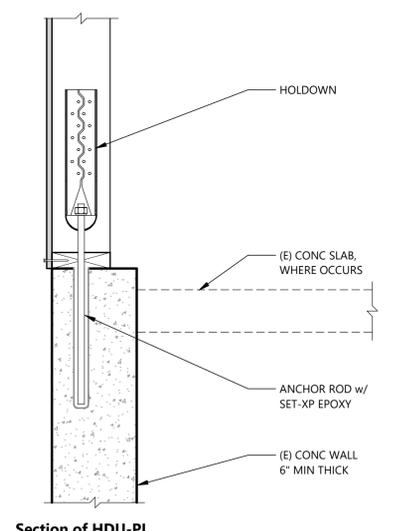
**8 Typical Roof Truss Perp to Parallel**  
Scale: 1 1/2" = 1'-0"

**5 Typical Rim Splice**  
Scale: 1 1/2" = 1'-0"



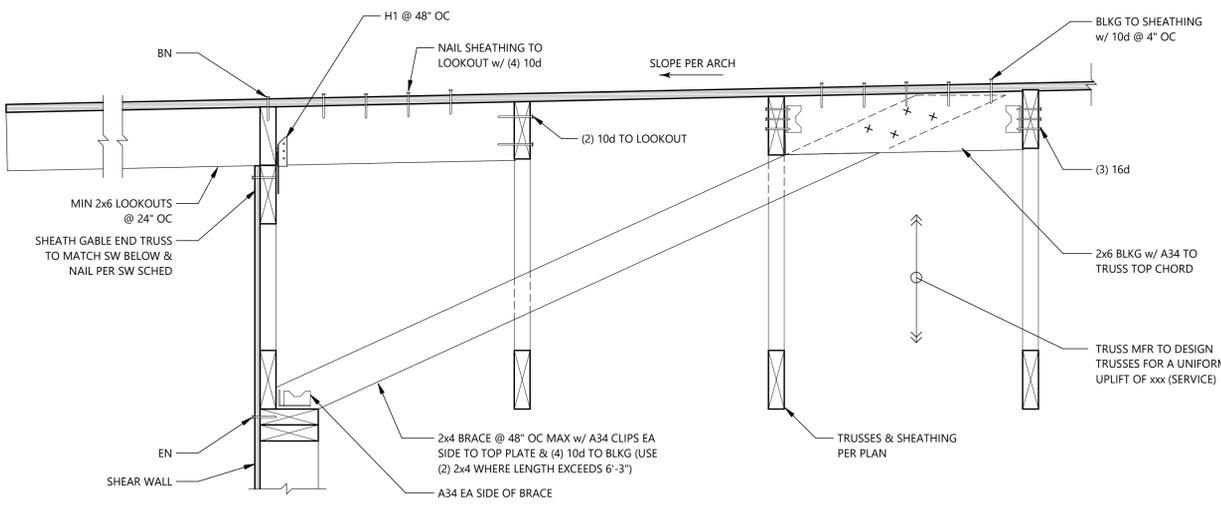
**HDU-PI Elevation**

**9 Typical Holdown - Post-Installed**  
Scale: 1 1/2" = 1'-0"



**Section of HDU-PI**

**11 Typical Roof Truss Parallel**  
Scale: 1 1/2" = 1'-0"



Engineer's Stamp



Project Title

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Project Information

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Issue

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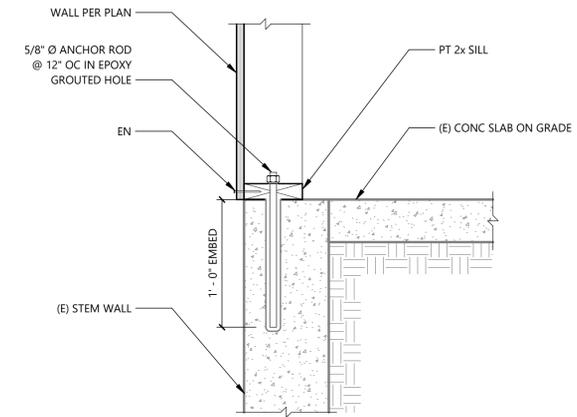
Department Approval

Sheet Title

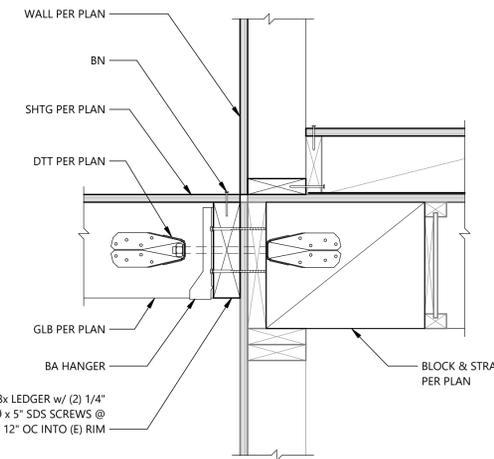
**STRUCTURAL WOOD DETAILS**

Sheet Number

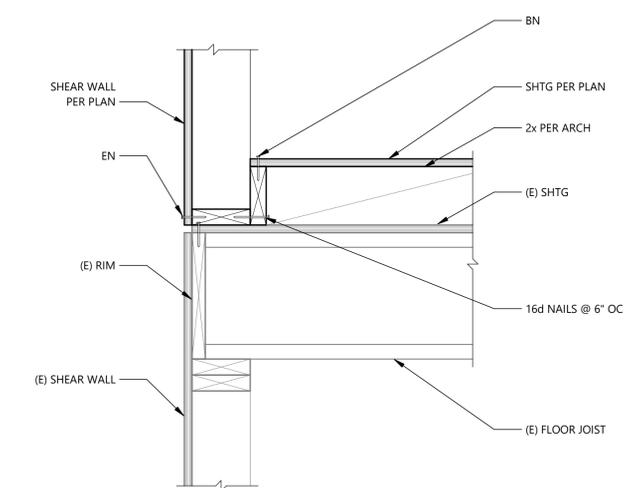
**S6.3**



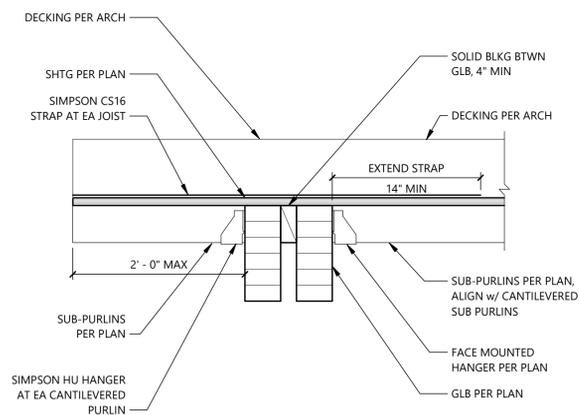
**4 Exterior Wall at Patio**  
Scale: 1 1/2" = 1'-0"



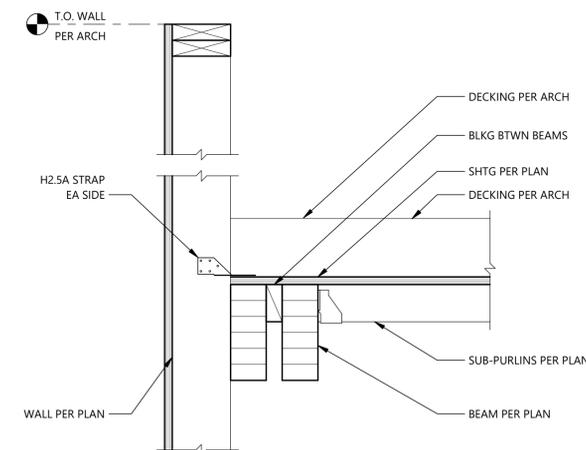
**7 Deck Framing at Exterior Wall**  
Scale: 1 1/2" = 1'-0"



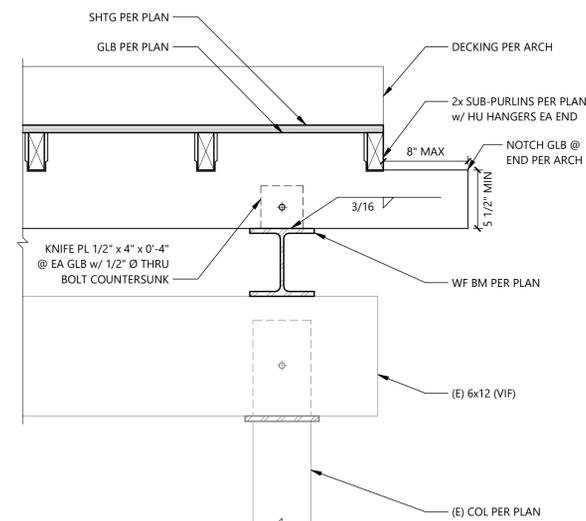
**8 Exterior Wall Framing**  
Scale: 1 1/2" = 1'-0"



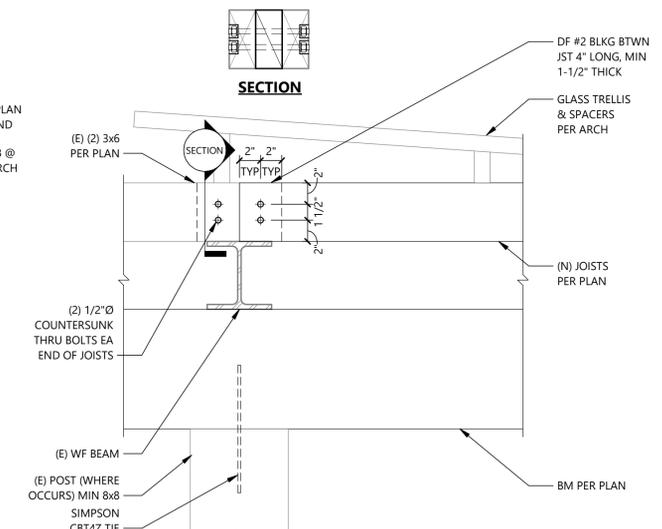
**9 Deck Framing at Cantilever**  
Scale: 1 1/2" = 1'-0"



**10 Deck Framing**  
Scale: 1 1/2" = 1'-0"



**11 Deck Framing**  
Scale: 1 1/2" = 1'-0"



**12 Trellis Framing**  
Scale: 1 1/2" = 1'-0"